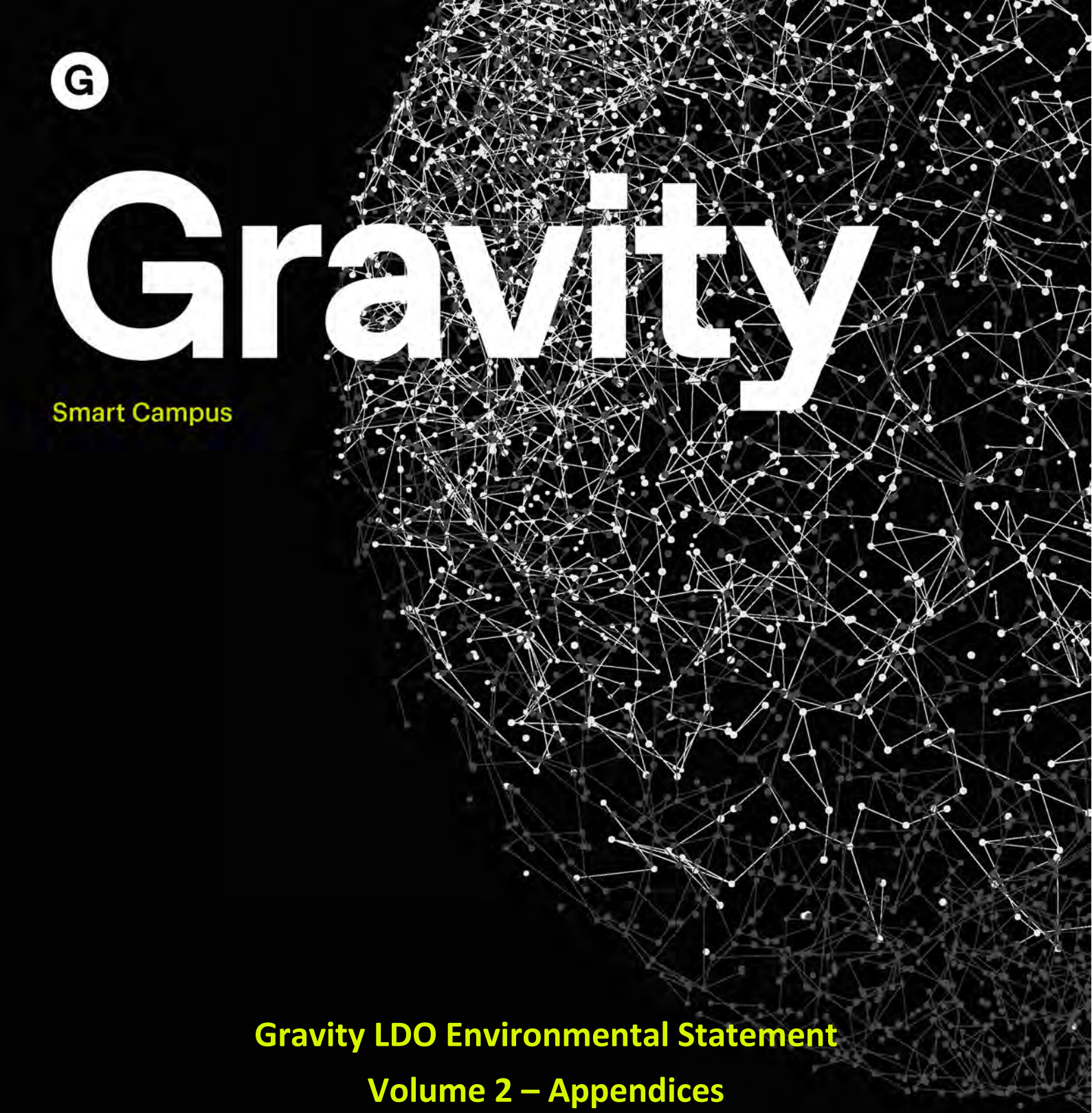


Gravity

Smart Campus

Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.1

Habitat Survey Report

CONTENTS

PLANS

APPENDICES

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.3. Habitat Survey Report

1.3.1. This document describes the results of ecological baseline habitat survey work undertaken and provides a broad assessment of the current ecological

interest of the Site as a whole, based upon field and desk-based studies. The importance of the habitats within the site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1. The methodology utilised for the survey work undertaken can be split into three areas, namely desk study, habitat survey, and faunal surveys. These are discussed in more detail below.

2.2. Desk Study

2.2.1. In order to compile background information on the sites and their immediate surroundings including species and habitat records, Ecology Solutions contacted Somerset Ecological Records Centre (SERC).

2.2.2. Further information on designated sites from a wider search area was obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC)[2] database. This information is reproduced where appropriate on Plan ECO1, Plan ECO2 and at Appendix 12.1A.

2.2.3. As part of the preliminary appraisal of the Site and to determine the scope and methodologies of further survey effort, the historic survey information available from ES Chapter and other intervening *Ad hoc* survey work has been reviewed.

2.3. Habitat Survey Methodology

2.3.1. Habitat surveys have been undertaken throughout 2020 and 2021 to ascertain the general ecological value of the Site and to identify the main habitats and associated plant species.

2.3.2. The site was surveyed based around extended Phase 1 survey methodology[3], as recommended by Natural England, whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential which require further survey. Any such areas identified can then be examined in more detail.

2.3.3. Using the above method, the site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified.

2.3.4. All the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent at different seasons. Nonetheless, the timing of the surveys undertaken allows for habitats present to be identified and as such it is considered that a robust appraisal has been made of the habitat interest.

[2] http://magic.defra.gov.uk

[3] Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit*. England Field Unit, Nature Conservancy Council, reprinted JNCC, Peterborough.

3. ECOLOGICAL FEATURES

3.1. The Site was subject to numerous ecological surveys since 2008, with initial work undertaken by EPI and subsequent update work carried out by Ecology Solutions in 2011 and 2017 to document any material changes have occurred within the Site. Over this period the Site has experienced a change in land use, with the decommissioning of the original BAE facility and the remediation of contaminated land within the ROF site. In the wider Site boundary, construction of the new road connection in the southwest and clearance related to the Hinckley 'C' grid connection has commenced. As such, the extent and condition of some habitats previously recorded have changed recently.

3.2. The vegetation present enabled the habitat types to be satisfactorily identified and an accurate assessment of the ecological interest of the habitats to be undertaken.

3.3. The following main habitat / vegetation types were identified:

- Improved Grassland;
- Semi-Improved Grassland;
- Amenity / Rough Grassland;
- Marshy Grassland;
- Plantation Woodland / Orchard;
- Trees;
- Scrub;
- Hedgerows;
- Tall Ruderal Vegetation;
- Ephemeral / Short Perennial Vegetation;
- Standing Water;
- Reed Bed;
- Bare Ground;
- Seasonal Wet Ditches / Dry Ditches; and
- Buildings and Hardstanding.

3.4. Each habitat present is described below with an account of their representative plant species. The location of these habitats is shown on Plan ECO3.

3.5. Consideration of the habitats present within areas of the Site that are also designated for their nature conservation interest are discussed further within section 5 of this report.

<u>Improved Grassland</u>

3.6. The majority of the fields within the Site including the fields in the south east, north east and north west of the Site are cattle, sheep or horse grazed pastures. This reflects the main land use of the wider landscape within which the Site is located. This habitat is typically intensively managed, either as grazing or as a combination of grazing and forage harvesting.

3.7. The grassland sward is typically species-poor as a result of the management / grazing regime in place. Perennial Rye *Lolium perenne* is typically dominant throughout, however localised patches of relatively higher herb content occur

within certain fields particularly where management is not as intensive. Equally, localised patched of pernicious weed species are also present.

Semi-Improved Grassland

3.8. There are areas of this habitat throughout the Site. These grassland areas are typically grazed (less intensively as improved grasslands) or cut for hay / silage.

3.9. These grasslands display a relatively greater floral diversity than the improved grasslands onsite, although the quality is variable across the Site. Areas of greater overall quality are limited to the north west of the Site in fields adjacent to the GCN pond mitigation area and the small field in the south of the Site known as the 'Puriton Cowslip Field'. Other areas of semi-improved grassland are of lower relative quality and are considered to be species-poor semi-improved grassland.

3.10. As noted above, the species composition of the semi-improved grassland varies somewhat across the Site. The species present are typical of the National Vegetation Classification habitats MG5 and contain species such as Species recorded include; Perennial Rye, False-oat Grass *Arrhenatherum elatius*, Meadow Foxtail *Alopecurus pratensis*, Meadow Barley *Hordeum brachyantherum*, Yellow Oat *Trisetum flavescens*, Common Mousear *Cerastium fontanum*, Field Bindweed *Convolvulus arvensis*, Hogweed *Heracleum sphondylium*, Cock's-foot *Dactylis glomrata*, Creeping Thistle *Cirsium arvense*, Meadow Vetchling *Lathyrus pratensis*, Red Fescue *Festuca rubra,* Tall Fescue *Festuca arundinacea*, Common Ragwort *Jacobaea vulgaris*, Hoary Ragwort *Jacobaea erucifolia*, Pyramidal Orchid *Anacamptis pyramidalis*, Oxeye Daisy *Leucanthemum vulgare* and False Fox Sedge *Carex obtubrae*.

Amenity / Rough Grassland

3.11. A large component of the grassland within the Site is associated with now mostly demolished buildings and internal road network related to the Sites former use. These amenity grasslands were formerly intensively managed, with a short, even and low diversity sward maintained. However, since the cessation of regular mowing, rough grassland has developed in many of these areas.

3.12. The botanical composition has been affected by both the regular mowing regime in the past and intensive grazing by rabbits. The mounds surrounding a number of existing buildings within the Site were originally constructed from both on-site and imported material, resulting in a variety of plant communities, from species-poor swards to relatively herb-rich communities. However, the majority of this grassland consists or Perennial Rye, Red Fescue, Yorkshire Fog, Daisy and Creeping Buttercup *Ranunculus repens* with rough grassland elements containing Cock's Foot and False Oat Grass. In some areas the rough grassland has developed into tall ruderal communities.

Marshy Grassland

3.13. The most extensive area of this habitat is present to the north and west of the 37 Club (west of the existing Site entrance). An area of marshy grassland was also created as part the GCN mitigation area in the north west of the Site.

3.14. The land to the north and west of the 37 Club contains habitats indicative of wetter ground. These areas contain a mix of communities that have developed, likely to a lack of regular management and/or the variations in hydrology. Vegetative communities range from scrub, ruderal species, rush pasture and wet grassland.

3.15. The wettest areas contain areas of tall herb and sedges, often forming dense stands of vegetation dominated by a limited number of species. Notably, dense areas of Greater Pond Sedge *Carex riparia* and Soft Rush *Juncus effusus* were recorded. Other species recorded in these areas include; Hemlock Water-dropwort *Oenanthe crocata*, Bittersweet *Solanum dulcamara*, Ragged Robin *Silene flos-cuculi*, Great Willowherb *Epilobium hirsutum*, Teasel *Dipsacus fullonum*, Common Nettle *Urtica dioica*, Water Figwort *Scrophularia umbrosa*, Field Horsetail *Equisetum arvensis* and Reedmace *Typha latifolia*.

3.16. Other areas support species or communities associated with drier conditions or are tolerant of occasional, or seasonal inundation / waterlogging. Species recorded include; Common Ragwort, Chickweed *Stellaria media*, Creeping Buttercup, Creeping Cinquefoil *Potentilla reptans*, Selfheal *Prunella vulgaris*, Common Spikerush *Eleocharis palustris*, Square-stalked Willowherb *Epilobium tetragonum*, Yorkshire Fog, Great Willowherb, Common Mousear, Hard Rush *Juncus inflexsus*, Short-fruited Willowherb *Epilobium obscurum*, White Clover, Spear Thistle *Cirsium vulgare*, Prickly Sedge *Carex muricata* agg., Hairy Sedge *Carex hirta*, Ground Ivy *Glenchoma hedera*, Cut-leaved Cranesbill *Geranium dissectum*, False Fox Sedge, Soft Rush, Broad-leaved Dock *Rumex obtusifolius*, Curled Dock *Rumex crispus*, Red Fescue, False Oat Grass, Creeping Thistle, Meadow Barley and Common Fleabane *Pulicaria dysenterica*,

3.17. The marshy grassland associated with the GCN mitigation area in the north west of the Site consisted of a similar compliment of species as described above. Although additional species present include; Quaking Grass *Briza media*, Sweet Vernal Grass *Anthoraxum odoratum*, Tufted Hair-grass *Deschampsia cespitosa*, Meadowsweet *Filipendula ulmaria*, Oxeye Daisy, Greater Bird's-foot Trefoil *Lotus pedunculatus*, Cowslip *Primula veris* and Common Sorrel *Rumex acetosa*.

<u>Plantation Woodland / Orchard</u>

3.18. There are discrete blocks of plantation woodland present throughout the Site, with larger areas present in the north west and south east and smaller isolated blocks scattered elsewhere within the Site. Given the nature of the plantation, the woodlands lack structural, age and species diversity.

3.19. In the north western part of the ROF site this habitat is more mature and is dominated by Poplar species *Populus nigra* and *Populus alba*. Throughout the rest of the ROF site, the plantation contains a mixture of native and non-native species, including Ash *Fraxinus excelsior*, Field Maple *Acer campestre*, Small-leaved Lime *Tilia cordata*, Silver Birch *Betula pendula*, Rowan *Sorbus aucuparia*, Black-poplar *Populus nigra*, Alder *Alnus glutinosa*, Pedunculate Oak *Quercus robur* and Sycamore *Acer pseudoplatanus*.

3.20. Due to low ambient light levels there are few understorey species, although tall herbs and Bramble *Rubus fruticosus* agg. scrub is present in many areas along the edge of plantation.

3.21. A remnant orchard is located to the south east of the Site. This area contains relatively few orchard trees (*Malus* sp.) while the remaining area consists of a mix of scrub, tall ruderal and semi-improved grassland.

Trees

3.22. Outside of the woodland, orchard and hedgerow treelines, there are relatively few mature trees within the Site.

3.23. Within the ROF site and along the approach roads, there are tree lined avenues consisting primarily of Horse Chestnut *Aesculus hippocastanum*. The majority of the trees present have been subject to pollarding, that had ceased in recent years resulting in an increased risk of structural failure as the pollards over mature. As such, an arboricultural management regime has initiated as of 2020. This has involved selective thinning of tree crowns and reinstating pollard management where possible.

3.24. In general, above the bole, the main branches lack any loose bark, cracked limbs or obvious holes. However, in some instances where specimens contained dead wood, conspicuous cracks and holes have been identified. As part of the ongoing management, this dead wood is to be removed or the tree removed entirely, where necessary. The removal of these features was facilitated by detailed internal inspections in search of evidence for potential roosting bats. Further details on the survey is provided below.

3.25. Other standard trees present along the roads within the ROF site include; Tulip Tree *Liriodendron tulipifera*, Gum Tree *Liquidambar* sp., Cherry *Prunus avium* and Leyland Cypress *Cupressus* × *leylandii*. None of these trees are considered to offer any suitable roost features for bats.

Scrub

3.26. Large areas of dense scrub are present across the Site. Furthermore, given the recent change in use of the Site and current construction activities underway, the extent of this habitat has varied over time. Scrub is also found in smaller patches throughout the Site, often alongside buildings which have been decommissioned and ditches.

3.27. The scrub is typically dominated by Bramble, most notably in areas that have been subject to recent clearance or in areas where no recent management has taken place. Other areas of more mature scrub present within the site consist of Goat Willow *Salix caprea*, Grey Willow *Salix cinerea*, Hawthorn *Crataegus monogyna*, and Blackthorn *Prunus spinosa*.

3.28. The railway corridor to the north-west of the Site has also been subject to extensive encroachment by scrub. The footprint of the (now removed) railway track is formed of railway ballast that remains free of scrub in areas, although Bramble has spread over significant portions of it. Areas adjacent have developed into dense scrub and is formed of Goat Willow, Hawthorn, Blackthorn and Field Maple.

Hedgerows

3.29. In line with the broad definition of hedgerows utilised by EPI, hedgerows identified within the Site include traditional hedgerows, tree belts and belts of woody scrub that form boundary features.

3.30. Hedgerows are largely isolated from one another across the Site, with low levels of connectivity. However, the complex of fields to the south east of the Site and along the route of the new access road are typically bound by hedges. However, it should be noted that these areas are currently subject to construction activities requiring the removal of hedgerow sections.

3.31. Construction activity related to the Hinkley Point C Connection Project, is currently underway in the south east of the Site. This project has required the removal of several hedgerows along the corridor of the connection route. The hedgerows in this area vary in species composition and structure, with a mix of treelines and hedges with trees also present. Species present include; Blackthorn, Hawthorn, Wild Privet *Ligustrum vulgare*, Elder *Sambucus nigra*, Field Maple; Elm *Ulmus procera*, Hazel *Corylus avellena*, Wayfaring Tree *Viburnum lantana*, Ash, Bramble, Sycamore *Acer pseudoplatanus*, Horse Chestnut and Dogwood *Cornus sanguinea*.

3.32. To the south west of the Site, the road connection from the Site to Junction 23 of the M5 motorway is under construction. This development also required the removal of section of hedgerow along the road corridor. The hedgerows within this part of the Site are generally in poor condition, with poor structure and low species diversity, consisting mainly of Hawthorn.

3.33. It is evident that hedgerows within the main part of Site have been subject to variable management over recent years; the majority are either open based and forming a canopy, or have broadened into more substantial corridors as a result of encroachment into areas of former grassland. Most hedgerows within the Site have limited botanical diversity consisting mainly of Hawthorn, Blackthorn and Bramble.

3.34. Hedgerow features are described further within Appendix 12.1B.

Tall Ruderal

3.35. Patches of tall ruderal vegetation are present across the Site in locations where disturbance has occurred, notably in the northern, central and western parts of the Site. In addition, ruderal vegetation has become established in areas where mowing and cattle grazing has been reduced or excluded. Tall ruderal communities have also developed on areas of cleared ground and stockpiled material.

3.36. Species present include Common Nettle *Urtica dioica*, Hogweed, Great Willowherb, Creeping Thistle *Circium arvense*, Prickly Sow-thistle *Sonchus asper* and Broad-leaved Dock, Hemlock *Conium maculatum*, Vervain *Verbena officinalis*, Teasel, Oxeye Daisy, Common Forget-me-not *Myosotis arvensis*, Common Vetch *Vicia sativa*, Field Bindweed, Cleavers *Galium aparine*, Bristly Oxtongue *Helminthotheca echioides* and Spotted Medick *Medicago arabica*.

Ephemeral / Short Perennial Vegetation

3.37. This habitat is present across the Site although often to a limited extent and persists in areas that are subject to regular disturbance. However, in the south west of the Site, in an area where boiler ash was historically disposed of, a larger area of ephemeral / short perennial vegetation has established. The deep bed of hardcore in this part of the site has slowed scrub encroachment (in the absence of active management) and has promoted the development of ephemeral vegetation.

3.38. The ephemeral vegetation supports a relatively wide diversity of herbs and grasses in localised patches, with many species demonstrating stunted growth due to nutrient deficiency as well as rabbit grazing. Vervain, Bugle *Ajuga reptans*, Common Stork's-bill *Erodium cicutarium*, Butterfly Bush *Buddleja davidii*, Prickly Sow-thistle, Creeping Cinquefoil *Potentilla reptans* and Ground Ivy *Glechoma hederacea* are present. Most notably the area contains a distinct cover of lichen *Cladonia portentosa* and mosses.

3.39. Although the process of scrub encroachment into this area is slowed due to the ground conditions, a notable amount of scrub have developed, reducing the extent of the open ground vegetation. Furthermore, a landscape bund has been created adjacent to and within the area thereby reducing its overall extent.

Standing Water

3.40. The most prominent water feature is the Borrow Pit located in the east of the Site, which is currently utilised for angling. The pit forms a relatively substantial aquatic habitat supporting a range of plant communities, including open water communities, reedbed and scrub. The open water habitat was recorded to consist of Canadian Pond Weed *Elodea canadensis*, Rigid Hornwort *Ceratophyllum demersum*, Frogbit *Hydrocharis morsus-ranae*, Water Lillie *Nymphaea alba*, Ivy-leaved Duckweed *Lemna trisulca* and Common Duckweed *Lemna minor*. Marginal species include Corky-fruited Water-dropwort *Oenanthe pimpinelloides*, Fool's Watercress *Apium nodiflorum*, Lesser Water-parsnip *Berula erecta*, Watermint *Mentha aquatica*, False Fox Sedge *Carex otrubae* and Gypsywort *Lycopus europaeus*.

3.41. A number of small seasonal ponds are located to the south east of the Site associated with grasslands, hedgerows and orchard. The ponds are generally small and noted to regularly dry out. The ponds commonly support dense vegetation growth, including aquatic, emergent and marginal vegetation, but are generally isolated from other aquatic features within the Site.

3.42. Four ponds have been created in the north west of the Site as part of the GCN mitigation area. These ponds have become well established and are considered to be in good condition. Aquatic and marginal species recorded include; Reedmace, Frogbit, Water Plantain *Alisma plantago-aquatica*, Celery-leaved Buttercup *Ranunculus sceleratus*, Gypsywort and Water-crowfoot *Ranunculus* subgenus *Batrachium*.

3.43. A number of built aquatic features are also present which supported operation of the factory, including save-alls, drainage bunds and emergency fire water tanks. Whilst the save-alls were subject to regular management, some of the other artificial features have not been in operation for an extended period of time.

Reed Bed

3.44. A substantial corridor of reed bed is present to the north of the Site which connects to the River Huntspill to the north. This series of connected reed beds was developed specifically to filter runoff from the site. The reed beds almost exclusively comprise Common Reed *Phragmites australis* although there is some scrub encroachment. As a result of decommissioning operations there has been a significant reduction in through flow.

3.45. There is also an area of extensive reed bed habitat adjacent to the Borrow Pit, as described previously. An invasive species, Himalayan Balsam *Impatiens glandulifera* is present within the reed bed located in this area.

Bare Ground

3.46. As part of the ongoing operation of the Site as well as historic and current remediation and construction works taking place, areas of bare ground have been created. These areas include footprints of demolished buildings, cleared ground, crushed hardcore, stockpiled materials or areas subject to regular disturbance by vehicle movements. These areas are, in the main, devoid of vegetation, although some ephemeral / ruderal species (as described above) occur sparingly across this habitat.

Seasonal Wet Ditches / Dry Ditches

3.47. Across the Site are a number of drainage ditches, forming a network of wetland habitats. Many of these features appear to pre-date the explosives factory, and would have formed part of the 'natural' drainage system of the former agricultural landscape. However, more recent drainage features, associated with the operations of the factory, are also present.

3.48. The more recently engineered drainage features include principal drainage ditches, flowing south to north through the centre of the Site and along the western boundary of the site, and an effluent ditch, which is connected to the reed bed to the north of the Site. A number of older ditches are connected to the effluent ditch.

3.49. In general, the main drainage ditches across the Site are deep, steep sided channels that are permanently wet. They are subject to regular maintenance, including dredging and scrub removal. As such, the vegetation associated with many of these ditches is limited.

3.50. The characteristics of the original 'natural' drainage ditches vary considerably across the Site. A number of ditches have become redundant, and now represent dry ditches. In many cases these are subject to extensive scrub growth, although this is limited where livestock have access.

3.51. Other ditches present within the Site are either seasonally inundated, support flows or permanently support water. Few features support standing water all year round and it is considered that the majority of watercourses only support water for part of the year, typically winter.

3.52. Consequently, the vegetation supported by ditches varies considerably across the Site. Many periodically dry ditches contain communities dominated by Sedges *Carex* sps., Common Reed or Willowherbs *Epilobium* sps., or have been subject to scrub encroachment.

3.53. Ditches supporting water all year round are typically more diverse; these features are most prevalent in the north eastern part of the Site (such as those associated with the Puriton Ponds and Rhynes LWS). Ditches in this area are typically unshaded, with wide channels and shallow banksides. Species associated with the ditches include; Greater Pond Sedge, Lesser Pond Sedge *Carex acutiformis*, Common Reed, Duckweed *Lemna* sp., Reedmace, Frogbit, Water Crowfoot and Water Plantain.

Buildings and Hardstanding

3.54. There are a number of buildings / buildings complexes remaining within the Site, although the majority of the previously existing buildings have been demolished. Those remaining are described below and shown graphically on Plan ECO3.

3.55. Building **B1** is known as the 37 Club and is a social and function venue. The building is a single storey structure with a complex shape that is of varied construction. The building is primarily of rendered brick construction with a mix of flat and pitched roof structures. The majority of the roof is felt covered, with smaller areas that are tiled.

3.56. Previous evidence (from 2008) of bat droppings was recorded on part of the roof edge, although subsequent emergence survey work did not record any roosting activity. Internal inspections of the building undertaken in 2020 observed a dead juvenile Pipistrelle below a void near the roof edge previously identified as a roosting location.

3.57. Building complex **B2** is formed of a gate house and reception with other smaller storage buildings. The buildings are all single storey with flat roofs.

3.58. Building **B3** is a disused fire depot. The structure is brick built with steel frames and large garage doors to the southern aspect. The building is currently used for storage.

3.59. Building **B4** is a disused office building with several flat concrete roof sections. No significant enclosed roof voids exist. The structure is understood to be in poor condition with sections of roof susceptible to leaking.

3.60. This building has previously been identified as a bat Brown Long-eared bat roost (in 2008), although further update work (2017) recorded no evidence of use by bats.

3.61. Building **B5** is a large shed comprised of a metal pitched roof structure used for storage as part of construction works.

3.62. Building **B6** is a currently in use as an office building with flat concrete roof sections. No significant enclosed roof voids exist. The building is considered to be in relatively good condition.

3.63. Building **B7** is a disused brick-built structure with concrete roofs without enclosed voids.

3.64. Building **B8** is a disused warhead lining facility that is a double storey brick-built / stell framed structure with a flat roof. The northern aspect consists of a single storey elevation.

3.65. Building **B9** is a disused double storey brick-built structure with a flat roof. The southern elevation is single storey.

3.66. Building **B10** is a residential dwelling location to the south of the Site, along Woolavington Road. The structure is a brick-built, two-storey dwelling with a pitched and tiled roof. A loft void is present. A small single storey, flat roof extension is present on the western aspect. The structure is in a state of disrepair with a number of large holes in the eaves of the roof, creating large access points to the loft void.

3.67. In 2008, abundant Brown Long-eared droppings were recorded within the loft, although subsequent emergence surveys recorded no roosting activity. In 2020 Brown Long-eared bat droppings were again recorded within the loft void.

3.68. A series of other smaller structures including small stores and utilities housings are present around the ROF site. They are predominantly constructed of brick or concrete blocks, with concrete or corrugated composite/iron roofs without enclosed voids.

3.69. In addition, a number of pillboxes are present at the Site boundary. Again, these are typically formed of brick walls with concrete slab roofs. No voids are present, although loopholes and open doorways are usually present. Those that remain are considered to be of no value to roosting bats, due structures providing no perching sites or crevices to shelter within as well as their exposure to climatic changes (e.g. temperature and humidity). However, during inspections undertaken in 2020, two pill boxes (shown as buildings **B11** and **B12**) were noted to have developed suitable perching sites, where part of the concrete ceilings had eroded and exposed the reinforcing metal bar.

3.70. None of the buildings are considered to offer suitable roosting features, except for those with a history of roosting bat evidence being present (**B1**, **B4** and **B10**) and **B11** and **B12** all of which are considered to offer low suitability for roosting bats, except for B10 with is considered to offer moderate roost potential.

3.71. Where these buildings have been removed there are areas of bare ground, cleared land and crushed hardcore.

3.72. Areas of hardstanding in the form of roads, tracks and rail head are distributed throughout the Site.

Priority Habitats

3.73. Of the several habitats identified during survey work a number fulfil criteria for UK priority habitats. The following Priority habitats are identified on Natural England spatial datasets:

- Traditional Orchard;
- Lowland Mixed Deciduous Woodland;
- Coastal and Floodplain Grazing Marsh; and
- Lowland Calcareous Grassland.

3.74. The distributions of these habitats are illustrated within Appendix 12.1A.

3.75. Traditional Orchard is characterised by fruiting trees set within herbaceous vegetation. Trees are grown in low intensity for fruit or nut production rather than timber. Given the presence of fruiting trees and the lack of apparent intensive management it is considered that this Priority Habitat is present in the form of the orchard habitat.

3.76. Lowland Mix Deciduous Woodland include most semi-natural woodland in lowland England. The woods tend to be small and vary greatly in species composition and can include both primary and secondary woodland. Given the broad nature of the Priority Habitat description and the characteristics of the onsite woodlands, it is considered that this Prior Habitat is present onsite in the form of plantation woodland.

3.77. Coastal and Floodplain Grazing Marsh is defined as periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Almost all areas are grazed and some are cut for hay or silage. Seasonal water-filled hollows and permanent ponds with emergent swamp communities, but not extensive areas of tall fen species like reeds. It is considered that this description fits with some areas of semi-improved grassland onsite, although the majority of the improved fields lack the presence of species rich rhynes or emergent swamp vegetation.

3.78. Lowland Calcareous Grassland is defined by the presence of calcareous plant communities with agricultural enclosures as well as other locations such as roadside verges. However, the small area identified within the Puriton Cowslip Field LWS is considered to support semi-improved neutral grassland and it is considered that this Priority Habitat is not present onsite.

3.79. The Natural England spatial datasets also identify areas of good quality semi-improved grassland (a Non Priority Habitat) in association with the fields to the northwest of the Site. However, areas of semi-improved grassland at the Site may be classified under Lowland Meadow, which shares a crossover with good quality semi-improved grassland.

3.80. The extent to which the above priority habitats are considered to be present, based on survey information collected within the Site are shown at Plan ECO4.

3.81. In addition to the above, other habitats within the Site that may fall within Priority Habitat descriptions include:

- Reed bed;
- Ponds;
- Hedgerows; and
- Open Mosaic Habitats on Previously Developed Land (OMHPDL)

3.82. Reedbeds, as defined by UK BAP priority habitat descriptions, are wetlands dominated by stands of the Common Reed that maintain water for the majority of the year. Areas of open water, ditches, wet grassland and carr woodland may be associated with them. Areas of Reedbed were recorded, namely to the north of the Site.

3.83. Ponds, as defined within the UK BAP priority habitat descriptions, are seasonal standing water bodies up to 2 ha in size and which meet at least one of the following criteria:

- Pond habitat is of international importance;
- Is host to floral and faunal species of high conservation importance;
- Exceptional assemblages of key biotic groups;
- Ponds of high ecological quality; and
- Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type or landscape context.

3.84. Ponds recognised for supporting Great Crested Newts (a species of high conservation importance) are considered to meet this criteria.

3.85. All hedgerows consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species are covered by the Priority Habitat. On this basis the Priority Habitat is considered to be present onsite in the hedgerow sections containing native species.

3.86. To identify OMHPDL all the following criteria set out in the UK BAP priority habitat descriptions must be met. The area of open mosaic habitat is at least 0.25 ha in size.

3.87. There must be a known history of disturbance at the site or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/substrates such as industrial spoil may have been added.

3.88. The site contains some vegetation. This will comprise early successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought).

3.89. The site contains unvegetated, loose bare substrate and pools may be present. The site shows spatial variation, forming a mosaic of one or more of the early successional communities plus bare substrate, within 0.25ha.

3.90. By applying the above criteria it is considered that some parts of the Site would qualify. This is considered to be limited to areas of sparsely vegetated ephemeral / short perennial vegetation present in the south west of the Site, in association with the Puriton Ash Grounds LWS. It is noted that given the Site has been subject to remediation and active construction works are taking place, other parts of the Site may superficially fit with this description. However, this is considered to the very recent / continuing activities onsite that are temporary in nature. As such, the habitat will not have the required time to establish as a distinct habitat type or develop a notable diversity of supported species.

3.91. **Background Information**

3.91.1. The desk study undertaken by SERC returned several records of protected or notable plant species from within the Site.

3.91.2. These included Rootless Duckweed *Wolffia arrhizal,* Greater Water-parsnip *Sium latifolium*, Frogbit, all these records pre-date 2000 with the most recent from 1997.

3.91.3. Other records of plant species from within the local area that were returned post-2000 include Greater Butterfly-orchid *Platanthera chlorantha*, Sea barley *Hordeum marinum* and Yellow vetchling *Lathyrus aphaca.*

3.91.4. Species records received from SERC are included at Appendix 12.1E

4. DESIGNATED SITES

4.1. Statutory Designated Sites

4.1.1. The nearest statutory designated site is the Huntspill River NNR, which is located immediately to the north of the Site, with a small section (c.0.7ha of a total 148.98ha) within the Site boundary itself. The legal protection afforded to NNRs is usually underpinned by their designation as a Site of Special Scientific Interest (SSSI), however in this case there is no such designation. The Huntspill River NNR consists of open water, lowland grassland and small areas of woodland. It supports populations of Otter *Lutra lutra* and Barn Owl *Tyto alba*. It is also designated due to its supporting and connecting habitat between the Severn Estuary SPA and the Somerset Levels and Moors SPA.

4.1.2. The next nearest statutory designated site is Bridgwater Bay SSSI which is situated approximately 2.2km to the west of the Site at its closest point. The SSSI forms part of the Severn Estuary SPA and Ramsar Site (approximately 2.2km to the west of the Site). Part of the Bridgwater Bay SSSI also forms part of the Severn Estuary SAC located approximately 2.6km to the west of the Site. This area is designated for its internationally important populations of wildfowl and waders, its coastal habitats and three annex II species of fish.

4.1.3. Catcott, Edington and Chilton Moors SSSI is situated 3.1km to the east of the Site. This SSSI forms part of the Somerset Levels and Moors SPA and Ramsar site. The Somerset Levels and Moors SPA and Ramsar site is designated for its important assemblages of wintering wildfowl and waders including four Annex I species.

4.1.4. Other statutory sites considered include three Bat SACs known as North Somerset and Mendip Bat SAC (located approximately 15.9km northeast of the Site at its closest point), Hestercombe House SAC (approximately 14.7km southwest of the Site) and Exmoor and Quantock Oakwoods SAC (approximately 14.3km west of the Site).

4.1.5. North Somerset and Mendip Bat SAC is designated on account of its orchid rich calcareous grasslands, caves, woodlands and the presences of Lesser Horseshoe Bats *Rhinolophus hipposideros* and Greater Horseshoe Bats *Rhinolophus ferrumequinum*. Hestercombe House SAC is designated on account of it supporting Lesser Horseshoe bats. Exmoor and Quantock Oaklands SAC is designated on account of it supporting Oakwoods, alluvial woods and Barbastelle bat *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteini* and Otter.

4.1.6. Citations for the above statutory designated sites are included at Appendix 12.1C. The locations of these sites are included at Plan ECO1.

4.2. Non-statutory Designated Sites within the Site

4.2.1. There are eight non-statutory designated sites of nature conservation interest within the Site (as illustrated on Plan ECO2). These are described below individually, with further details provided on the type and condition of

habitats present as well as protected / notable species present where relevant. Relevant citation and SERC survey sheets for these sites are included at Appendix 12.1D.

4.2.2. In the northeast corner of the Site lies **Puriton Rhyne and Ponds LWS**, which includes an area of reed bed that runs north of the Site to the Huntspill River. It is designated for its notable plant species within the rhynes, and as it has been noted to support Otter and the nationally scarce Hairy Dragonfly *Brachytron pratense*. The shape of the LWS has been subject to a minor alteration following a resurvey in 2015 that noted historic features as no longer being present.

4.2.3. The reed bed to the north is notable for its extent, rather than its inherent ecological diversity. Floristically the area is dominated by Common Reed. This area is known to support Water Vole, breeding birds and provides wetland habitat connectivity between the River Huntspill and the rest of the Site.

4.2.4. The LWS is designated for its aquatic drainage ditches and the species that they support. During update habitat surveys undertaken in 2020, the main ditches within the LWS were noted to contain a diverse flora compared to the rest of the rhyne / ditch system in the Site. Evidence of Water Vole have also been recorded within the ditches, although no evidence of Otter presence has been recorded. Detail on the invertebrate assemblage within the ditch system required further analysis.

4.2.5. Dry and seasonally wet areas of ditch that are heavily overshaded by encroaching scrub. None of these ditches have been recorded as supporting any notable or protected species. Furthermore, the grasslands within the LWS consist of improved grasslands that are of little ecological significance. Areas of hardstanding and cleared ground resultant from the demolition of buildings are equally insignificant in ecological terms.

4.2.6. **Borrow Pit, Puriton LWS** is situated in the east of the Site. It is designated for its breeding population of Cetti's Warbler.

4.2.7. The Borrow Pit is currently used as a fishing lake. The area has been subject to works to improve drainage across the Site, with a new ditch created in the north west of the Borrow Pit and the shape of the lake has been formalised. This has modified the drainage across the LWS and reduced the areas of inundated reed bed. The smaller areas of reed bed within the Borrow Pit are developing among existing scrub consisting of Goat Willow and Blackthorn. The wetland habitat is considered to continue to offer breeding habitat for Cetti’s Warbler.

4.2.8. Small instances of Himalayan Balsam were recorded within the LWS.

4.2.9. **Stoning Pound Field and Rhyne LWS** is situated in the east of the Site and to the south of the Borrow Pit LWS. It is designated for its notable aquatic plant species present within boundary rhynes and on account of it previously supporting Otter.

4.2.10. The field itself consists of improved grassland which does not form part of the designating features for this LWS and it not considered to be of any significant ecological value.

4.2.11. The rhyne system varies in quality and in 2020 extensive build up of duckweed was noted across much of the Stoning Pound rhyne to the north, whilst the rhyne to the east was devoid of duckweed and contained greater species diversity. The western rhyne was heavily overshadowed by scrub.

4.2.12. **Woolavington Road and Fields North LWS** is situated immediately south of the Site. It is designated for the mire habitats that it supports. The LWS also contains areas of semi-improved grassland, rushes and scrub.

4.2.13. The majority of the LWS consists of semi-improved grassland that is generally species poor with False Oat grass and Yorkshire Fog forming much of the sward present. Other areas are heavily rabbit grazed and show signs of disturbance with nettle bed having formed. These areas are not considered to be of any great ecological significance.

4.2.14. Further north the ground level drops and conditions become wetter. In the wetter zones, extensive areas of Soft Rush and Greater Pond Sedge are present among dense areas of scrub formed primarily of Blackthorn. The species diversity within this area was noted to be limited.

4.2.15. **Puriton Cowslip Field LWS** is situated within the Site to the north of the Woolavington Road and Fields North LWS. It is designated for its calcareous to neutral grassland habitat and the plant species it supports.

4.2.16. Recent inspections of the LWS notes that the eastern field was is relatively good condition, with a sward that contain a mix of wildflowers and grasses. A notable population of Pyramidal Orchids was noted amongst the sward. This area represents one of the more ecologically valuable areas of grassland within the context of the Site. However, the field edges become more species poor, with a greater assemblage of robust grasses and scrub present. The western field shares a similar species composition as the eastern field although is generally less diverse. As such, the areas of greatest value are located centrally within the eastern field of the LWS.

4.2.17. **Puriton Ash Ground LWS** is situated within the western part of the Site and is designated for notable plant species that it supports. It is a species rich re-colonising waste ground with areas of scrub. The area was used as tip for rubble and ash associated with the factory. This has provided a basic nutrient poor substrate allowing the associated plant community to establish and also slows the establishment of perennial vegetative communities (such as permanent grasslands).

4.2.18. As part of the remediation of this part of the Site the LWS has been partially capped under a recently constructed landscape feature that is to be seeded native wildflower seed mixes. Areas within the LWS that have not been subject to treatment remain and comprise open ephemeral vegetation with scattered scrub, although in some areas the scrub is becoming more dense and reducing the open nature of the LWS.

4.2.19. This LWS is of potential value to the invertebrate assemblage at the Site due to vegetation that has developed on the nutrient poor substrate.

4.2.20. **Northmead Drove Fields LWS** is situated immediately to the northwest of the Site. It is designated for its mosaic habitats of grassland and rhynes. However, the grasslands themselves are species poor, consisting of improved grasslands that are of little ecological value. The rhynes are comparatively more species rich and therefore, more ecologically significant.

4.2.21. **Puriton Meadows and Rail Spur LWS** is situated in the northwest of the Site and then continues along the railway spur to the northwest where it bisects the Northmead Drove Fields LWS. It is designated for its notable species that it supports and an area of semi-natural grassland.

4.2.22. The vegetation along the railway spur is dominated by dense scrub consisting of Bramble, Blackthorn, Hawthorn and Willow species. Open areas are generally limited to railway ballast where vegetation has been unable to establish.

4.2.23. The grassland fields to the south east of the LWS consist of improved grassland, with a relatively diverse sward compared to other areas of more species-poor grassland within the Site.

5. SUMMARY

5.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

5.2. The Site was surveyed based around extended Phase 1 survey methodology, as recommended by Natural England.

5.3. The results of the survey work undertaken are present within this report and it is considered that an extensive habitats baseline has been established that can fully inform the current state of the environment at the Site.

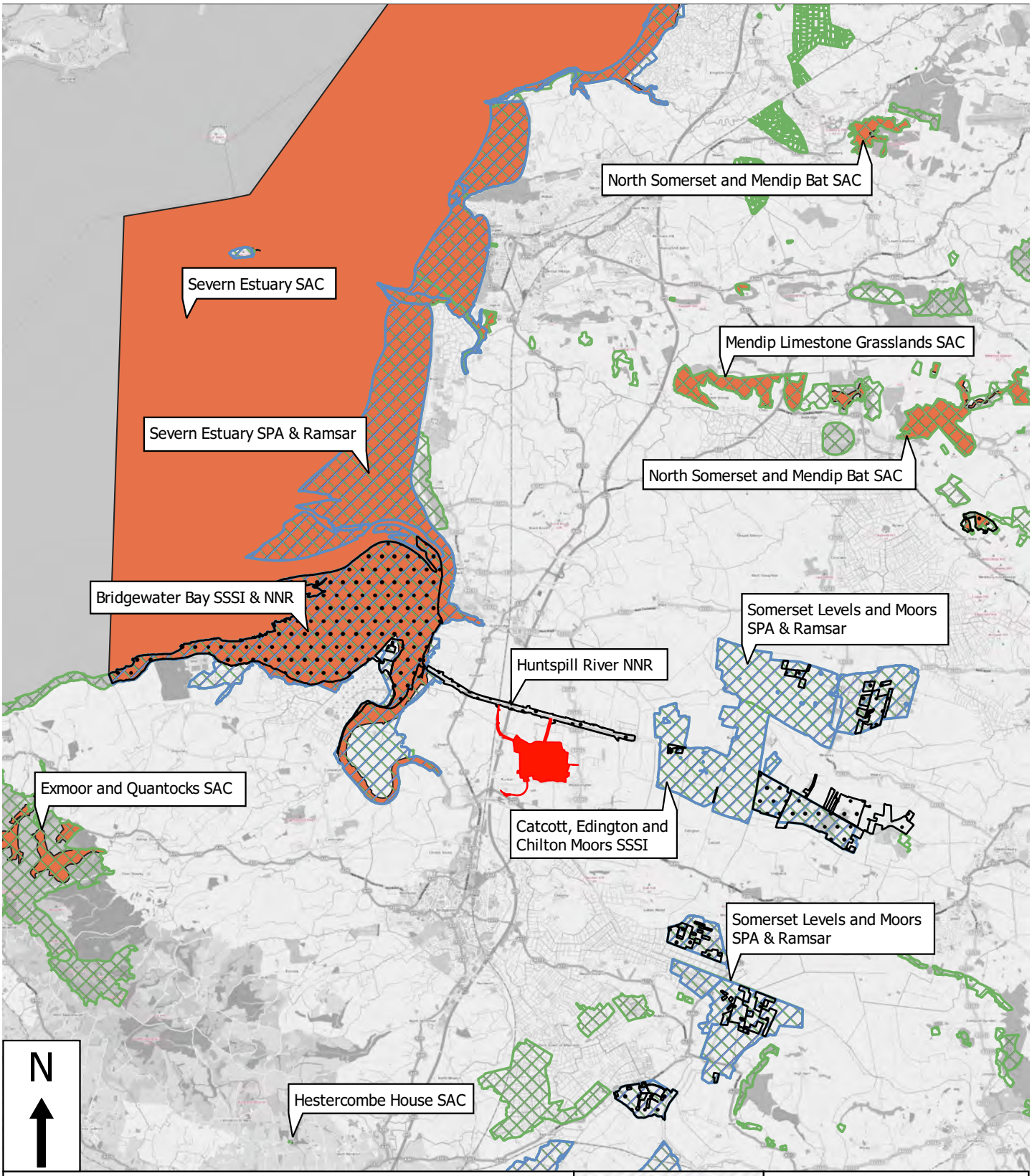
5.4. The survey work will inform the LDO process and the related environmental assessment process.

PLANS AND APPENDICES

PLANS

PLAN ECO1

Statutory Designated Sites Locations



Key:

- Site Boundary
- Special Protection Areas (SPAs) and Ramsar sites
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- National Nature Reserves (NNR)

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7761: PROJECT GRAVITY

PLAN ECO1 STATUTORY DESIGNATED SITES LOCATIONS

Rev: A

Aug 2021

PLAN ECO2

Local Wildlife Sites Within the Site Boundary

SITE LOCATION

LOCAL WILDLIFE SITE (LWS)

① PURITON RHYNES & PONDS

② BORROW PIT, PURITON

③ STONING POUND FIELD SOUTH & STONING POUND RHYNE

④ WOOLAVINGTON ROAD & FIELDS NORTH

⑤ PURITON COWSLIP FIELD

⑥ PURITON ASH GROUND

⑦ NORTH MEAD DROVE FIELDS

⑧ PURITON MEADOWS & RAIL SPUR

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PLAN ECO2: LOCAL WILDLIFE SITES WITHIN THE SITE BOUNDARY

Rev: C

Feb 2021

PLAN ECO3

Ecological Features

B1
B2
B3
B4
B5
B6
B7
B8
B9
B10

KEY:

- BOUNDARY OF SITE
- IMPROVED GRASSLAND
- SEMI-IMPROVED GRASSLAND
- AMENITY / ROUGH GRASSLAND
- MARSHY GRASSLAND
- PLANTATION / WOODLAND
- ORCHARD
- SCRUB
- HEDGEROW
- TALL RUDERAL VEGETATION
- EPHEMERAL / SHORT PERENNIAL VEGETATION
- STANDING WATER
- REED BED
- DRAINAGE DITCH
- SEASONAL DRAINAGE DITCH
- DRY DITCH
- BUILDING
- HARDSTANDING
- BARE GROUND

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7761: GRAVITY

PLAN ECO3: ECOLOGICAL FEATURES

Rev: B

Sept 2021

PLAN ECO4

Priority Habitats Considered Present

KEY:

- BOUNDARY OF SITE
- COASTAL AND FLOODPLAIN GRAZING MARSH
- GOOD QUALITY SEMI IMPROVED GRASSLAND (NON PRIORITY)
- DECIDUOUS WOODLAND
- TRADITIONAL ORCHARD
- HEDGEROW
- REED BED
- OPEN MOSAIC HABITAT ON PREVIOUSLY DEVELOPED LAND
- PONDS

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7761: GRAVITY

PLAN ECO4: PRIORITY HABITATS CONSIDERED PRESENT

Rev: A

Sept 2021

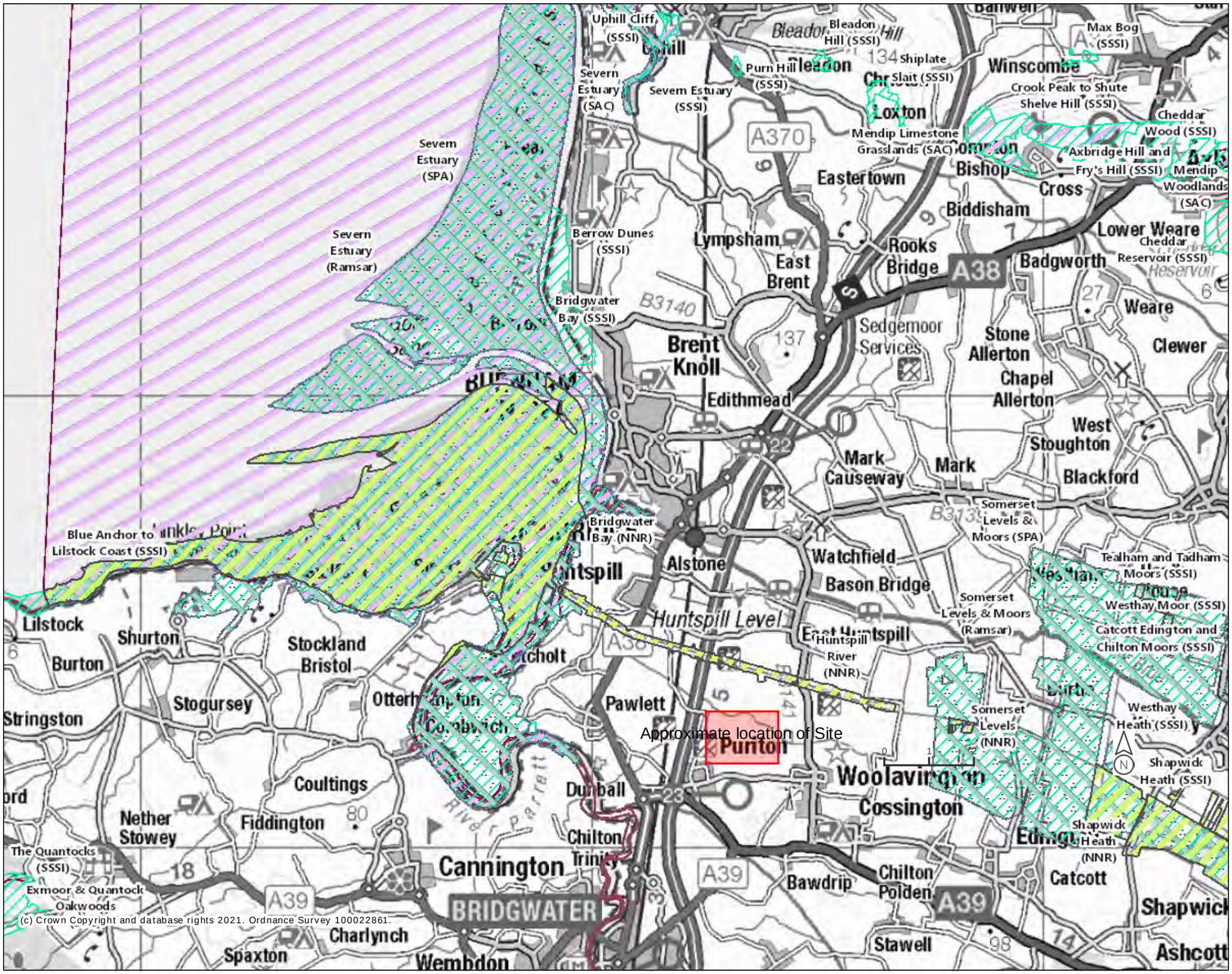
APPENDICES

APPENDIX 12.1A

MAGIC Maps

MAGiC

Magic Map



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Legend

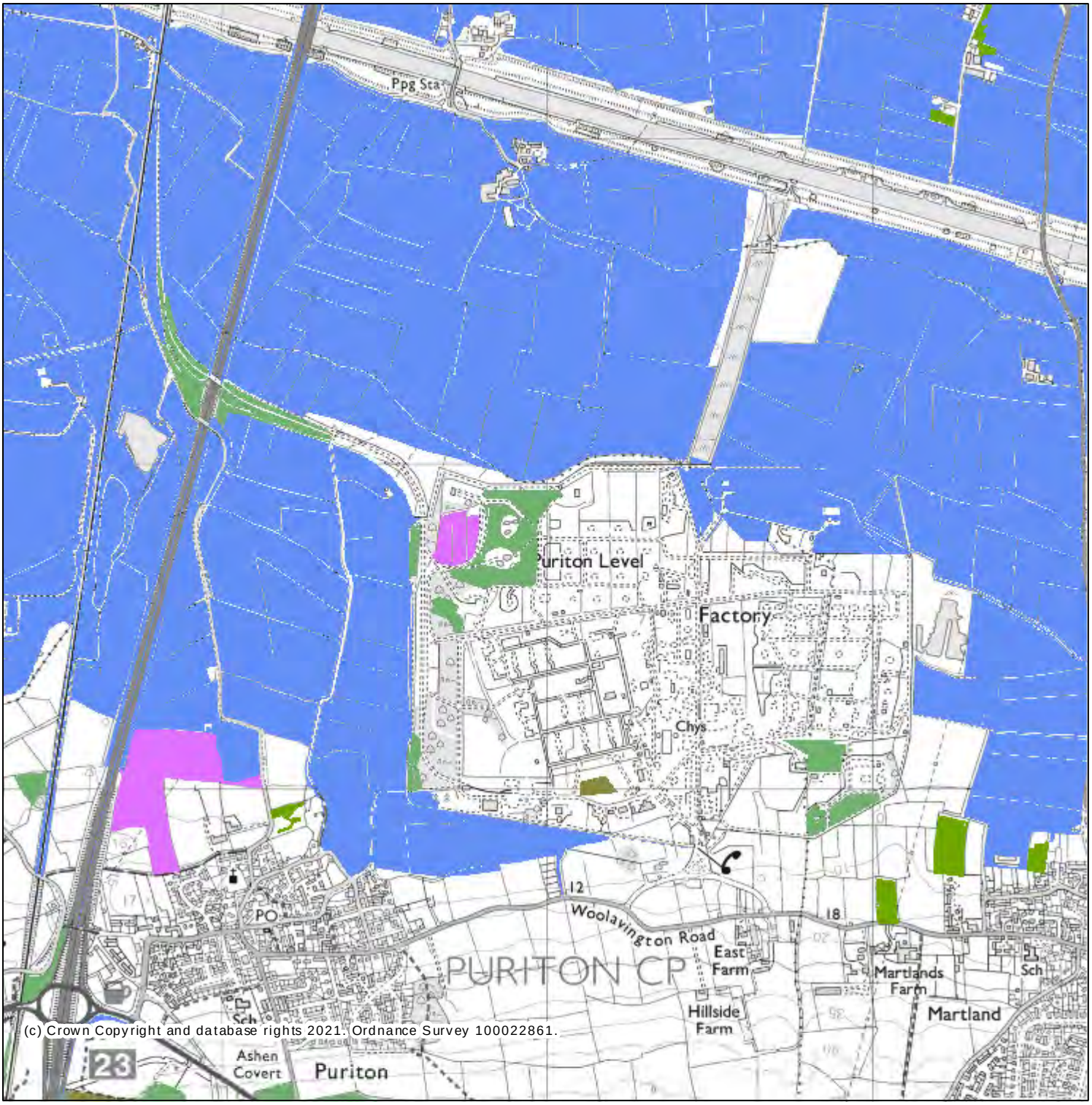
- National Nature Reserves (England)
- Ramsar Sites (England)
- Sites of Special Scientific Interest (England)
- Special Areas of Conservation (England)
- Special Protection Areas (England)

Projection = OSGB36
xmin = 301800
ymin = 137000
xmax = 359200
ymax = 158900

0 1.5 3
km

Map produced by MAGIC on 16 August, 2021.

Priority Habitats



Legend

- Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England)
- Priority Habitat Inventory - Good quality semi-improved grassland (Non Priority) (England)
- Priority Habitat Inventory - Lowland Calcareous Grassland (England)
- Priority Habitat Inventory - Deciduous Woodland (England)
- Priority Habitat Inventory - Traditional Orchards (England)

0 0.5 1
km

Projection = OSGB36
xmin = 327200
ymin = 140600
xmax = 338700
ymax = 144900

APPENDIX 12.1B

Hedgerow Descriptions

Appendix 12.1B: Hedgerow Descriptions

1. Hedgerows within the Site are descripted within the table and shown graphically on the plan below.

Hedgerow Number	Hedgerow Description	Species Recorded
H1	Maintained Hedgerow 1.8m tall and 2m wide with wet ditch.	Blackthorn, Hawthorn, Elm, Bramble, Field Maple and Ash.
H2	Well maintained Hedgerow 1.5m tall and 1.8m wide with a ditch on northern side	Blackthorn, Hawthorn and Bramble.
H3	Well maintained Hedgerow 1.8m tall and 2m wide.	Blackthorn, Hawthorn and Common Reed
H4	Well maintained Hedgerow with occasional trees 1.5m tall and 4m wide with shaded ditch running through centre	Hawthorn, Blackthorn, Elm, Elder, Crack willow and Ash
H5	Well maintained Hedgerow with occasional trees 1.5m tall and 2m wide. Wet ditch along its length	Hawthorn, Blackthorn, Elm, Elder and Ash.
H6	Hedgerow / Treeline 1.4m and 2m wide. Well maintained except for last 20m of eastern end which has no management and young elm trees to 7m.	Elm, Hawthorn and Blackthorn.
H7	Well maintained hedgerow 1.4m and 2m wide with a wet ditch on south side	Elm, Hawthorn and Blackthorn.
H8	Well maintained hedgerow 1.4m and 2m wide.	Elm, Hawthorn and Blackthorn.
H9	Well maintained hedgerow 1.4m and 2m wide.	Elm, Hawthorn and Blackthorn.
H10	Hedgerow / Treeline 6m tall and 3m wide.	Hawthorn and Willow
H11	Hedgerow / Treeline 6m tall and 3m wide.	Hawthorn and Willow
H12	Overgrown Hedgerow 5m tall.	Blackthorn, Hawthorn, Ash, Sycamore and Bramble
H13	Hedgerow 6m tall and 5m wide with dry ditch	Hawthorn, hazel, Crack Willow, Blackthorn, Ash, Goat Willow and Elm
H14	Hedgerow 6m tall and 5m wide with dry ditch	Hawthorn, hazel, Crack Willow, Blackthorn, Ash, Goat Willow and Elm
H15	Hedgerow 4m tall and 3m wide next to deep ditch	Hawthorn, Blackthorn, Bramble and Willow
H16	Hedgerow 3m tall and 2m wide with dry ditch.	Hawthorn, Blackthorn and Elm
H17	Hedgerow 3m tall and 2m wide	Hawthorn and Blackthorn
H18	Hedgerow / Treeline 7m tall with outgrowing sections. Dutch Elm Disease present on some Elm	Ash, Bramble, Elm, Hawthorn and Goat Willow.
H19	Hedgerow with tree 5m tall and 3m wide. Dutch Elm Disease present on some Elm	Elder, Hawthorn, Blackthorn and Elm.
H20	Unmanaged Treeline 25m tall and 3m wide.	Leyland Cypress and Sycamore, garden Privet and Blackthorn.
H21	Hedgerow 2m tall and 1m wide.	Hawthorn and Bramble
H22	Hedgerow 2m tall and 1m wide.	Hawthorn, Blackthorn and Bramble
H23	Hedgerow 2m tall and 1m wide.	Hawthorn, Blackthorn and Bramble
H24	Treeline 12m tall and 4m wide	Leyland Cypress
H25	Outgrown Hedgerow / Treeline 14m tall	Sycamore, Ash, Hawthorn and Bramble
H26	Outgrown hedgerow 5m tall	Blackthorn
H27	Hedgerow / Treeline 14m tall and 3m wide.	Hawthorn, Bramble and Ash
H28	Defunct remnant Hedgerow 2m tall and 2m wide.	Bramble and Elder
H29	Hedgerow 5m tall and 2m wide.	Elder, Hawthorn, Field Maple Blackthorn and Bramble
H30	Outgrowing Hedgerow / Treeline 15m tall and 5m to 8m wide	Hawthorn, Field Maple, Italian Alder, Blackthorn, Elm and Ash
H31	Outgrowing Hedgerow / Treeline 15m tall and 5m to 8m wide	Hawthorn, Field Maple, Italian Alder, Blackthorn, Elm and Ash

Appendix 3: Hedgerow Descriptions

H32	Unmanaged Hedgerow 4m tall and 4m wide.	Elder, Bramble, Hawthorn, Dog Rose and Ash.
H33	Hedgerow / Treeline 14m tall and 3m wide	Ash, Crack Willow, Sycamore and Elder.
H34	Hedgerow 7m tall and 2m wide.	Hawthorn, Field Maple, Italian Alder, Elm and Ash
H35	Hedgerow 6m tall and 2m wide.	Hawthorn, Field Maple, Italian Alder, Elm, Ash and Blackthorn
H36	Hedgerow / Treeline 12m tall and 4m wide.	Crack Willow, Hawthorn, Blackthorn and Bramble
H37	Hedgerow 3m tall and 2m wide.	Hawthorn, Elder, Blackthorn and Bramble
H38	Hedgerow 3m tall and outgrown into dense scrub	Blackthorn, Hawthorn and Bramble
H39	Defunct Hedgerow along internal palisade fencing	Hawthorn, Elder and Bramble
H40	Defunct Hedgerow along internal palisade fencing	Hawthorn, Elder, Willow and Bramble
H41	Defunct Hedgerow / Treeline 8m tall and 4m wide	Horse Chestnut, Bramble, Elder and Hawthorn
H42	Hedgerow 3m tall and 2m wide.	Horse Chestnut, Bramble, Elder and Hawthorn
H43	Hedgerow 3m tall and 2m wide.	Bramble, Elder and Hawthorn
H44	Defunct Hedgerow 7m tall and 4m wide along wet ditch.	Blackthorn, Hawthorn, Elder, Willow and Bramble
H45	Defunct Hedgerow 7m tall and 4m wide along wet ditch.	Blackthorn, Hawthorn, Elder, Willow and Bramble
H46	Defunct Hedgerow 7m tall and 4m wide along wet ditch.	Blackthorn, Hawthorn, Elder, Willow and Bramble
H47	Defunct Hedgerow 4m tall and outgrown at the middle and southern sections.	Blackthorn, Hawthorn and Bramble
H48	Defunct Hedgerow 4m tall and 2m wide	Blackthorn, Hawthorn, Elder and Bramble
H49	Hedgerow / Treeline 20m tall and 3m wide.	Poplar sp., Alder, Elder, Hawthorn and Bramble
H50	Treeline 15m tall.	Crack Willow, Blackthorn and Bramble.
H51	Treeline 15m tall.	Crack Willow, Hawthorn, Blackthorn and Bramble.
H52	Hedgerow / Treeline 10m tall and 4m wide	Bramble, Ash, Blackthorn, Hawthorn and Sycamore.
H53	Treeline 15m tall with some evidence of recent thinning	Leyland Cypress
H54	Outgrown hedgerow 5m tall and up to 12m wide.	Hawthorn, Blackthorn and Bramble.
H55	Hedgerow 5m tall and 5m wide.	Hawthorn, Elm, Elder, Ash and Field Maple
H56	Treeline 14m tall and 4m wide.	Crack Willow and Italian Alder
H57	Hedgerow / Treeline 14m tall and 4m wide.	Crack Willow and Bramble
H58	Treeline / Woodland Edge 10m tall	Oak, Ash and Bramble
H59	Treeline 14m tall and 2m wide	Horse Chestnut and Sycamore.
H60	Treeline 18m tall and 4m wide.	Italian Alder, Silver Birch, Willow and Sycamore
H61	Defunct hedge, 6m tall and 1m wide.	Hawthorn, Blackthorn, Field Maple and Dog Rose
H62	Treeline adjacent to 113 in the north of the field	Sycamore
H63	Hedgerow 2m tall and 1m wide.	Hawthorn and Bramble
H64	Hedgerow 2m tall and 1m wide.	Elder Blackthorn and Bramble.
H65	Hedgerow 4m tall and 2m wide with seasonal ditch.	Blackthorn, Hawthorn and Bramble.
H66	Double Hedgerow / Treeline 20m tall and 4m wide.	Crack Willow, Hawthorn, Elm, Blackthorn and Bramble
H67	Treeline 20m tall and 2m wid.	Ash, Italian Alder, Crack Willow.
H68	Hedgerow 3m tall and 3m wide.	Blackthorn, Elm, Elder, Ash and Wild Privet.
H69	Treeline / Hedgerow 20m tall and 2m wide with seasonal ditch.	Elm, Hawthorn, Elder, Norway Maple, Ash, Goat Willow and Bramble

Appendix 3: Hedgerow Descriptions

H70	Hedge 4m tall and 4m wide with a seasonal ditch.	Bramble, Blackthorn, Hawthorn and Sycamore
H71	Hedgerow / Treeline 20m tall and 2m wide with seasonal ditch.	Ash, Hawthorn, Bramble and Sycamore.
H72	Hedgerow / Treeline 20m tall and 3m wide.	Ash, Blackthorn, Dog Rose, Hawthorn and Sycamore.
H73	Hedgerow 3m tall and 3m wide.	Blackthorn, Elm and Field Maple
H74	Hedgerow cut low.	Elm, Blackthorn, and Wayfaring Tree
H75	Hedgerow / Treeline 12m tall and 4m wide with a dry ditch.	Bramble, Ash, Spindle, Blackthorn and Ash
H76	Hedgerow 5m tall and outgrown into a small area of dense scrub behind toward ROF site boundary. Covers a dry ditch.	Blackthorn
H77	Hedgerow / Treeline 20m tall and 3m wide.	Ash, Blackthorn, Dog Rose, Hawthorn and Sycamore.
H78	Hedgerow / Treeline 20m tall and 3m wide.	Ash, Blackthorn, Dog Rose, Hawthorn and Sycamore.
H79	Hedgerow has been cut low, includes dry ditch	Hawthorn and Elder.
H80	Hedgerow 3m tall and 3m wide.	Elder, Blackthorn and Elm.
H81	Hedgerow / Treeline 18m tall and 5m wide with a wet ditch.	Sycamore, Elm, Bramble and Elder.
H82	Hedgerow / Treeline 16m tall and 3m wide.	Elm, Alder, Blackthorn and Dog Rose.
H83	Hedgerow 3m tall and 3m wide.	Blackthorn, Elm and Hawthorn
H84	Hedgerow 3m tall and 3m wide.	Elm, Elder, Field Maple and Hazel.
H85	Hedgerow recent cut to 2m tall.	Elder, Blackthorn, Elm, Dog Rose and Ash.
H86	Hedgerow recent cut to 2m tall.	Elder, Blackthorn, Elm, Dog Rose, Ash, Crack Willow and Field Maple.
H87	Hedgerow 5m tall and 3m wide.	Elder, Blackthorn, Elm, Dog Rose and Ash.
H88	Hedgerow 5m tall and 3m wide with dry ditch.	Field Maple, Blackthorn, Hawthorn and Hazel
H89	Roadside Hedgerow 2m tall and 3m wide.	Blackthorn, Hawthorn, Wild Privet, Elder and Field maple
H90	Hedgerow / Treeline 12m tall and 3m wide with a wet ditch	Elm and Bramble
H91	Defunct Hedgerow partially cut to 2m	Blackthorn, Elm, Bramble, Dog rose, Hawthorn and Elder
H92	Hedgerow / Treeline 12m tall and 6m wide with dry ditch.	Blackthorn, Elm, Bramble, Dog rose, Hawthorn and Elder
H93	Hedgerow 6m tall and 3m wide.	Blackthorn, Elm, Bramble, Dog rose, Hawthorn and Elder
H94	Double Hedgerow / Treeline 25m tall and 10m wide	Crack Willow, Blackthorn, Hawthorn, Elm, Bramble, Dog Rose, Ash, Spindle and Field Maple
H95	Hedgerow / Treeline 16m tall and 6m wide	Elm, Bramble, Blackthorn and Crack Willow.
H96	Hedgerow / Treeline 18m tall and 7m wide	Blackthorn, Ash, Elm and Elder.
H97	Hedgerow / Treeline 18m tall and 7m wide	Blackthorn, Ash, Elm and Elder.
H98	Hedgerow / Treeline 16m tall and 6m wide becoming defunct toward northern end.	Elm, Bramble, Blackthorn and Crack Willow.
H99	Double Hedgerow / Treeline 25m tall and 10m wide with footpath running between.	Crack Willow, Blackthorn, Hawthorn, Elm, Bramble, Dog Rose, Ash, Spindle and Field Maple
H100	Double Hedgerow / Treeline 25m tall and 10m wide with footpath running between.	Crack Willow, Blackthorn, Hawthorn, Elm, Bramble, Dog Rose, Ash, Spindle and Field Maple
H101	Double Hedgerow / Treeline 25m tall and 10m wide	Crack Willow, Blackthorn, Hawthorn, Elm, Bramble, Dog Rose, Ash, Spindle and Field Maple
H102	Hedgerow / Treeline 18m tall and 3m wide. Evidence of Dutch Elm disease	Elm, Blackthorn, Ash, Hawthorn, Bramble, Sycamore and Italian Alder
H103	continuation of H162	

Appendix 3: Hedgerow Descriptions

H104	Hedgerow / Treeline 16m tall and 4m wide with a dry ditch	Elm, Ash, Bramble, Blackthorn and Field Maple
H105	Hedgerow 5m tall and 3m wide.	Hawthorn, Blackthorn, Bramble, Ash and Elm.
H106	Partially removed, with Treeline remnant	Crack Willow
H107	Double Hedgerow / Treeline 25m tall and 10m wide with footpath running between.	Crack Willow, Blackthorn, Hawthorn, Elm, Bramble, Dog Rose, Ash, Spindle and Field Maple
H108	Double Hedgerow / Treeline 25m tall and 10m wide with footpath running between.	Crack Willow, Blackthorn, Hawthorn, Elm, Bramble and Dog Rose
H109	Hedgerow 3m tall and 2m wide with wet ditch	Blackthorn, Elm, Bramble, Dog rose, Hawthorn and Elder
H110	Hedgerow 3m tall and 2m wide with wet ditch	Blackthorn, Elm, Bramble, Dog rose, Hawthorn and Elder
H111	Hedgerow 4m tall and 4m wide with a wet ditch.	Hawthorn, Dog Rose, Bramble and Blackthorn
H112	continuation of H175	continuation of H175
H113	Double Hedgerow / Treeline with access track running between, 10m tall and 10m wide.	Elder, Elm, Blackthorn, Bramble, Goat Willow, Ash, Hawthorn, Dog Rose, Wild Privet, Guelder Rose, Field Maple, Hazel and Spindle
H114	Hedgerow 4m tall and 4m wide with a wet ditch.	Hawthorn, Dog Rose, Elder, Bramble and Blackthorn
H115	Defunct Hedgerow 3m tall and 2m wide with a wet ditch	Hawthorn, Crack Willow, Blackthorn and Goat Willow
H116	Hedgerow 5m tall and 2m wide with wet ditch	Hawthorn, Crack Willow, Blackthorn and Goat Willow
H117	Hedgerow 5m tall and 2m wide with dry ditch	Blackthorn, Hawthorn, Elm, Bramble, Field Maple and Ash.
H118	Hedgerow 5m tall and 4m wide with dry ditch	Blackthorn, Hawthorn, Elm, Bramble, Field Maple and Ash.
H119	Defunct Hedgerow 3m tall and 2m wide with a wet ditch	Hawthorn, Crack Willow, Blackthorn and Goat Willow

KEY:

- BOUNDARY OF SITE
- HEDGEROW

N

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7761: GRAVITY

APPENDIX 12.1B:
HEDGEROW NUMBERS

Rev: A
Dec 2020

APPENDIX 12.1C

Citations for Statutory Designated Sites

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK9015022**

SITENAME **Severn Estuary**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
A	UK9015022

1.3 Site name

Severn Estuary

1.4 First Compilation date	1.5 Update date
1995-07	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1995-07
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-3.049166667	51.22472222

2.2 Area [ha]:

24487.91

2.3 Marine area [%]

90.3

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area
UKL2	East Wales
UKL1	West Wales and The Valleys

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A051	Anas strepera			w	282	282	i		G	B		C	
B	A394	Anser albifrons albifrons			w	2664	2664	i		G	A		B	
B	A672	Calidris alpina alpina			w	44624	44624	i		G	B		C	
B	A037	Cygnus columbianus bewickii			w	280	280	i		G	B		C	
B	A048	Tadorna tadorna			w	3330	3330	i		G	B		C	
B	A162	Tringa totanus			w	2330	2330	i		G	B		C	

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	WATR	Waterfowl assemblage			84317	84317	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N02	89.0
N03	6.0
N14	1.0
N04	4.0
Total Habitat Cover	100

Other Site Characteristics

3 Marine:
Geology: limestone/chalk,sandstone/mudstone,clay,shingle,sedimentary,mud,sand,cobble,peat,gravel,biogenic reef 4 Marine: Geomorphology: islands,intertidal rock,subtidal rock (including rocky reefs),tidal rapids,intertidal sediments (including sandflat/mudflat),open coast (including bay),subtidal sediments (including sandbank/mudbank),pools,cliffs,estuary

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe) 3.9% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Anas strepera (North-western Europe) 0.9% of the population 5 year peak mean 1991/92-1995/96 Anser albifrons albifrons (North-western Siberia/North-eastern & North-western Europe) 0.4% of the population 5 year peak mean 1991/92-1995/96 Calidris alpina alpina (Northern Siberia/Europe/Western Africa) 3.3% of the population 5 year peak mean 1991/92-1995/96 Tadorna tadorna (North-western Europe) 1.1% of the population 5 year peak mean 1991/92-1995/96 Tringa totanus (Eastern Atlantic - wintering) 1.3% of the population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 84317 waterfowl (5 year peak mean 1991/92-1995/96) Including: Cygnus columbianus bewickii , Tadorna tadorna , Anas strepera , Calidris alpina alpina , Tringa totanus

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	G01		I
H	E06		B
H	A02		I
H	M01		B
H	J02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A04		I
H	D05		I
H	A02		I
M	G03		B
H	A04		I
H	A02		I
H	A03		I
H	A03		I
H	D05		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

https://naturalresources.wales/conservation-biodiversity-and-wildlife/find-protected-areas-of-land-and-seas/designated-s

http://publications.naturalengland.org.uk/category/3212324
http://publications.naturalengland.org.uk/category/6490068894089216

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]

Code	Cover [%]	Code	Cover [%]
UK01	9.0	UK04	100.2

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

Organisation:	Natural Resources Wales
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

- [X] Yes — Name: SEVERN ESTUARY
  Link: https://naturalresources.wales/media/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-jur
- [ ] No, but in preparation
- [ ] No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EC Directive 79/409 on the Conservation of Wild Birds: Special Protection Area

SEVERN ESTUARY (GLOUCESTERSHIRE, AVON, SOMERSET, SOUTH GLAMORGAN, MID GLAMORGAN, GWENT)

The Severn Estuary is one of the largest estuaries in Britain and it has the second largest tidal range in the world. Its classic funnel shape and south-west orientation makes it susceptible to extreme weather conditions in the east Atlantic. There are large urban developments on the estuary including the cities of Bristol and Cardiff.

The Severn Estuary qualifies under Article 4.1 of the Birds Directive by regularly supporting an internationally important wintering population of Bewick's swan *Cygnus columbianus bewickii*, an Annex 1 species. During the period 1988/89 to 1992/93 a mean peak of 289 birds (1.7% of the north-west European population, 4.1% of the British wintering population) used the estuary.

The Severn Estuary qualifies under Article 4.2 as a wetland of international importance by regularly supporting in winter over 20,000 waterfowl. In the five year period 1988/89 to 1992/93 the average peak count was 68,026 waterfowl comprising 17,502 wildfowl and 50,524 waders.

The Severn Estuary also qualifies under Article 4.2 by regularly supporting in winter internationally important numbers of the following 5 species of migratory waterfowl (average peak means for the period 1988/89 to 1992/93): 3,002 European white-fronted goose *Anser albifrons albifrons* (1.0% NW European, 50.0% British), 2,892 shelduck *Tadorna tadorna* (1.2% NW European, 3.9% British), 330 gadwall *Anas strepera* (2.8% NW European, 5.5% British), 41,683 dunlin *Calidris alpina* (2.9% east Atlantic flyway (EAF), 9.6% British) and 2,013 redshank *Tringa totanus* (1.3% EAF, 2.6% British).

The Severn Estuary also supports nationally important wintering populations of a further 10 species: 3,977 wigeon *Anas penelope* (1.6% British), 1,998 teal *Anas crecca* (2.0% British), 523 pintail *Anas acuta* (2.1% British), 1,686 pochard *Aythya ferina* (3.8% British), 913 tufted duck *Aythya fuligula* (1.5% British), 227 ringed plover *Charadrius hiaticula* (1.0% British), 781 grey plover *Pluvialis squatarola* (3.7% British), 3,096 curlew *Numenius arquata* (3.4% British), 246 whimbrel N. phaeopus (4.9% British total) and 3 spotted redshank *Tringa erythropus* (1.5% British).

In addition, during passage periods, the estuary supports nationally important numbers of ringed plover (spring migration: 442 birds (1.4% British passage), autumn migration: 1,573 birds (5.2% British passage)), dunlin (spring: 3,510 birds (1.7% British passage), autumn: 5,500 birds (2.7% British passage)), whimbrel *Numenius phaeopus* (spring: 246 birds (4.9% British passage), autumn: 66 birds (1.3% British passage)) and redshank (autumn: 2,456 birds (2% British passage)).

The Severn Estuary also supports a nationally important breeding population of a migratory species. In 1993 2040 pairs of lesser black-backed gulls *Larus fuscus* bred on the islands of Steep Holm and Flat Holm within the estuary. This represents 2.5% of the British total.

SPA Citation
CAR
December 1993

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 13 July 1995

3. Country:

UK (England/Wales)

4. Name of the Ramsar site:

Severn Estuary

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* ;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 13 29 N 03 02 57 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Bristol

In the south-west of the United Kingdom, between Wales and England

Administrative region: Bro Morgannwg/ Vale of Glamorgan; Caerdydd/ Cardiff; Casnewydd/ Newport; Avon; City of Bristol; Fynwy/ Monmouthshire; Gloucestershire; Gwent; North Somerset; Somerset; South Glamorgan; South Gloucestershire

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 24662.98

Min. -4
Max. 17
Mean 0

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The estuary's classic funnel shape, unique in Britain, is a factor causing the Severn to have the second-largest tidal range in the world (after the Bay of Fundy, Canada). This tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide swept sand and rock. The species-poor invertebrate community includes high densities of ragworms, lugworms and other invertebrates forming an important food source for passage and wintering waders.

A further consequence of the large tidal range is the extensive intertidal zone, one of the largest in the UK, comprising mudflats, sand banks, shingle, and rocky platforms.

Glassworts and annual sea-blite colonise the open mud, with beds of all three species of eelgrass *Zostera* occurring on more sheltered mud and sandbanks. Large expanses of common cord-grass also occur on the outer marshes. Heavily grazed saltmarsh fringes the estuary with a range of saltmarsh types present. The middle marsh sward is dominated by common saltmarsh-grass with typical associated species. In the upper marsh, red fescue and saltmarsh rush become more prominent.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 3, 4, 5, 6, 8

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities.

Habitats Directive Annex I features present on the pSAC include:

H1110 Sandbanks which are slightly covered by sea water all the time

H1130 Estuaries

H1140 Mudflats and sandflats not covered by seawater at low tide

H1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Ramsar criterion 3

Due to unusual estuarine communities, reduced diversity and high productivity.

Ramsar criterion 4

This site is important for the run of migratory fish between sea and river via estuary. Species include Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla anguilla*. It is also of particular importance for migratory birds during spring and autumn.

Ramsar criterion 8

The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla anguilla* use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad *Alosa alosa* and twaite shad *A. fallax* which feed on mysid shrimps in the salt wedge.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
70919 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in winter:

Tundra swan , *Cygnus columbianus bewickii*, NW Europe	229 individuals, representing an average of 2.8% of the GB population (5 year peak mean 1998/9-2002/3)
Greater white-fronted goose , *Anser albifrons albifrons*, NW Europe	2076 individuals, representing an average of 35.8% of the GB population (5 year peak mean for 1996/7-2000/01)
Common shelduck , *Tadorna tadorna*, NW Europe	3223 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)
Gadwall , *Anas strepera strepera*, NW Europe	241 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	25082 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	2616 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.

Species regularly supported during the breeding season:

Lesser black-backed gull , *Larus fuscus graellsii*, W Europe/Mediterranean/W Africa	4167 apparently occupied nests, representing an average of 2.8% of the breeding population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	740 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Eurasian teal , *Anas crecca*, NW Europe	4456 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	756 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
See Sections 21/22 for details of noteworthy species
Details of bird species occuring at levels of National importance are given in Section 22

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation)**:**

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

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16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	alluvium, basic, biogenic reef, clay, cobble, gravel, limestone/chalk, mud, neutral, nutrient-rich, peat, sand, sandstone/mudstone, sedimentary, shingle
Geomorphology and landscape	cliffs, coastal, estuary, floodplain, intertidal rock, intertidal sediments (including sandflat/mudflat), islands, lowland, open coast (including bay), pools, subtidal rock (including rocky reefs), subtidal sediments (including sandbank/mudbank), tidal rapids
Nutrient status	eutrophic
pH	circumneutral
Salinity	brackish / mixosaline, saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Cardiff, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/cardiff.html) Max. daily temperature: 14.3° C Min. daily temperature: 6.8° C Days of air frost: 33.0 Rainfall: 1111.7 mm Hrs. of sunshine: 1518.0

General description of the Physical Features:

The Severn Estuary is a large estuary with extensive intertidal mudflats and sandflats, rocky platforms and islands. Saltmarsh fringes the coast backed by grazing marsh with freshwater ditches and occasional brackish ditches. The seabed is rock and gravel with subtidal sandbanks. The estuary's classic funnel shape, unique in the UK, is a factor causing the Severn to have the second-highest tidal range in the world. This tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide-swept sand and rock. A further consequence of the large tidal range is an extensive intertidal zone, one of the largest in the UK.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Severn Estuary is a large estuary with extensive intertidal mudflats and sandflats, rocky platforms and islands. Saltmarsh fringes the coast backed by grazing marsh with freshwater ditches and occasional brackish ditches. The seabed is rock and gravel with subtidal sandbanks. The estuary's classic funnel shape, unique in the UK, is a factor causing the Severn to have the second-highest tidal range in the world. This tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide-swept sand and rock. A further consequence of the large tidal range is an extensive intertidal zone, one of the largest in the UK.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping

19. Wetland types:

Inland wetland, Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	84.1
H	Salt marshes	4.7
D	Rocky shores	4.7
E	Sand / shingle shores (including dune systems)	4.4
Tp	Freshwater marshes / pools: permanent	1
B	Marine beds (e.g. sea grass beds)	0.9
F	Estuarine waters	0.2

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The large tidal range leads to strong tidal streams and high turbidity, producing communities characteristic of the extreme physical conditions of liquid mud and tide-swept sand and rock. Broad intertidal flats with areas of unstable sand and muddy flats support high densities of invertebrates. Intertidal rock platforms support a wide variety of invertebrate species. There are large areas of subtidal sand, rock and gravel with a variety of aquatic estuarine communities including *Sabellaria alveolata* reef. Areas of saltmarsh fringe the estuary, mostly grazed with a range of vegetation communities. There are gradual and stepped transitions between bare mudflat to upper marsh and grassland. Main vegetation types are: upper saltmarsh with *Festuca rubra* and *Juncus gerardii*; middle marsh dominated by *Puccinellia maritima* with *Glaux maritima* and *Triglochin maritima*; dense monocultures of *Spartina anglica* at the edge of the mudflats-brackish pools and depressions with *Phragmites australis* and *Bolboschoenus maritimus*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Aster linosyris (nationally rare),

Alopecurus bulbosus, *Althaea officinalis*, *Bupleurum tenuissimum*, *Hordeum marinum*, *Lepidium latifolium*, *Petroselinum segetum*, *Puccinellia rupestris*, *Trifolium squamosum*, *Zostera marina/angustifolia*, *Zostera noltei* (all nationally scarce)

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Herring gull , *Larus argentatus argentatus*, NW Europe and Iceland/W Europe)	1540 apparently occupied nests, representing an average of 1.1% of the GB population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Little egret , *Egretta garzetta*, West Mediterranean	17 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	12 individuals, representing an average of 1.7% of the GB population (5 year peak mean 1998/9-2002/3)
Whimbrel , *Numenius phaeopus*, Europe/Western Africa	333 individuals, representing an average of 11.1% of the GB population (5 year peak mean 1998/9-2002/3 - spring peak)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	2021 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	26 individuals, representing an average of 4.3% of the GB population (5 year peak mean 1998/9-2002/3)
Species with peak counts in winter:	
Eurasian wigeon , *Anas penelope*, NW Europe	4658 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	297 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3)
Common pochard , *Aythya ferina*, NE & NW Europe	1118 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Rallus aquaticus*, Europe	11 individuals, representing an average of 2.4% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , *Tringa erythropus*, Europe/W Africa	10 individuals, representing an average of 7.3% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Species occurring at levels of international importance on the site.

Fish.

Alosa alosa (IUCN Red data book – threatened; Habitats Directive Annex II, Annex V (S1102)),
Alosa fallax (IUCN Red data book – threatened; Habitats Directive Annex II, Annex V (S1103))
Lampetra fluviatilis (IUCN Red data book – threatened; Habitats Directive Annex II (S1099)),
Petromyzon marinus (Habitats Directive Annex II (S1095))

Nationally important species occurring on the site.

Invertebrates.

Tenellia adspersa (nationally rare); *Corophium lacustre* (nationally scarce); *Gammarus insensibilis* (nationally scarce)

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation

Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Traditional cultural
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
National/Crown Estate	+	
Private	+	+
Public/communal	+	+
Other	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Fishing: commercial	+	+
Fishing: recreational/sport	+	+
Gathering of shellfish	+	
Bait collection	+	
Arable agriculture (unspecified)		+
Grazing (unspecified)	+	+
Permanent pastoral agriculture		+

Hunting: recreational/sport	+	+
Industrial water supply	+	
Industry	+	+
Sewage treatment/disposal	+	+
Harbour/port	+	+
Flood control	+	+
Mineral exploration (excl. hydrocarbons)	+	+
Mining/quarrying	+	+
Transport route	+	+
Urban development		+
Military activities	+	+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Dredging	1		+	+	+
Erosion	1		+		+
Recreational/tourism disturbance (unspecified)	1		+	+	

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	+

National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	+
Management agreement	+	+
Site management statement/plan implemented	+	
Other	+	
Management plan in preparation	+	+

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Contemporary.

Fauna.
Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Wildfowl shooting monitoring. Returns received annually from Wildfowling Clubs.

Completed.

Flora and Fauna.
CCW/EN Marine Intertidal Phase 1 survey of the biotopes of the Severn Estuary in 2003/4
BTO Research report 335 for CCW/EN (November 2003). Low tide distribution of waterbirds of Severn Estuary SPA. Results of 2002/03 WeBS low tide counts and a historical analysis (Burton *et al*. 2003).
WWT Wetlands Advisory Service. Report for CCW (April 2003). Baseline bird monitoring of the River Severn.
Joint Nature Conservation Committee (1997) Subtidal biotope survey at mouth of the River Parrett.
Joint Nature Conservation Committee (1997) Upper estuary intertidal rocky shore survey.
Mettam, C (1997) *Biotopes in the subtidal sandbanks of the Severn estuary*. Report to English Nature

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

There are fixed interpretation panels and hides at Bridgwater Bay, Newport Wetlands Reserve, Flat Holm LNR and field centre. Interpretation boards at Black Rock.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.
Walking, dog walking, and birdwatching are concentrated along the sea walls all the year round and on the saltmarsh and sandy beaches.

Bathing, beach recreation, including sand yachting and wind surfing are practised on the sandy beaches, mainly in the summer.

There are boat clubs/marinas in the sub-estuaries with sailing, motor boats, and jet skiing.

Angling is carried out from the shore and small boats. There is a certain amount of bait digging.

Wildfowling is carried out from September to February all around the Estuary; consents and further management measures are being addressed. There are agreed refuge areas for the birds.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

Head, Countryside Division, Welsh Assembly Government, Cathays Park, Cardiff, CF1 3NQ

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK / Site Safeguard Officer, International Designations, Countryside Council for Wales, Maes-y-Ffynnon, Penrhosgarnedd, Bangor, Gwynedd, LL57 2DW

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK9010031**

SITENAME **Somerset Levels and Moors**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
A	UK9010031

1.3 Site name

Somerset Levels and Moors

1.4 First Compilation date	1.5 Update date
1997-06	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1997-06
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.866666667	51.17055556

2.2 Area [ha]:

6395.47

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A052	Anas crecca			w	13307	13307	i		G	B		C	
B	A037	Cygnus columbianus bewickii			w	191	191	i		G	B		B	
B	A140	Pluvialis apricaria			w	3029	3029	i		G	C		C	
B	A142	Vanellus vanellus			w	36316	36316	i		G	B		C	

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with

some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	WATR	Waterfowl assemblage			73014	73014	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N06	5.0
N15	1.0
N10	52.0
N21	2.0
N16	4.0
N07	5.0
N14	26.0
N23	5.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: peat,neutral,alluvium,clay 2 Terrestrial: Geomorphology and landscape: lowland,floodplain

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe) 2.7% of the GB population 5 year peak mean 1991/92-1995/96 Pluvialis apricaria [North-western Europe - breeding] 1.2% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Anas crecca (North-western Europe) 3.3% of the population 5 year peak mean 1991/92-1995/96 Vanellus vanellus (Europe - breeding) 0.5% of the population 5 year peak mean

1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 73014 waterfowl (5 year peak mean 1991/92-1995/96) Including: Cygnus columbianus bewickii , Anas crecca , Pluvialis apricaria [North-western Europe - breeding], Vanellus vanellus

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A02		I
H	A01		I
H	J02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02		I
H	D05		I
H	D05		I
H	A02		I
H	G03		I
H	A04		I
H	A03		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

http://publications.naturalengland.org.uk/category/3212324
http://publications.naturalengland.org.uk/category/6490068894089216

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK01	11.9	UK04	100.0		

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EU Directive 79/409 on the Conservation of Wild Birds:
Special Protection Area

SOMERSET LEVELS AND MOORS
(1003A)

The Somerset Levels and Moors is the largest area of lowland wet grassland and associated wetland habitat remaining in Britain, covering about 35,000 hectares in the floodplains of the Rivers Axe, Brue, Parrett, Tone and their tributaries. The proposed SPA comprises a series of sites within the extensive area bounded by Bridgwater Bay in the west and the higher ground of the Mendips, Dorset Hills, Blackdown Hills, Brendons and Quantocks. The majority of the site is only a few metres above mean sea level and drains through a large network of ditches, rhynes and rivers. Flooding may affect large areas in winter to an extent that depends on levels of rainfall on the moors and surrounding higher ground, and on tidal conditions. The site is mainly given over to cattle grazing, often in conjunction with hay or silage production, although withy growing is also an important traditional activity. Parts of the site around Westhay Moor and Shapwick Heath include areas of former raised peat bog, now substantially modified by agricultural improvement and peat extraction. The pSPA supports internationally important numbers of waterfowl in winter and is one of the most important sites in southern Britain for breeding waders associated with lowland wet grassland.

The pSPA covers 6,386.01 hectares and includes the following twelve Sites of Special Scientific Interest (SSSI), notified under the Wildlife and Countryside Act, 1981: Catcott, Edington & Chilton Moors, Curry & Hay Moors, King's Sedgemoor, Moorlinch, Shapwick Heath, Southlake Moor, Tealham & Tadham Moors, West Moor, West Sedgemoor, Westhay Heath, Westhay Moor and Wet Moor.

The Somerset Levels and Moors pSPA qualifies under Article 4.1 of the EU Birds Directive by regularly supporting nationally important numbers of wintering Bewick's swan *Cygnus columbianus bewickii* and golden plover *Pluvialis apricaria*, both Annex 1 species. In the five year period 1989/90 to 1993/94 the site supported a peak mean of 310 Bewick's swan (4.4% of the British and 1.8% of the north-west European population) and 3,110 golden plover (1.2% of the British population).

The site qualifies under Article 4.2 of the Directive as a wetland of international importance by regularly supporting over 20,000 waterfowl in winter. The five year peak mean for the period 1989/90 to 1993/94 was 58,093 birds, comprising 41,442 waders and 16,651 wildfowl.

The site further qualifies under Article 4.2 by regularly supporting internationally important numbers of the migratory species teal *Anas crecca* and lapwing *Vanellus vanellus*. In the five year period 1989/90 to 1993/94 the site supported a peak mean of 7,476 teal (5.3% of the British and 1.9% of the north-west European population) and 36,565 lapwing (exceeding 20,000 threshold for a wetland of international importance).

Notable also are nationally important numbers of the following species in winter (figures are five year peak means for the period 1989/90 to 1993/94): 94 gadwall *Anas strepera* (1.2% of British population), 5,927 wigeon *A. penelope* (2.1% of British population) and 217 shoveler *A. clypeata* (2.1% of British population). The site also supports an important assemblage of breeding and wintering birds in addition to the species mentioned above, including important populations of breeding waders associated with lowland wet grassland. The Annex 1 marsh harrier *Circus aeruginosus* breeds and the Annex 1 species bittern *Botaurus stellaris,* merlin *Falco columbarius*, peregrine *F. peregrinus*, hen harrier *Circus cyaneus* and short-eared owl *Asio flammeus* are regularly present in winter.

SPA Citation
ICC/CAR
March 1995

This citation / map relates to a site entered in the Register of European sites for Great Britain
Register reference number UK90\0031
Date of registration 25 AUG 1995
Signed .....
on behalf of the Secretary of State for the Environment

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 26 June 1997

3. Country:

UK (England)

4. Name of the Ramsar site:

Somerset Levels and Moors

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* ;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 10 14 N 02 52 00 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Weston-super-Mare

The Somerset Levels and Moors Ramsar site is bounded by Bridgwater Bay in the west and the higher ground of the Mendips, Dorset Hills, Blackdown Hills, Brendons and Quantocks

Administrative region: North Somerset; Somerset

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 6388.49

Min. 2
Max. 9
Mean 4

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Ramsar site consists of a series of Sites of Special Scientific Interest (SSSI) within the largest area of lowland wet grassland and associated wetland habitat remaining in Britain. It covers about 35,000 ha in the flood plains of the Rivers Axe, Brue, Parrett, Tone and their tributaries. The majority of the site is only a few metres above mean sea level and drains through a large network of ditches, rhynes, drains and rivers. Flooding may affect large areas in winter depending on rainfall and tidal conditions. Parts of the site in the Brue Valley include areas of former raised peat bog which have now been substantially modified by agricultural improvement and peat extraction which has created areas of open water, fen and reedbed.

The site attracts internationally important numbers of wildfowl in winter and is one of the most important sites in southern Britain for breeding waders. The network of rhynes and ditches support an outstanding assemblage of aquatic invertebrates, particularly beetles.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

Supports 17 species of British Red Data Book invertebrates.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
97155 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):
Species with peak counts in winter:

Tundra swan , *Cygnus columbianus bewickii*, NW Europe	112 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	21231 individuals, representing an average of 5.3% of the population (5 year peak mean 1998/9-2002/3)
Northern lapwing , *Vanellus vanellus*, Europe - breeding	36580 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.
Species with peak counts in winter:

Mute swan , *Cygnus olor*, Britain	842 individuals, representing an average of 2.2% of the population (5 year peak mean 1998/9-2002/3)
Eurasian wigeon , *Anas penelope*, NW Europe	25759 individuals, representing an average of 1.7% of the population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	927 individuals, representing an average of 1.5% of the population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	1094 individuals, representing an average of 2.7% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	acidic, basic, neutral, clay, alluvium, peat
Geomorphology and landscape	lowland, floodplain
Nutrient status	eutrophic
pH	acidic, circumneutral
Salinity	fresh
Soil	mainly organic
Water permanence	usually seasonal / intermittent
Summary of main climatic features	Annual averages (Cardiff, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/cardiff.html) Max. daily temperature: 14.3° C Min. daily temperature: 6.8° C Days of air frost: 33.0 Rainfall: 1111.7 mm Hrs. of sunshine: 1518.0

General description of the Physical Features:

The Somerset Levels and Moors are one of the largest and richest areas of traditionally managed wet grassland and fen habitats in lowland UK. The majority of the site is only a few metres above mean sea level and drains through a large network of ditches, rhynes, drains and rivers. Flooding may affect large areas in winter depending on rainfall and tidal conditions. Parts of the site in the Brue Valley include areas of former raised peatbog that have now been substantially modified by agricultural intensification and peat extraction. This has created areas of open water, fen and reedbed.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Somerset Levels and Moors are one of the largest and richest areas of traditionally managed wet grassland and fen habitats in lowland UK. The majority of the site is only a few metres above mean sea level and drains through a large network of ditches, rhynes, drains and rivers. Flooding may affect large areas in winter depending on rainfall and tidal conditions. Parts of the site in the Brue Valley include areas of former raised peatbog that have now been substantially modified by agricultural intensification and peat extraction. This has created areas of open water, fen and reedbed.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Inland wetland

Code	Name	% Area
4	Seasonally flooded agricultural land	85.1
U	Peatlands (including peat bogs swamps, fens)	5
O	Freshwater lakes: permanent	3
Other	Other	2.9
9	Canals and drainage channels	2
Xp	Forested peatland	2

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The majority of the site is dominated by open wet grassland and ditches with a range of plant communities: Species-poor grassland including the semi-improved grassland communities with perennial rye grass and naturally-occurring species-poor floodplain or inundation grassland communities (National Vegetation Classification communities (NVC) include MG13, MG6, MG7, MG10).

Species-rich fen meadows and flood pastures where agricultural improvement has been less intense with MG8 *Cynosurus cristatus- Caltha palustris* grassland with *Cirsium dissectum* and *Caltha palustris* and mire communities such as M23, M24 and M25 with more *Juncus* and *Carex* species.

Smaller areas of drier species-rich hay meadows (MG5) with *Centaurea nigra, Orchis morio* and *Briza media*.

In the rivers, rhynes and ditches the floristic diversity is largely dependent upon sympathetic cleaning practises. The field ditches support the greatest floristic diversity including the species; *Wolffia arrhiza, Hottonia palustris* and *Hydrocharis morsus-ranae*.

Other habitats include - withy beds, orchards and pollarded willows.

The remaining habitats are largely restricted to the SSSIs within the Bure Valley where areas of former raised bog have been modified by peat extraction and agricultural improvement.

Small areas of tall herb fen (S24) with *Lathyrus palustris, Peucedanum palustre* and *Thelypteris palustris* and small remnants of raised bogs which are very degraded and support vegetation more akin to wet heath with *Erica tetralix* and *Molinia caerulea*.

Open water, reed swamp and reedbed with a range of species from submerged plants to tall stands of *Phragmites australis* and *Typha latifolia* are found in the flooded peat workings.

Wet woodland where peat has been cut many years ago and dominated by *Salix* spp., *Betula* spp. and *Alnus glutinosa*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Althaea officinalis, Persicaria laxiflora, Lathyrus palustris, Peucedanum palustre, Potamogeton coloratus, Potamogeton trichoides, Sium latifollum, Wolffia arrhiza

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species with peak counts in winter:

Gadwall , *Anas strepera strepera*, NW Europe	522 individuals, representing an average of 3% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Rallus aquaticus*, Europe	36 individuals, representing an average of 8% of the GB population (5 year peak mean 1998/9-2002/3)
European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	3857 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	16 individuals, representing an average of 2.2% of the GB population (5 year peak mean 1998/9-2002/3)
Common snipe , *Gallinago gallinago gallinago*, Europe -breeding	1633 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

Hydrochara caraboides, Bagous nodulosus, Odontomyia angulata, Oulema erichsoni, Valvata macrostoma, Odontomyia ornata, Stethophyma grossum, Pteromicra leucopeza, Lejops vittata, Cantharis fusca, Paederus caligatus, Hydaticus transversalis, Dytiscus dimidiatus, Hydrophilus piceus, Limnebus aluta, Laccornis oblongus

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Aquatic vegetation (e.g. reeds, willows, seaweed)
Archaeological/historical site
Environmental education/ interpretation
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Tourism
Traditional cultural

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	
National/Crown Estate	+	
Private	+	
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Collection of non-timber natural products: commercial	+	+
Commercial forestry	+	+

Cutting of vegetation (small-scale/subsistence)	+	+
Fishing: recreational/sport	+	+
Arable agriculture (unspecified)	+	+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Permanent pastoral agriculture	+	+
Hay meadows	+	+
Hunting: recreational/sport	+	+
Industrial water supply		+
Flood control	+	+
Irrigation (incl. agricultural water supply)	+	+
Mining/quarrying	+	+
Transport route		+
Urban development		+
Non-urbanised settlements	+	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
No factors reported	NA				

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site

Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Other	+	+

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.
Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Separate surveys to assess bird populations in relation to the restoration of disused peat workings on Shapwick Heath SSSI.
Ditch fauna: repeat Levels and Moors wide surveys undertaken approximately every five years by EN.

Flora.
Ditch flora: repeat Levels and Moors wide surveys undertaken approximately every five years by EN.
Meadow flora: repeat surveys 4-5 year repeat surveys by EN.

Completed.

Fauna.
Analysis of most recent trends undertaken by RSPB 2002.
Breeding waders: Four most recent major collaborative surveys on Levels and Moors, 1992, 1995, 1997, 2004.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Existing programmes: Guided walks and school group visits are available to Shapwick National Nature Reserves. Somerset Wildlife Trust run their own programme of events on Westhay Moor SSSI and likewise the RSPB on West Sedgemoor SSSI. English Nature's team newsletter for farmers and landowners runs regular features about the site.
Interpretation facilities: Are available at the Peat Moors visitor centre adjacent to the Shapwick National Nature Reserve. Interpretation panels have been located around the Reserve where appropriate. SWT have provided interpretation boards on Westhay Moor SSSI.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.
Controlled microlighting with few reported incidences of disturbance.

Wildfowling on a number of moors across the area although the affects of disturbance on the Ramsar is largely unknown and requires further work. Further work on disturbance to waterfowl has been undertaken for EN. Closer working between Wildflowing Clubs, BASC is ongoing.

Facilities provided.
Limited facilities for visitors to use the site except at NNRs in Brue Valley. General visitors and bird watchers at Shapwick National Nature Reserve, Westhay Moor and West Sedgemoor. Walking, including dog walking on droves, cycling, bird watching, coarse angling on the Main Drains may cause some limited disturbance to sites.

Seasonality.
All year.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

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Williams, R & Williams, R (1992) *The Somerset Levels*. Ex Libris Press, Bradford on Avon

Wolseley, PA, Palmer, MA & Williams R (1984) The aquatic flora of the Somerset Levels and Moors. *Nature Conservancy Council, CSD Report*, No. **545**

Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0013030**

SITENAME **Severn Estuary/ Môr Hafren**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0013030

1.3 Site name

Severn Estuary/ Môr Hafren

1.4 First Compilation date	1.5 Update date
2007-08	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2007-08
Date site confirmed as SCI:	2008-12
Date site designated as SAC:	2010-12
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.978055556	51.46861111

2.2 Area [ha]:

73714.11

2.3 Marine area [%]

98.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKL2	East Wales
UKK2	Dorset and Somerset
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area
UKZZ	Extra-Regio

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
1110			11779.51		G	C	C	B	C
1130			73677.25		G	A	A	B	B
1140			20271.38		G	A	B	B	B
1170			1474.28		P	C	C	A	C
1310						D			
1320			191.66		G	D			
1330			656.06		G	A	B	B	A

2110						D			

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
F	1102	Alosa alosa			p				P	DD	D			
F	1103	Alosa fallax			p				P	DD	A	B	C	A
F	1099	Lampetra fluviatilis			p				P	DD	C	B	C	B
F	1095	Petromyzon marinus			p				P	DD	C	A	C	B

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N03	1.0
N02	99.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: mud,clay,shingle,sedimentary,sand,peat 2 Terrestrial: Geomorphology and landscape: coastal 3 Marine:

Geology: sandstone/mudstone,pebble,sand,peat,gravel,shingle,sedimentary,cobble,biogenic reef,limestone/chalk,mud 4 Marine: Geomorphology: intertidal sediments (including sandflat/mudflat),estuary,subtidal rock (including rocky reefs),subtidal sediments (including sandbank/mudbank),intertidal rock,cliffs,pools,tidal rapids,islands,open coast (including bay),islands

4.2 Quality and importance

Sandbanks which are slightly covered by sea water all the time for which the area is considered to support a significant presence. Estuaries for which this is considered to be one of the best areas in the United Kingdom. Mudflats and sandflats not covered by seawater at low tide for which this is considered to be one of the best areas in the United Kingdom. Reefs for which the area is considered to support a significant presence. Atlantic salt meadows (Glauco-Puccinellietalia maritimae) for which this is considered to be one of the best areas in the United Kingdom. Petromyzon marinus for which this is considered to be one of the best areas in the United Kingdom. Lampetra fluviatilis for which this is considered to be one of the best areas in the United Kingdom. Alosa fallax for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	E06		B
H	M01		B
H	J02		B
H	G01		I
H	A02		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A04		I
H	A02		I
M	G03		B
H	D05		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

https://naturalresources.wales/conservation-biodiversity-and-wildlife/find-protected-areas-of-land-and-seas/designated-s

http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	22.7	UK00	77.3	UK01	3.4

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural Resources Wales
Address:	
Email:	

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

[X] Yes Name: SEVERN ESTUARY / MÔR HAFREN
Link:
https://naturalresources.wales/media/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-jur

[ ] No, but in preparation

[ ] No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora
Citation for Special Area of Conservation (SAC)

Name:	Severn Estuary/ Môr Hafren
Unitary Authority/County:	England: Bristol City, Gloucestershire, Bath & North East Somerset, Somerset, South Gloucestershire. Wales: Bro Morgannwg/Vale of Glamorgan, Caerdydd/Cardiff, Casnewydd/ Newport, Sir Fynwy/ Monmouthshire.
SAC status:	Designated on 10 December 2009
Grid reference:	ST321748
SAC EU code:	UK0013030
Area (ha):	73715.40
Component SSSI:	**Upper Severn Estuary SSSI, Severn Estuary SSSI, Bridgwater Bay SSSI.**

Site description:
The Severn Estuary lies on the south west coast of Britain at the mouth of four major rivers (the Severn, Wye, Usk, and Avon). The immense tidal range (the second highest in the world) and classic funnel shape make the Severn Estuary unique in Britain and very rare worldwide. This tidal range creates strong tidal streams and high turbidity, producing communities characteristic of the extreme physical conditions of liquid mud and tide-swept sand and rocks.

The **Estuary** includes a wide diversity of habitats including **Sandbanks which are slightly covered by sea water all the time, Mudflats and sandflats not covered by sea water at low tide**, **Atlantic salt meadows**, and **Reefs**, which are identified as Annex I habitat types in their own right.

The intertidal zone of mudflats, sand banks, rocky platforms and saltmarsh is one of the largest and most important in Britain. The estuary has a diverse geological setting and a wide range of geo-morphological features, especially sediment deposits. It is important for the interpretation of coastline dynamics and land-forms, and also past changes, in sea level, sediment supply, climate and river flow. The estuary's overall interest depends on its large size, and on the processes and interrelationships between the intertidal and marine habitats and its fauna.

The fluctuating salinity and highly mobile sediments with consequent high turbidity limits the benthic invertebrates of the mud and sandflats to relatively few species. Those which are tolerant of such conditions occur in very high densities on the more stable mudflats. Beds of eel-grass *Zostera* spp. also occur on some mudflats. A greater variety of invertebrates occurs on the intertidal rock platforms, a more stable habitat with rock pools and a relatively high cover of seaweeds.

The estuary fringes have large areas of saltmarsh. These are often grazed by sheep and/or cattle, a significant factor determining the plant communities. A range of saltmarsh types is present, with both gradual and stepped transitions between bare mudflat and upper marsh.

The estuarine fauna includes: invertebrate populations of importance (especially as a food resource for a wide range of bird and fish species), internationally important populations of waterfowl; and large populations of migratory fish, including **Sea lamprey** *Petromyzon marinus*, **River lamprey** *Lampetra fluviatilis* (both of which spawn in freshwater but complete part of their life cycle in the sea), **Twaite shad** *Alosa fallax* and the nationally rare and endangered Allis Shad *Alosa alosa*.

Qualifying habitats: The site is designated under Article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Estuaries
- Sandbanks which are slightly covered by sea water all the time. (Subtidal sandbanks)
- Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Reefs

Qualifying species: The site is designated under Article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Sea Lamprey (*Petromyzon marinus)*
- River Lamprey (*Lampetra fluviatilis)*
- Twaite Shad (*Alosa fallax)*

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0013030
Date of registration: 10 December 2009

Signed: S G Hopkinson

On behalf of the Secretary of State for Environment, Food and Rural Affairs

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030052**

SITENAME **North Somerset and Mendip Bats**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030052

1.3 Site name

North Somerset and Mendip Bats

1.4 First Compilation date	1.5 Update date
1998-03	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	1998-03
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.746388889	51.28611111

2.2 Area [ha]:

555.93

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
4030			10.56		G	D			
6210			151.77		G	B	C	A	B
8310			10.01		G	C	C	B	C
9180	X		138.43		G	B	C	B	B

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
I	1065	Euphydryas (Eurodryas, Hypodryas) aurinia			p				P	DD	D			
M	1304	Rhinolophus ferrumequinum			p	101	250	i		M	B	A	C	A
M	1303	Rhinolophus hipposideros			p	101	250	i		M	C	B	C	B

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N23	1.0
N08	22.5
N16	30.0
N09	27.5
N19	19.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sedimentary,nutrient-poor,basic,limestone 2 Terrestrial: Geomorphology and landscape: hilly,lowland,caves

4.2 Quality and importance

Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) for which this is considered to be one of the best areas in the United Kingdom. Caves not open to the public for which the area is considered to support a significant presence. Tilio-Acerion forests of slopes, screes and ravines for

which this is considered to be one of the best areas in the United Kingdom. Rhinolophus ferrumequinum for which this is considered to be one of the best areas in the United Kingdom. Rhinolophus hipposideros for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	U		O
H	E06		B
H	B02		I
H	K04		I
H	A04		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A04		I
H	B02		I
H	A02		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐ Yes

[ ]	No, but in preparation
[X]	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
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M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	North Somerset and Mendip Bats
Unitary Authority/County:	Bath and North East Somerset, North Somerset, Somerset
SAC status:	Designated on 1 April 2005
Grid reference:	ST480544
SAC EU code:	UK0030052
Area (ha):	561.19
Component SSSI:	Banwell Caves SSSI, Banwell Ochre Caves SSSI, Brockley Hall Stables SSSI, Compton Martin Ochre Mine SSSI, King's Wood and Urchin Wood SSSI, The Cheddar Complex SSSI, Wookey Hole SSSI

Site description:
The Cheddar complex and Wookey Hole areas support a wide range of habitats which provide feeding grounds for bats. These include semi-natural dry grasslands of which the principal community present is sheep's-fescue – meadow oat-grass (*Festuca ovina – Helictotrichon pratense*) grassland which occurs on rock ledges and on steep slopes with shallow limestone soil, especially in the dry valleys and gorges and on the south-facing scarp of the Mendips. King's Wood and Urchin Wood have developed over limestone which outcrops in parts of the site and forms a steep scarp to the south-east. There is mostly oak *Quercus robur* and ash *Fraxinus excelsior* woodland, though some areas are dominated by small-leaved lime *Tilia cordata* with both maiden and coppice trees. Other canopy trees include yew *Taxus baccata*, cherry *Prunus avium* and wild service tree *Sorbus torminalis*. There is a rich ground flora including many ferns and mosses.

The limestone caves and mines of the Mendips and the north Somerset hills provide a range of important breeding and hibernation sites for lesser horseshoe bat *Rhinolophus hipposideros* and greater horseshoe bat *Rhinolophus ferrumequinum*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- *Tilio-Acerion* forests of slopes, screes and ravines. (Mixed woodland on base-rich soils associated with rocky slopes)*
- Caves not open to the public
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*). (Dry grasslands and scrublands on chalk or limestone)

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Greater horseshoe bat *Rhinolophus ferrumequinum*
- Lesser horseshoe bat *Rhinolophus hipposideros*

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030052
Date of registration: 14 June 2005

Signed: Trevor Salmon

On behalf of the Secretary of State for Environment, Food and Rural Affairs

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE	**UK0030168**
SITENAME	**Hestercombe House**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0030168

1.3 Site name

Hestercombe House

1.4 First Compilation date	1.5 Update date
2001-03	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2001-03
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-3.084166667	51.05194444

2.2 Area [ha]:

0.06

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1303	Rhinolophus hipposideros			p	250	250	i		G	C	B	C	B

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N23	100.0
Total Habitat Cover	100

Other Site Characteristics

2 Terrestrial: Geomorphology and landscape: lowland

4.2 Quality and importance

Rhinolophus hipposideros for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	J02		B
H	K02		I
H	G01		I
H	M02		B
H	E06		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

http://publications.naturalengland.org.uk/category/6490068894089216

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Hestercombe House
Unitary Authority/County:	Somerset
SAC status:	Designated on 1 April 2005
Grid reference:	ST240287
SAC EU code:	UK0030168
Area (ha):	0.08
Component SSSI:	Hestercombe House SSSI

Site description:
Hestercombe House is a former country house and estate consisting of mixed woodland, pasture, lakes and landscaped gardens. A colony of lesser horseshoe bats *Rhinolophus hipposideros* utilise two roof voids within the former stable block and domestic outbuildings as maternity (breeding) roosts during the summer months, with a small number of bats also using the roofs as hibernation sites during the winter.

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Lesser horseshoe bat *Rhinolophus hipposideros*

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030168
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

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22/12/2015

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Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
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Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030148**

SITENAME **Exmoor and Quantock Oakwoods**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030148

1.3 Site name

Exmoor and Quantock Oakwoods

1.4 First Compilation date	1.5 Update date
2001-01	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2001-01
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-3.5825	51.18388889

2.2 Area [ha]:

1894.05

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK4	Devon
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
4030			0.57		G	D			
9120			70.08		G	D			
91A0			1414.86		G	A	C	B	B
91E0	X		45.46		G	C	C	A	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1308	Barbastella barbastellus			p	51	100	i		M	B	A	C	A
F	1163	Cottus gobio			p				C	DD	D			
F	1096	Lampetra planeri			p				R	DD	D			
I	1083	Lucanus cervus			p				P	DD	D			
M	1355	Lutra lutra			p				P	DD	C	B	C	C
M	1323	Myotis bechsteini			p				P	DD	C	B	C	C
M	1303	Rhinolophus hipposideros			p				P	DD	D			
F	1106	Salmo salar			p				C	DD	D			

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N07	0.5
N19	1.0
N06	0.5
N08	6.0
N10	0.5
N23	0.5
N16	87.0
N17	1.0

N09	3.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sedimentary,acidic,sandstone,neutral,nutrient-poor 2 Terrestrial: Geomorphology and landscape: upland,hilly,valley,slope,floodplain

4.2 Quality and importance

Old sessile oak woods with Ilex and Blechnum in the British Isles for which this is considered to be one of the best areas in the United Kingdom. Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) for which the area is considered to support a significant presence. Myotis bechsteini for which the area is considered to support a significant presence. Barbastella barbastellus for which this is considered to be one of the best areas in the United Kingdom. Lutra lutra for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A04		I
H	B02		I
H	H04		B
H	K04		I
H	I01		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02		I
H	B06		I
H	A04		I
H	A02		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

http://publications.naturalengland.org.uk/category/3212324
http://publications.naturalengland.org.uk/category/6490068894089216

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK01	22.4	UK04	100.0		

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

[ ]	Yes
[ ]	No, but in preparation
[X]	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Exmoor and Quantock Oakwoods
Unitary Authority/County:	Devon, Somerset
SAC status:	Designated on 1 April 2005
Grid reference:	SS894440
SAC EU code:	UK0030148
Area (ha):	1895.17
Component SSSI:	Barle Valley SSSI, North Exmoor SSSI, The Quantocks SSSI, Watersmeet SSSI, West Exmoor Coast and Woods SSSI

Site description:
This site supports extensive tracts of old sessile oak *Quercus petraea* with transitions to heathland. The oakwoods are rich in bryophytes, ferns (including *Dryopteris aemula*) and epiphytic lichens, the latter often associated with old trees, since parts are former wood-pasture rather than the oak coppice that is more common with this type. In the Barle Valley the woods also occur in mosaic with glades and small fields and the combination results in good populations of fritillary butterflies. Valley woodland dominated by alder *Alnus glutinosa* as well as ash *Fraxinus excelsior* which occurs in small areas alongside some of the streams.

A maternity colony of barbastelle bats *Barbastella barbastellus* utilises a range of tree roosts in the oak *Quercus* spp. woodland. The woods also hold Bechstein's bats *Myotis bechstenii*, whilst rivers and streams flowing through the site support otters *Lutra lutra*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*). (Alder woodland on floodplains)*
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles. (Western acidic oak woodland)

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Barbastelle bat *Barbastella barbastellus*
- Bechstein's bat *Myotis bechsteinii*
- Otter *Lutra lutra*

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030148
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

COUNTY: SOMERSET SITE NAME: CATCOTT, EDINGTON AND CHILTON MOORS

DISTRICT: SEDGEMOOR

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 (as amended)

Local Planning Authority: Somerset County Council, Sedgemoor District Council

National Grid Reference: ST 390420 Area: 1083 (ha) 2676 (ac)

Ordnance Survey Sheet 1:50,000: 182 1:10,000: ST 44 SW, ST 43, NW, ST 34 SE

Date Notified (Under 1949 Act): 1967 Date of Last Revision: –

Date Notified (Under 1981 Act): 1986 Date of Last Revision: –

Other Information:
Major part of site is new SSSI but includes Catcott Heath SSSI (nnotified inder 1949 Act: 1967)

Description:
Catcott, Edington and Chilton Moors form part of the extensive grazing marsh and ditch systems of the Somerset Levels and Moors. The land lies below 8m ODN in the basin of the River Brue. The soils are principally of the Altcar series reed peats which are overlain in parts by remnants of the Turberry Moor series moss peats. On the northern and southern fringes of the site the peat soils are overlain by Midelney series alluvial clay.

The water table is high for most of the year with occasional winter flooding by overtopping of the River Brue. The complex of rhynes and ditches has a high penned water level in summer and drains freely to the arterial system in winter.

A wide range of sward types has developed due to the variation in soils and in management practice. Unimproved swards are well represented with many meadows dominated by species-rich mire-type communities characterised by Meadow Thistle *Cirsium dissectum*, Meadow Rue *Thalictrum flavum*, Quaking-grass *Briza media*, Heath-grass *Danthonia decumbens*, Carnation Sedge *Carex panicea*, Common Sedge *C. nigra* and Southern Marsh-orchid *Dactylorhiza praetermissa*. Wetter unimproved marshy grassland may, in addition, contain Rushes *Juncus* spp, Marsh marigold *Caltha palustris*, Marsh Pennywort *Hydrocotyle vulgaris*, Tubular Water-dropwort *Oenanthe fistulosa*, Ragged-Robin *Lychnis flos-cuculi* and Creeping Jenny *Lysimachia nummularia*. A few meadows also contain Devil's-bit Scabious *Succisa pratensis*. Many of the semi-improved *Festu-Lolium* grasslands include components of the mire-type community, often with Oxeye Daisy *Leucanthemum vulgare*, Autumn Hawkbit *Leontodon autumnalis* and Meadow Vetchling *Lathyrus pratensis*.

Catcott Heath, on the south-eastern part of the site, contains an area of Purple Moor-grass *Molinia caerulea*, Bog Myrtle *Myrica gale* and Cross-leaved Heath *Erica tetralix* heathland with Alder *Anlus glutinosa* carr woodland and mixed scrub, containing Common Cotton-grass *Eriophorum angustifolium* and Royal Fern *Osmunda regalis*. The heath is noted for its rare vascular plants including Marsh Pea *Lathyrus palustris* Milk-parsley *Peucedanum palustre* and Marsh Fern *Thelypteris thelypteroides*. Other species with restricted distributions nationally include Marsh Cinquefoil *Potentilla palustris*, Great Fen-sedge *Cladium mariscus*, Slender Sedge *Carex lasiocarpa* and Marsh Stitchwort *Stellaria palustris*. A similar but less species-

rich area of alder carr and wet grassland is found on Burtle Whites on the North-eastern part of the site.

127 aquatic and bankside vascular plant species have been recorded in the field ditches, IDB-maintained rhynes and deep arterial watercourses. The diverse bankside flora, dominated by Reed Sweet-grass *Glyceria maxima,* includes Flowering Rush *Butomus umbellatus*, Bottle Sedge *Carex rostrata* and Water Dock *Rumex hydrolapathum*. Aquatic deep water species such as Yellow Water-lily *Nuphar lutea* and Arrowhead *Sagittaria sagittifolia* are largely confined to the eutrophic arterial channels. The ditches and rhynes contain a good range of submerged species: notably Fan-leaved Water-crowfoot *Ranunculus circinatus,* Spiked Water-milfoil *Myriophyllum spicatum*, Water-violet *Hottonia palustris* and Greater Bladderwort *Utricularis vulgaris*. Floating species include Frogbit *Hydrocharis morsus-ranea* and Rootless Duckweed *Wolffia arrhiza* with several notable emergent species including Mare's- tail *Hippuris vulgaris,* Greater Water-parsnip *Sium latifolium*, Lesser Water-plantain *Baldellia ranunculoides* and Fine-leaved-Water-dropwort *Oenanthe aquatica*.

A diverse invertebrate fauna is associated with these botanically rich water channels. The water beetle fauna is of exceptional interest, with the nationally rare species *Haliplus mucronatus* and *Hydrophilus piceus* present. The rare soldier fly *Stratiomys furcata* is found, and there are good numbers of dragonflies and damselflies, notably *Brachytron pratense* and *Sympetrum sanguineum.*

Other habitats present include hedges and hedgerow trees of Alder, Hawthorn *Crataegus monogyna* and willow *Salix spp*.

These diverse habitats provide suitable feeding and nesting sites for a wide range of birds. In winter, waterfowl such as Golden Plover *Pluvialis apricota*, Lapwing *Vanellus vanellus*, Snipe *Gallinago gallinago* and Dunlin *Calidris alpina* feed on the wet grasslands, whilst under flood conditions, wildfowl such as Teal *Anas crecca*, Wigeon *A. penelope* and Mallard *A. platyrhynchos* move on to the Moors. The pastures remain moist into spring and early summer when the tussocky fields support breeding Snipe, Lapwing, Curlew *Numenius arquata* and a few pairs of Redshank *Tringa totanus,* Yellow Wagtail *Motacilla flava* and Whinchat *Saxicola rubeta* breed on the moors and in spring, the pastures are an important feeding ground for Whimbrel *Numenius phaeopus* on migration.

Other vertebrate species present, include the Otter *Lutra lutra*, Grass Snake *Natrix natrix* and Common Frog *Rana temporaria*.

COUNTY: SOMERSET SITE NAME: BRIDGWATER BAY

DISTRICT: WEST SOMERSET

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 (as amended)

Local Planning Authority: Sedgemoor District Council, West Somerset District Council, Somerset County Council

National Grid Reference: ST 290480 Area: 3574.1 (ha) 8831.6 (ac)

Ordnance Survey Sheet 1:50,000: 181 182 1:10,000: ST 14 NE, 24 SW, NW, SE, NE, 25 SW, SE, NE, 34 NW, 35 SW

Date Notified (Under 1949 Act): – Date of Last Revision: –

Date Notified (Under 1981 Act): 1989 Date of Last Revision: –

Other Information:
The site includes Bridgwater Bay National Nature Reserve declared under Section 23 of the National Parks and Access to the Countryside Act 1949 and designated a wetland of international importance under the Ramsar Convention. A Nature Conservation Review Grade 1* site. The site is contiguous with the Brean Down, Berrow Dunes and Blue Anchor to Lilstock Coast SSSIs.

Description and Reasons for Notification:
Bridgewater Bay comprises a succession of habitats ranging through extensive intertidal mudflats, saltmarsh, shingle beach and grazing marsh intersected by a complex network of freshwater and brackish ditches. It supports internationally and nationally important numbers of over-wintering and passage migrant waders and waterfowl. The ditches and ponds contain a diverse invertebrate fauna including six nationally rare species and eighteen nationally scarce species. The site is an integral part of the Severn Estuary system and is ecologically linked to the Somerset Levels which provide alternative winter feeding grounds for waders and wildfowl.

The Bay occupies the sweeping arc of coastline between the wave-cut platform of Jurassic Blue Lias at the northern tip of the Quantock Hills and the cliffs of Carboniferous Dolomites and Limestone at Brean Down which project into the Severn Estuary and provide some degree of protection from the erosive tidal currents. This has allowed the deposition of an extensive area of intertidal mud which nonetheless remains highly mobile. Strong prevailing westerly winds have thrown up sand dunes and a shingle ridge at Barrow and Steart, respectively. On the landward side of these features is the marine/estuarine alluvium of Pleistocene and geologically recent times. The River Parrett meanders across this plain, its final loop encircling Pawlett Hams before entering the Bay and flowing out between Stert and Berrow Flats. The Hams are a hydrologically discrete area with water provided by the Cannington Brook which originates in the Quantock Hills.

The site contains the most extensive area of saltmarsh within Somerset and one of the largest Common Cord-grass *Spartina anglica* swards in the Severn Estuary. This is located on a spit at the mouth of the River Parrett, occupies a wide coastal band from Wall Common to Stert Island and fringes the mouth of the Brue. Common Cord-grass dominates much of the seaward edge of the marsh, having vigorously invaded and consolidated the fronting mudflats. Higher up, Common Saltmarsh-grass *Puccinellia maritima* increases in abundance with Sea Aster *Aster tripolium.* Where ungrazed, Common Reed *Phragmites australis* frequently forms a zone above this. Grazing of the upper marsh tends to encourage Red Fescue *Festuca rubra* and Creeping Bent *Argostis*

stolonifera. Sea Couch *Elymus pycnanthus* and Sea Club-rush *Scirpus maritimus* occur at the landward edge of the marsh. Other members of this community include Sea Wormwood *Artemisia maritima*, Saltmarsh Rush J*uncus gerardi*, Common Sea-lavender *Limonium vulgare*, Common Scurvy-grass *Cochlearia officinalis*, Spear-leaved Orache *Atriplex prostrata* and Sea Purslane *Halimione portulacoides*. High level sheep-grazed marshes carry populations of the nationally scarce Bulbous Foxtail *Alopecurus bulbosus*, Slender Hare's-ear *Bupleurum tenuissimum* and Sea Barley *Hordeum marinum* while Stert Island is known to support the nationally rare Compact Brome *Bromus madritensis* and nationally scarce Ray's Knotgrass *Polygonum oxyspermum*.

The development of shingle ridges and construction of sea defences has prevented tidal inundation and encouraged a transition from saltmarsh to grazing marsh on Pawlett Hams, Wick Moor, Catsford and Wall Common. The majority of Pawlett Hams is semi-improved, permanent neutral grassland with Perennial Rye-grass *Lolium perenne* and Crested Dog's-tail *Cynosurus cristatus* abundant. Some fields have been converted to arable.

Pawlett Hams, Steart and Wick Moor are divided by networks of ditches which act as a drainage system in winter and as stock barriers and drinking water supplies in the summer. A wide variety of aquatic and bankside plant species occur in the ditches. Free-floating species include the nationally restricted Rootless Duckweed *Wolffia arrhiza*, together with uncommon species such as Frogbit *Hydrocharis morsus-ranae* and Water Fern *Azolla filiculoides*. Amongst the submerged waterweeds, Rigid Hornwort *Ceratophyllum demersum* and Spiked Water-milfoil *Myriophyllum spicatum* are common. Emergent species include Flowering Rush *Butomus umbellatus*, Common Reed and Water-plantain *Alisma plantago-aquatica*, while Brookweed *Samolus valerandi* and the local Parsley Water-dropwort *Oenanthe lachenalii* are found on the banksides. The slightly brackish nature of the water is indicated by the presence of plants such as the nationally restricted Brackish Water-crowfoot *Ranunculus baudotii*, Sea Clubrush *Scirpus maritimus*. Fennel Pondweed *Potamogeton pectinatus*, Lesser Pondweed *P. berchtoldii* and Grey Clubrush *Schoenoplectus tabernaemontani* form part of the community here. Many of the fields contain ponds which have well developed communities of plants and invertebrates very similar to those of the surrounding ditches.

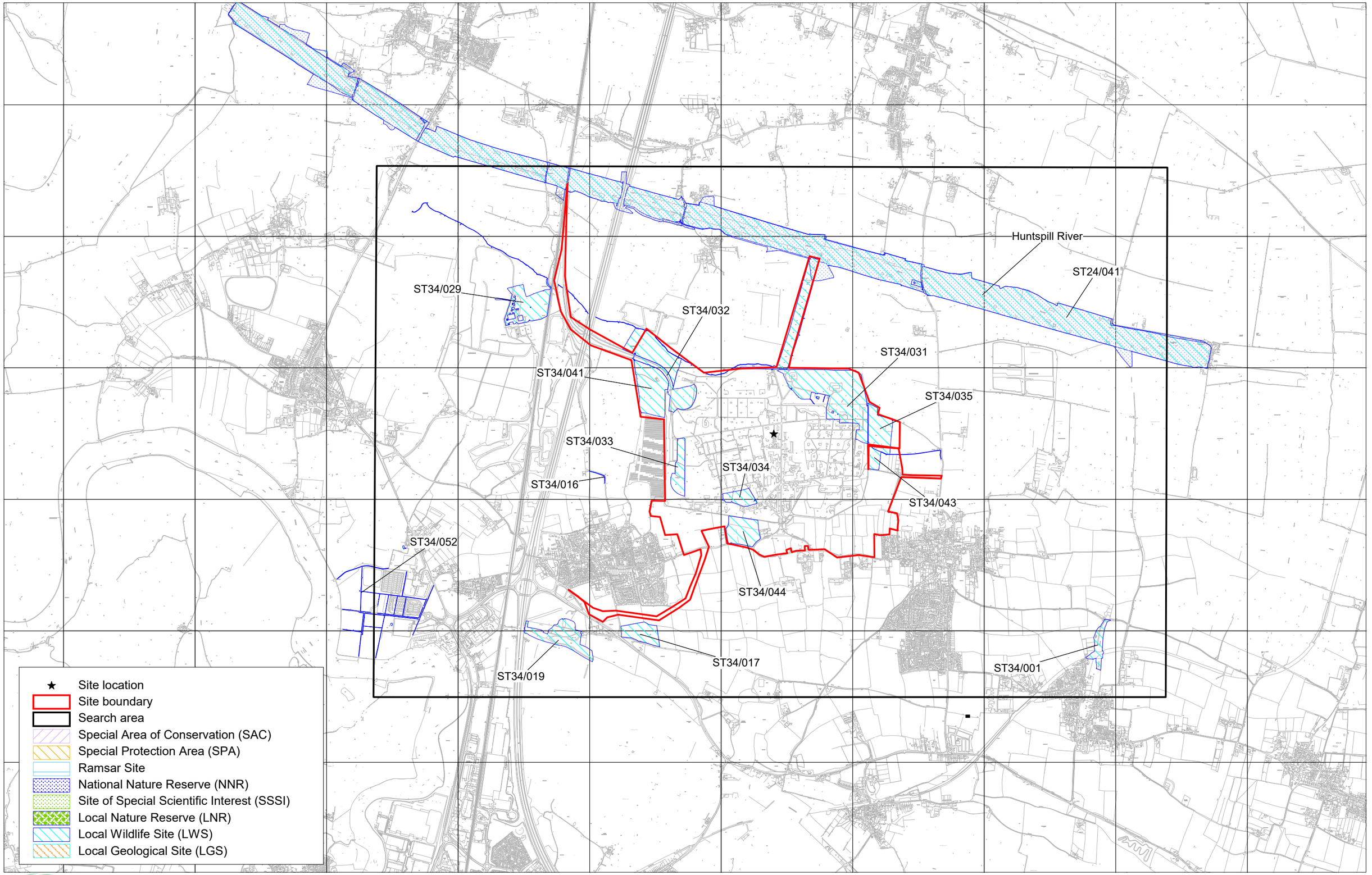
The invertebrate interest is associated with the brackish and freshwater rhyne systems and ponds of Pawlett Hams and Wick Moor and the saltmarsh communities within the site. Five Red Data Book species have been recorded from Pawlett Hams: the Great Silver Water Beetle *Hydrophilus piceus*, the water beetle *Hydrovatus clypealis*, the hover fly *Lejops vittata* and the soldier flies *Odontomyia ornata* and *Stratiomys singularior*. A water mite new to Britain, *Diplodontus scapalaris*, has recently been recorded here. Nationally scarce species include the aquatic snail *Cyraulus laevis*, the Hairy Dragonfly *Brachytron pratense* and a ladybird *Coccidula scutellata*. The Rhyne system of Wick Moor supports a Red Data Book water beetle *Haliplus mucronatus*. Other nationally scarce species include the water beetles *Rhantus suturalis*, *Enochrus bicolor*, and *Berosus affinis*, the ladybird *Coccidula scutellata* and a soldier fly *Odontomyia viridula*. The insect fauna of the ungrazed saltmarshes include the nationally notable beetles *Bembidion normannum*, *Phaedon concinnus* and *Tachyporus atriceps*. Two nationally scarce Diptera have also been recorded; *Nemotelus notatus* and *Thinophilus flavipalpis*. Common saltmarsh specialists include the Dipteran species *Scatomyza litorea* and *Dolidropus griseipennis*, and the beetles *Pogonus chalceus* and *Reichenbachia helferi*.

Bridgwater Bay is a critical feeding ground for passage and over-wintering waders and wildfowl. In its own right it supports internationally important numbers of Whimbrel *Numenius phaeopus* and Black-tailed Godwit *Limosa limosa* on passage. Of the over-wintering species it attracts nationally important numbers of Dunlin *Calidris alpina* and Wigeon *Anas penelope*. Shelduck *Tadorna tadorna* use the Bay as a moulting ground and are also present in nationally important numbers. The Bay forms an integral part of the Severn Estuary system and is used by a substantial proportion of the overall waterfowl

population which is of international importance. The assemblage of wildfowl and waders contains individual populations present in internationally important numbers including Dunlin, Shelduck, Wigeon, Curlew *Numenius arquata*, Redshank *Tringa totanus* and Teal *Anas crecca*. Populations of national importance are those of Ringed Plover *Charadrius hiaticula* and Grey Plover *Pluvialis squatarola.* Significant numbers of Knot *Calidris canutus*, Turnstone *Arenaria interpres*, Common Snipe *Gallinago gallinago* and Mallard *Anas platyrhynchos* also occur.

APPENDIX 12.1D

Local Wildlife Site Citation and SERC Survey Sheets



Search area: 6km x4km buffer around site at: ST334425
Requested Sites: Statutory designated sites
Non-statutory designated sites

For: Ecology Solutions

Client ref: Puriton 7761

Job no: 5010

Date: November 2020

Evaluated Site Details

Date: 06/11/2020
Client: Ecology Solutions
Job number: 5010
Reference / Project Title: Puriton 7761
Location: Puriton near Bridgwater
Search Area: 6km x 4km around site at ST334425

Refer to accompanying Sites Map for locations

Evaluated sites with statutory designations recorded within the area of search:

Name	Status
Huntspill River	NNR

For more information on designated sites please refer to the **Natural England web site**

Evaluated sites with non-statutory designations, Local Wildlife Sites (LWS) cLWS (Candidate Local Wildlife Sites) and/or Local Geological Sites (LGS), recorded within the area of search:

File Code	Name	Description	Status	Criteria[1]
ST24/041	Bridgwater Bay NNR	Part of NNR Outside of SSSI supporting legally protected species	LWS	5H4.9
ST34/001	Upper Combe Plantation	Broadleaved woodland (part ancient) with bare earth tracks.	LWS	5H2.2 5S1.2
ST34/016	Batch Road Fields	Semi- improved ridge and furrow grassland with a small pond and permanently wet ditches.	LWS	5S1.2
ST34/017	New Ground Covert	Ancient semi-natural broadleaved woodland.	LWS	H2.2
ST34/019	South Hills Wood	Ancient semi-natural broadleaved woodland with species rich grassland.	LWS	5H2.1 5S1.2
ST34/029	Pawlett Mead Drove Fields	Unimproved neutral grassland.	LWS	5H2.2 5S8.3 5H2.1
ST34/031**	Puriton rhynes and ponds	Rhyne network, ponds and reed beds with legally protected species.	LWS	6H5.6.1 6H7.4
ST34/032**	Puriton Meadows	Unimproved grassland and scrub-lined dissused railway.	LWS	5H2.1 5S1.2
ST34/033**	Puriton Ash Ground	Species rich ash-tip.	LWS	H11.3 S1.2
ST34/034**	Puriton Cowslip Field	Unimproved calcareous grassland with rhyne.	LWS	H3.2

Evaluated Site Details

File Code	Name	Description	Status	Criteria[1]
ST34/035**	Borrow Pit, Puriton	Lake with extensive reed beds.	LWS	5S4.2 5H7.2 5S1.2 5S4.2
ST34/041**	North Mead Drove Fields	Species rich rhynes and damp grassland used by wetland birds.	LWS	5H8.1
ST34/043**	Stoning Pound Field South and Stoning Pound Rhyne	Vascular plant species-rich rhynes with legally protected fauna and semi-improved grassland.	LWS	5S1.2 5S3.1.2
ST34/044**	Woolavington Road and Fields North	Semi-improved grassland with rush pasture and reedbeds.	LWS	5H5.1
ST34/052	Junction 23 Ponds & Ditches	Network of ditches and ponds supporting protected, UK BAP and Somerset notable species.	LWS	candidate LWS

[1]Criteria– Reasons for Selection for Local Wildlife Sites

For code prefixed by '**6**' refer to **Somerset Local Sites Guidelines 2010**

For code prefixed by '**5'** refer to **Local Wildlife Site Guidelines 1997 (revised 2004)**

For other codes refer to **Local Wildlife Site Guidelines 1991**

**** Site is within site boundary and additional survey report, if available supplied as requested**

[1]Criteria– Reasons for Selection for Local Geological Sites

LGS Criteria

ST34/31/03/A

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
PURITON RHYNES	ST 34/031	S T 3 3 9 4 2 9

Date 8TH AUGUST 1995 | Recorder(s) V. RASHFORD, C BELLFIELD, L. GRIFFITHS, R ALLEN

Species rich rhyne network

LOCATION, TOPOGRAPHY, BOUNDARIES AND SURROUNDING LAND USE

Puriton Rhynes, total length 1 KM, are located approximately 1·5 KM north west of Woolavington. The site lies on flat land with an underlying geology of Marine alluvium. Surrounding land use consists of semi-improved grassland which is cattle grazed on the south. Figure 1 illustrates the layout of the rhynes, with labelling to assist the description.

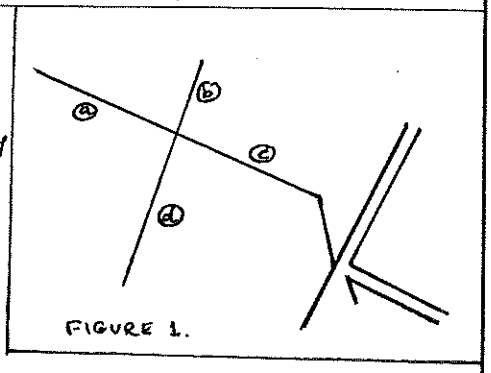


FIGURE 1.

DETAILED DESCRIPTION

Section (a) is fringed with Bramble (Rubus fruticosus agg) and some small Hawthorne (Crataegus monogyna). Vegetation in the centre of the rhyne is dominated by ◆ Greater Water Parsnip (Sium latifolium) with some Hard Rush (Juncus inflexus), ◆ Frogbit (Hydrocharis morsus-ranae) and Common Reed (Phragmites australis). A variety of species are present on the margins, these include False Fox Sedge (Carex otrubae), Hogweed (Heracleum sphondylium) ◆ Lesser Skullcap (Scutellaria minor) and Water Mint (Mentha aquatica). Common Fleabane (Pulicaria dysenterica), Marsh Bedstraw (Galium palustre), Ribwort Plantain (Plantago lanceolata), Agrimony (Agrimonia eupatoria) and Shore Parsley (Sison anomum) occur at the edge of the field. Grasses include Couch Grass (Elymus farctus), Timothy (Phleum pratense), False Oat Grass (Arrhenatherum elatius) and Yellow Oat Grass (Trisetum flavescens).

At the centre of the crossing rhynes Section (b) is shaded by Hawthorn and here Greater Duckweed (Lemna Polyrhiza) and Common Water Plantain (Alisma Plantago-aquatica) are found. Tall growth of Bur Reed (Sparganium sp) with Redshank (Polygonum persicaria), Floating Sweet Grass (Glyceria fluitans), Common Spike Rush (Eleocharis palustris) Gipsywort (Lycopus europaeus) Water Mint and Hairy Sedge (Carex hirta) occur along the rhyne. More terrestrial vegetation is present such as Hedge Bindweed (Calystegia sepium ssp sepium), Bristly Oxtongue (Picris echioides) and Dog Rose (Rosa canina). The water surface is visible and dominated by ◆ Frogbit. Banks are steep with overhanging rushes. ◆ Wild Parsnip (Pastinaca sativa) ◆ Lesser Skullcap and False Fox Sedge are also present. Where the rhyne meets the road large emergent vegetation dominates, overshadowing the water surface.

The centre of Section (c) is overgrown with Greater Water parsnip and Reed Sweet Grass (Glyceria maxima). There are also some patches of bramble. Many of the previously mentioned species occur here along with Perforate St Johns Wort (Hypericum perforatum), Marsh Bedstraw (Galium palustre), Pepper Saxifrage (Silaum silaus), Tufted Vetch (Vicia cracca) and Marsh Woundwort (Stachys palustris). Samples of aquatic vegetation revealed Ivy Leaved Duckweed (Lemna trisulca), Fat Duckweed (Lemna gibba), Common Duckweed (Lemna minor), ◆ Rootless Duckweed (Wolffia arrhiza) and ◆ Water Horsetail (Equisetum fluviatile). Poaching on the cattle grazed south side has created a sloping bank. At its furthest extremity the rhyne becomes completely choked with common Reed. Here an example of ◆ Strawberry Clover (Trifolium fragiferum) was also seen.

Section (d) of the rhyne system is steep sided with Hard Rush overhanging the banks. ◆ Lesser Pond Sedge (Carex acutiformis) and much water Mint are present as well as creeping Jenny (Lysimachia nummularia) ◆ Wild Parsnip and ◆ Water Horsetail. At the

Habitat[s] G125

ST 34/31/03/A

SERC Survey Sheet	Site Name: Puriton Rhynes	Site Number: ST 34/031	Grid Reference: S T 3 3 9 4 2 9
	Date: 8th August 1995	Recorders: V. BASHFORD, L GRIFFITHS, C. BELLFIELD, R. ALLEN	

fence the water surface contains much ◆ Frogbit and water Plantain. The surrounding substrate is generally wetter, Hard and Soft Rush (Juncus effusus) Marsh Woundwort and creeping Buttercup (Ranunculus repens) are found.

The remaining rhynes are dominated by Common Reed although occasional Purple Loosestrife (Lythrum Salicaria), Greater Pond Sedge (Carex riparia) and Marsh Ragwort (Senecio aquaticus) are found.

◆ Somerset Notable Species.

ST34/31/03/A

SERC Survey Sheet

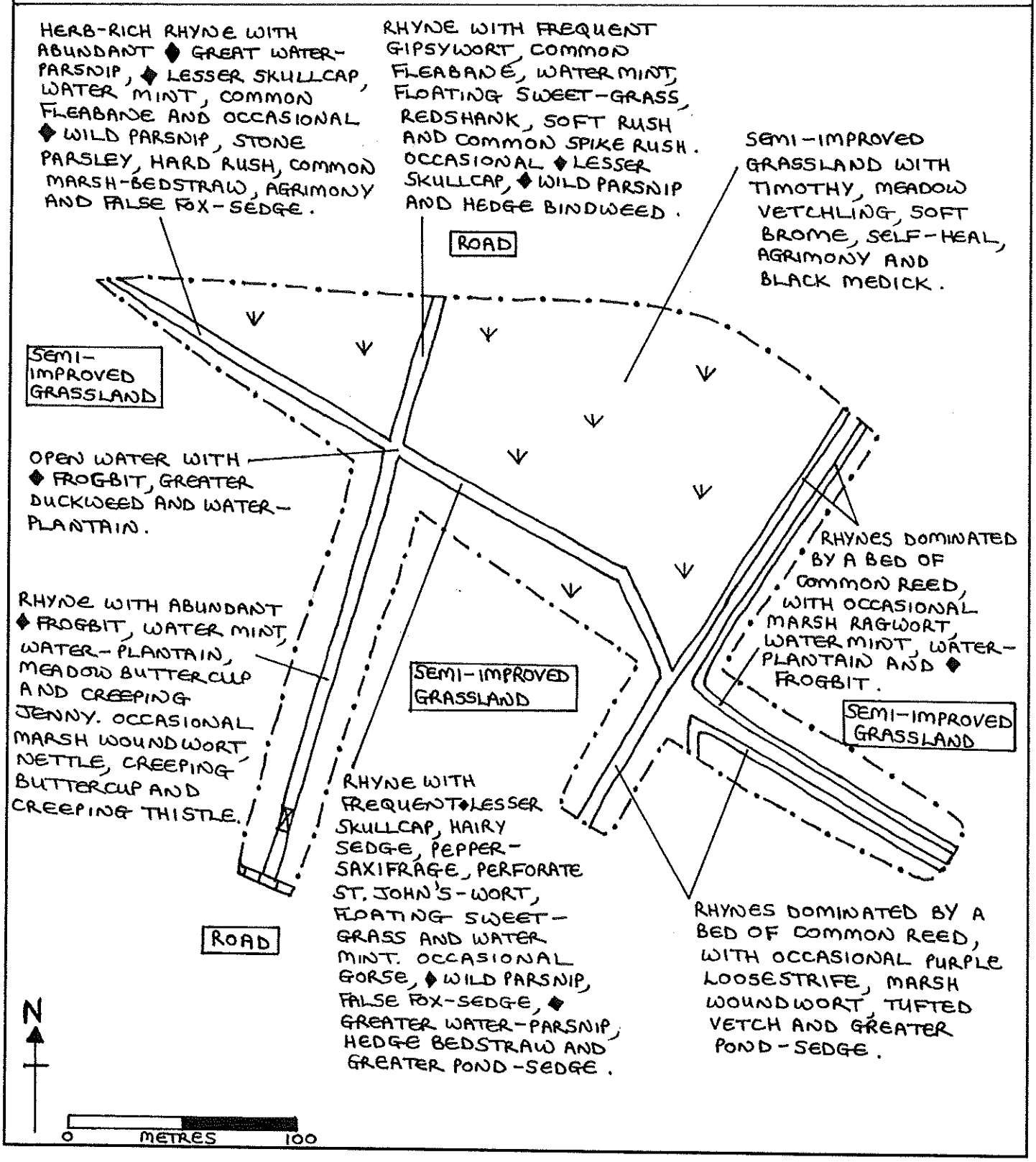
Site Name	Site Number	Grid Reference(s)
PURITON RHYNES	ST 34/031	S T 3 3 9 4 2 9

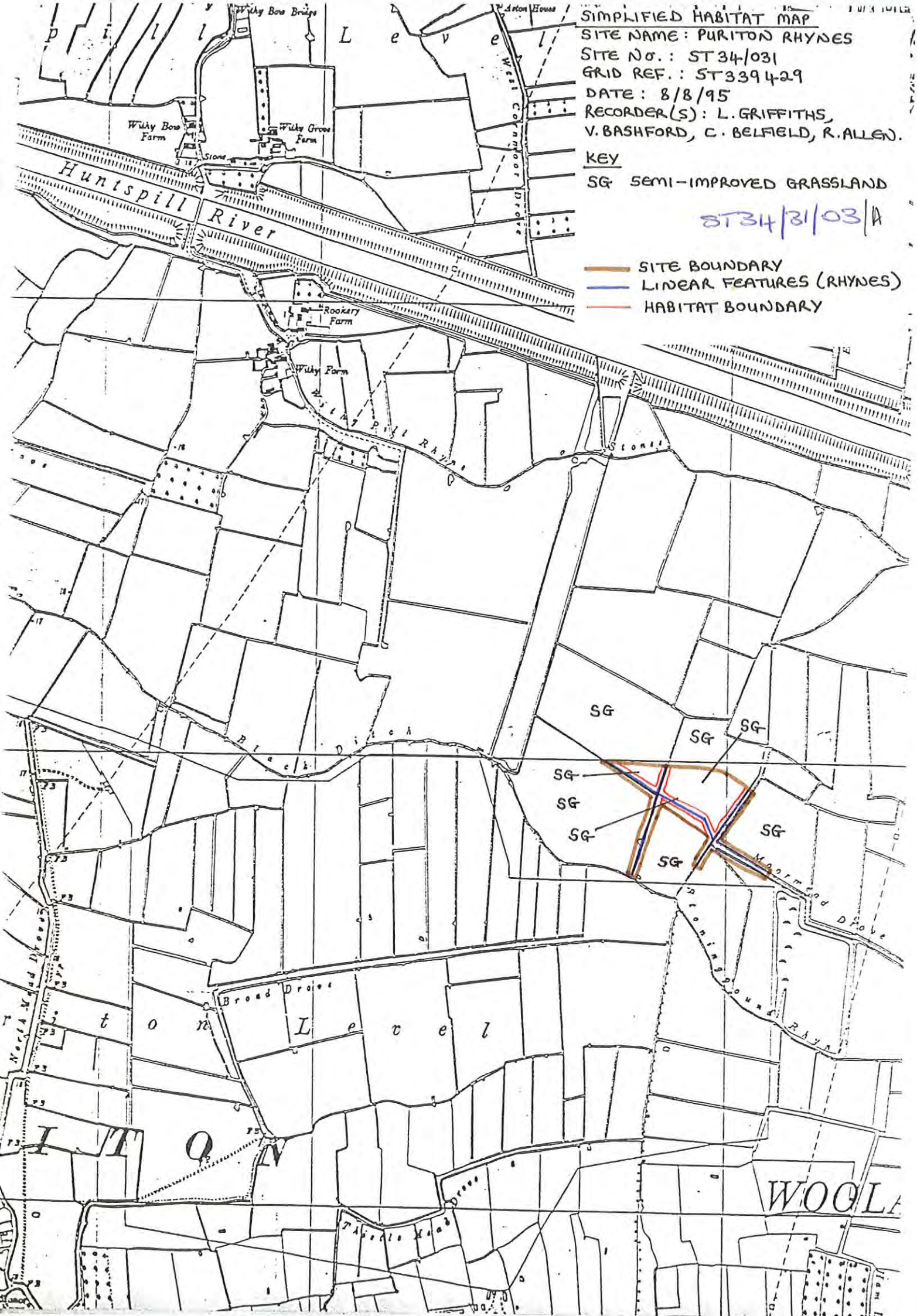
Date 8/8/95

Recorder(s) L. GRIFFITHS, V. BASHFORD, C. BELFIELD, R. ALLEN.

KEY :

- NO PHYSICAL BOUNDARY TO SITE
- WOODEN FENCE
- GATE
- SEMI-IMPROVED GRASSLAND
- ◆ SOMERSET NOTABLE SPECIES
- RHYNES
- HABITAT SURROUNDING LAND USE




SIMPLIFIED HABITAT MAP
SITE NAME: PURITON RHYNES
SITE No.: ST34/031
GRID REF.: ST339429
DATE: 8/8/95
RECORDER(S): L. GRIFFITHS, V. BASHFORD, C. BELFIELD, R. ALLEN.
KEY
SG SEMI-IMPROVED GRASSLAND
ST34/31/03/A
SITE BOUNDARY
LINEAR FEATURES (RHYNES)
HABITAT BOUNDARY
Huntspill River
Willy Bore Bridge
Willy Bore Farm
Willy Green Farm
Stone
Rookery Farm
Willy Farm
Wyld Pill Rhyne
Black Ditch
Broad Drove
Moorland Drove
Broadmoor Rhyne
Puriton Level
SG

ST 34/31/03/A

Vascular Plant Recording Form

Site Name: PURITON RHYNES

File Code: ST 34/031

Date: 5/5/95

Grid Ref.: S T 3 3 9 4 2 9

Recorder(s): V. BASHFORD, L GRIFFITHS

	O	L
Acer campestre		
Acer platanoides		
Acer pseudoplatanus		
Achillea millefolium		R
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria		
Aesculus hippocastanum		
Aethusa cynapium		
Agrimonia eupatoria		
Agrostis canina / canina	O	
Agrostis capillaris		
Agrostis gigantea		
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum		
Alisma plantago-aquatica	O	
Alliaria petiolata		
Allium ursinum		
Allium vineale		
Alnus glutinosa		
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis		
Anacamptis pyramidalis		
Anagallis arvensis		
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris		
Anthemis cotula		
Anthoxanthum odoratum		
Anthriscus caucalis		
Anthriscus sylvestris		
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum		
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.		
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius	O	
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes		
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis		
Berula erecta		
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum		
Brassica napus		
Brassica nigra		
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.	O	
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii		
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa		
Callitriche stagnalis		
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium		R
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris		
Cardamine flexuosa		
Cardamine hirsuta		
Cardamine pratensis		
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis	O	

	O	L
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca		
Carex hirta	O	
Carex nigra		
Carex otrubae	O	
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		R
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra		
Centaurea scabiosa		
Centaurium erythraea		
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum		
Cerastium glomeratum		
Ceratophyllum demersum		
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.		
Chamaecyparis lawsonian.		
Chamaenerion angustifoli.		
Cheiranthus cheiri		
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana		
Cirsium acaule		
Cirsium arvense		O
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare		
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum		
Conopodium majus		
Convolvulus arvensis		
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus		
Coronopus squamatus		
Corydalis claviculata		
Corydalis lutea		
Corylus avellana		
Crataegus monogyna		R
Crepis capillaris		
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		
Cynosurus cristatus		
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata		O
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota		
Deschampsia cespitosa		
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea		
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl		
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		O
Eleocharis uniglumis		
Elodea canadensis		
Elymus caninus		
Elymus repens		
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum	O	D
Epilobium lanceolatum		
Epilobium montanum		
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		

	O	L
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense		
Equisetum fluviatile	O	C
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		
Erodium cicutarium		
Erophila verna sens.lat.		
Euonymus europaeus		
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.		
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior		
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine		
Galium cruciata		
Galium mollugo agg.		
Galium odoratum		
Galium palustre agg.	F	
Galium saxatile		
Galium uliginosum		
Galium verum		
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum		
Geranium lucidum		
Geranium molle		
Geranium pratense		
Geranium pyrenaicum		
Geranium robertianum		
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea		
Glyceria declinata		
Glyceria fluitans	O	
Glyceria maxima	O	
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix		
Helianthemum nummula.		
Heracleum sphondylium	O	
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus		
Holcus mollis		
Hordeum murinum		
Hordeum secalinum		
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.	O	
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum	O	
Hypericum tetrapterum		
Hypochoeris radicata		
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus		
Juncus acutiolia		
Juncus articulatus		
Juncus conglomeratus		
Juncus effusus	F	
Juncus inflexus	F	
Juniperus communis		
Knautia arvensis		
Koeleria macrantha		
Lamiastrum galeobdolon		
Lamium album		
Lapsana communis		
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis	O	
Lemna gibba	O	C
Lemna minor	O	D
Lemna polyrhiza	O	A
Lemna trisulca	O	A
Leontodon autumnalis		
Leontodon hispidus		
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare		
Ligustrum vulgare		

	O	L
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne		
Lonicera periclymenum		
Lotus corniculatus		
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus	O	
Lysimachia nemorum		
Lysimachia nummularia	R	
Lythrum portula		
Lythrum salicaria	O	
Malus sylvestris sens.lat.		
Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica		
Medicago lupulina	O	
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		
Melilotus officinalis		
Mentha aquatica	E	
Mentha arvensis		
Mentha spicata		
Mercurialis annua		
Mercurialis perennis		
Milium effusum		
Moehringia trinervia		
Molinia caerulea		
Mycelis muralis		
Myosotis arvensis		
Myosotis discolor		
Myosotis laxa	O	
Myosotis ramosissima		
Myosotis scorpiodes		
Myosoton aquaticum		
Nardus stricta		
Nasturtium officinale sl		
Nasturtium microphyllum		
Nuphar lutea		
Nymphaea alba		
Odontites verna		
Oenanthe crocata		
Oenanthe fluviatilis		
Oenanthe pimpinelloides		
Oenothera erythrosepala		
Ononis repens		
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		
Orobanche hederae		
Orobanche minor		
Oxalis acetosella		
Papaver dubium		
Papaver lecoqii		
Papaver rhoeas		
Parietaria judaica		
Pastinaca sativa	O	D
Pedicularis sylvatica		
Pentaglottis sempervirens		
Petasites fragrans		
Petasites hybridus		
Phalaris arundinacea		
Phleum pratense / berto.		
Phleum pratense / prate.	O	
Phragmites australis	O	D
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides	O	
Picris hieracioides		
Pilosella officinarum		
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
Plantago lanceolata	O	
Plantago major	R	
Plantago media		
Platanthera chlorantha		
Poa annua		
Poa compressa		
Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis		
Polygala serpyllifolia		
Polygala vulgaris		
Polygonatum multiflorum		
Polygonum amphibium	O	
Polygonum arenastrum		
Polygonum aviculare		
Polygonum bistorta		
Polygonum hydropiper		
Polygonum lapathifolium		

	O	L
Polygonum persicaria	O	
Polypodium interjectum		
Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus		
Potamogeton pusillus		
Potentilla anserina	O	
Potentilla erecta		
Potentilla reptans	E	
Potentilla sterilis		
Primula veris		
Primula vulgaris		
Prunella vulgaris		
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa		R
Pseudotsuga menziesii		
Pteridium aquilinum		
Pulicaria dysenterica		
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris		
Ranunculus aquatilis st		
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		
Ranunculus flammula		
Ranunculus omiophyllus		
Ranuculus parviflorus		
Ranuculus repens	O	
Ranunculus sceleratus		
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		
Reseda luteola		
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis		
Rosa canina	O	
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.		F
Rubus idaeus		
Rumex acetosa		
Rumex acetosella agg.		
Rumex confertus		
Rumex crispus	O	
Rumex hydrolapathum		
Rumex obtusifolius		
Rumex pulcher		
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba		
Salix caprea		
Salix cinerea		
Salix fragilis		
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra		
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata		
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		R
Sedum acre		
Sedum album		
Senecio aquaticus	O	
Senecio erucifolius		
Senecio jacobaea	O	
Senecio squalidus		
Senecio vulgaris		
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus	O	
Silene alba		
Silene dioica		
Silene vulgaris		
Sinapis arvensis		
Sison amomum	O	
Sisymbrium officinale		
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara		
Solanum nigrum		

	O	L
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		O
Sonchus asper		
Sonchus oleraceus		
Sorbus aria agg.		
Sorbus aucuparia		
Sparganium emersum		
Sparganium erectum		
Spergula arvensis		
Stachys officinalis		
Stachys palustris		O
Stachys sylvatica		
Stellaria alsine		
Stellaria graminea		
Stellaria holostea		
Stellaria media sens. str.		
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.		
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		R
Trifolium hybridum		
Trifolium medium		
Trifolium pratense		
Trifolium repens		
Triglochin palustris		
Tripleurosperm. mar. / ino.		
Trisetum flavescens		O
Tsuga heterophylla		
Tussilago farfara		
Typha latifolia		
Ulex europaeus		R
Ulex gallii		
Ulmus glabra		
Ulmus procera		
Umbilicus rupestris		
Urtica dioica	O	F
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis		
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		
Verbena officinalis		
Veronica anagallis-aquatica		
Veronica arvensis		
Veronica beccabunga		
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca		F
Vicia hirsuta		
Vicia sativa / sativa		
Vicia sepium		
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza	O	

Sium latifolium O D
Elymus farctus O
Sparganium sp. F

Notables count:

A.V. Plant count:

Somerset notable species in **BOLD**. Ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

ST 34|32|03

SERC Survey Sheet	Site Name: PURITON MEADOWS & RAIL SPUR	Site Number: ST34/32	Grid Reference(s): S T 3 2 7 4 2 7
	Date: 8/8/95	Recorder(s): C BELFIELD, R. ALLEN	

Unimproved grassland and scrub-lined disused railway.

Location, Topography, Boundaries and Surrounding Land Use.

The site, area 4.25 ha, is situated 1 km north of Puriton. The site consists of three fields and part of a disused railway which are within the boundary of the Royal Ordinance site and a section of the disused railway outside the boundary to the northwest. Boundaries to the fields are indistinct to the south, east and west with hedgerows to the north. The railway is bordered by a wooden fence to the northeast and hedgerow to the southwest. Surrounding land use is improved and semi-improved grassland to the north and west, unimproved grassland to the east and scrub to the south. At the time of survey the fields had recently been mown.

Detailed Description.

The three fields are unimproved and support a range of species, including frequent Crested Dogstail (*Cyanosurus cristatus*), Sweet Vernal Grass (*Anthoxanthum odoratum*), Meadow Foxtail (*Alopecurus pratensis*), Pepper Saxifrage (*Silaum silaus*), occasional Black Knapweed (*Centaurea nigra*), Birdsfoot Trefoil (*Lotus corniculatus*), Agrimony (*Agrimonia eupatoria*), and Cowslip (*Primula veris*). Adderstongue Fern (*Ophioglossum vulgatum*) is reported as being present in these fields. The middle field becomes wetter to the north and in this area are found Hard Rush (*Juncus inflexus*) and ♦Lesser Pond Sedge (*Carex acutiformis*). Vegetation grows to a height of 1.5 m around the field margins. Species include Tufted Hair Grass (*Deschampsia cespitosa*), False Oat Grass (*Arrhenatherum elatius*), Cocksfoot (*Dactylis glomerata*) and Rosebay Willowherb (*Chamerion angustifolium*). To the west of the fields is a small area of Common Reed (*Phragmites australis*). The fields are divided by mature hedgerows of Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*) and Goat Willow (*Salix caprea*).

The disused railway runs to the northwest. In the southern section the gravel around the track is overgrown with Creeping Cinquefoil (*Potentilla reptans*), Perforate St John's-wort (*Hypericum perforatum*) and Ivy (*Hedera helix*). To the sides of the railway line there are patches of tall, dense scub of Hawthorn, Bramble (*Rubus fruiticosus* agg.) and Blackthorn. Between these patches of scrub is tall vegetation (*to 1.5 m*) including False Oat Grass, Tufted Hair Grass, Creeping Thistle (*Cirsium arvense*) and Nettle (*Urtica dioica*). Other species found on the dry railway banks, include locally frequent Tall Melilot (*Melilotus altissima*), occasional ♦Wild Parsnip (*Pastinaca sativa*), Spear Thistle (*Cirsium arvense*), ♦Pyramidal Orchid (*Anacamptis pyramidalis*) and Lady's Bedstraw (*Galium verum*).

♦ Somerset Notable Species.

Habitat[s]	B01.2	A2	A22								

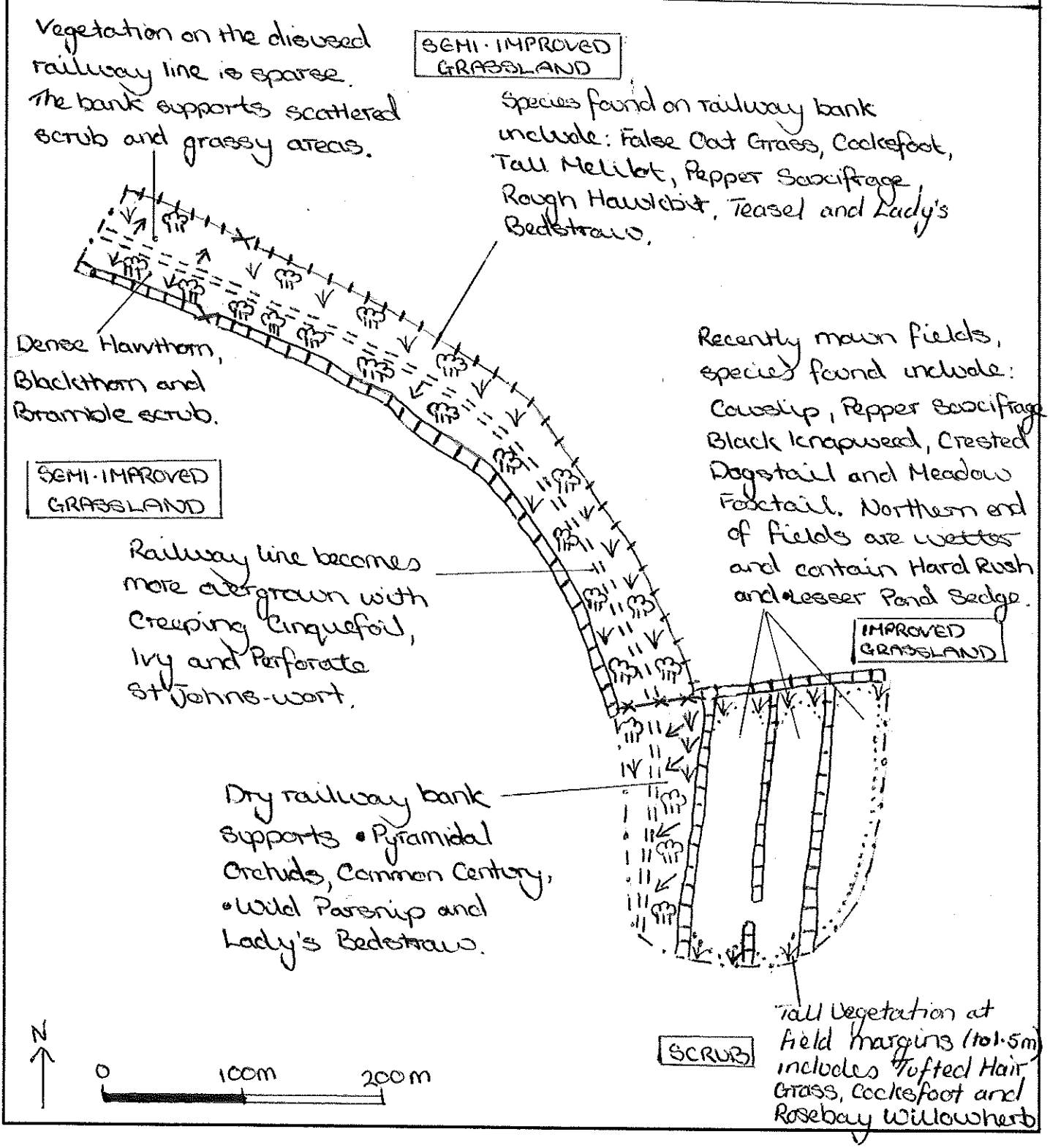
ST34/32/03

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
PURITON MEADOWS & RAIL SPUR.	ST34/32	ST 324274
Date 8/8/95	Recorder(s) C. BELFIELD R. ALLEN	

KEY

= = = Disused Railway
+++++ Wooden Fence.
IIIIII Stockproof Hedge
× Gate.
×—×—× Wire Fence.
– · – · Indistinct Boundary
···· Habitat Boundary.
HABITAT Surrounding Land Use.
Scrub
V Tall Vegetation (to 1.5m)
↘ Slope.



ST34/32/03

Vascular Plant Recording Form

Site Name: PURITON MEADOWS / RAIL SPUR

File Code: ST 34/32

Date: 6/8/95

Grid Ref.: S T 3 2 7 4 2 7

Recorder(s): C BELFIELD, R. ALLEN

	O	L
Acer campestre		
Acer platanoides		
Acer pseudoplatanus		
Achillea millefolium		a
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria		
Aesculus hippocastanum		
Aethusa cynapium		
Agrimonia eupatoria		a
Agrostis canina / canina		
Agrostis capillaris		c
Agrostis gigantea		
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum		
Alisma plantago-aquatica		
Alliaria petiolata		
Allium ursinum		
Allium vineale		
Alnus glutinosa		
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis	F	
Anacamptis pyramidalis		c
Anagallis arvensis		
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris		
Anthemis cotula		
Anthoxanthum odoratum	F	
Anthriscus caucalis		
Anthriscus sylvestris		a
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum		
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.		
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius	F	
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes		
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis		
Berula erecta		
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum		
Brassica napus		
Brassica nigra		
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.		
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii		
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa		
Callitriche stagnalis		
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium		
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris		
Cardamine flexuosa		
Cardamine hirsuta		
Cardamine pratensis		
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis		c
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca		c
Carex hirta		
Carex nigra		
Carex otrubae		
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra		c
Centaurea scabiosa		
Centaurium erythraea		c
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum		
Cerastium glomeratum		
Ceratophyllum demersum		
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.		
Chamaecyparis lawsonian.		
Chamaenerion angustifoli		c
Cheiranthus cheiri		
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana		
Cirsium acaule		
Cirsium arvense		A
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare		c
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum		c
Conopodium majus		
Convolvulus arvensis		F
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus		
Coronopus squamatus		
Corydalis claviculata		
Corydalis lutea		
Corylus avellana	R	
Crataegus monogyna	F	
Crepis capillaris		
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		F
Cynosurus cristatus		
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata	F	
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota		c
Deschampsia cespitosa		c
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea		
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl		c
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		
Eleocharis uniglumis		
Elodea canadensis		
Elymus caninus		
Elymus repens		
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum		c
Epilobium lanceolatum		
Epilobium montanum		
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense		
Equisetum fluviatile		
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		R
Erodium cicutarium		
Erophila verna sens.lat.		
Euonymus europaeus		
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		c
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.		c
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior		c
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine		
Galium cruciata		
Galium mollugo agg.		
Galium odoratum		
Galium palustre agg.		
Galium saxatile		
Galium uliginosum		
Galium verum		c
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum		
Geranium lucidum		
Geranium molle		
Geranium pratense		
Geranium pyrenaicum		
Geranium robertianum		R
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea		
Glyceria declinata		
Glyceria fluitans		
Glyceria maxima		
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix		F
Helianthemum nummula.		
Heracleum sphondylium		c
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus		F
Holcus mollis		
Hordeum murinum		
Hordeum secalinum		c
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.		
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum		F
Hypericum tetrapterum		
Hypochoeris radicata		
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus		
Juncus acutiolia		
Juncus articulatus		
Juncus conglomeratus		
Juncus effusus		
Juncus inflexus		F
Juniperus communis		
Knautia arvensis		
Koeleria macrantha		
Lamiastrum galeobdolon		
Lamium album		
Lapsana communis		
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis		c
Lemna gibba		
Lemna minor		
Lemna polyrhiza		
Lemna trisulca		
Leontodon autumnalis		c
Leontodon hispidus		c
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare		c
Ligustrum vulgare		
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne		
Lonicera periclymenum		
Lotus corniculatus		c
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus		
Lysimachia nemorum		
Lysimachia nummularia		
Lythrum portula		
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Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica		
Medicago lupulina		
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		F
Melilotus officinalis		
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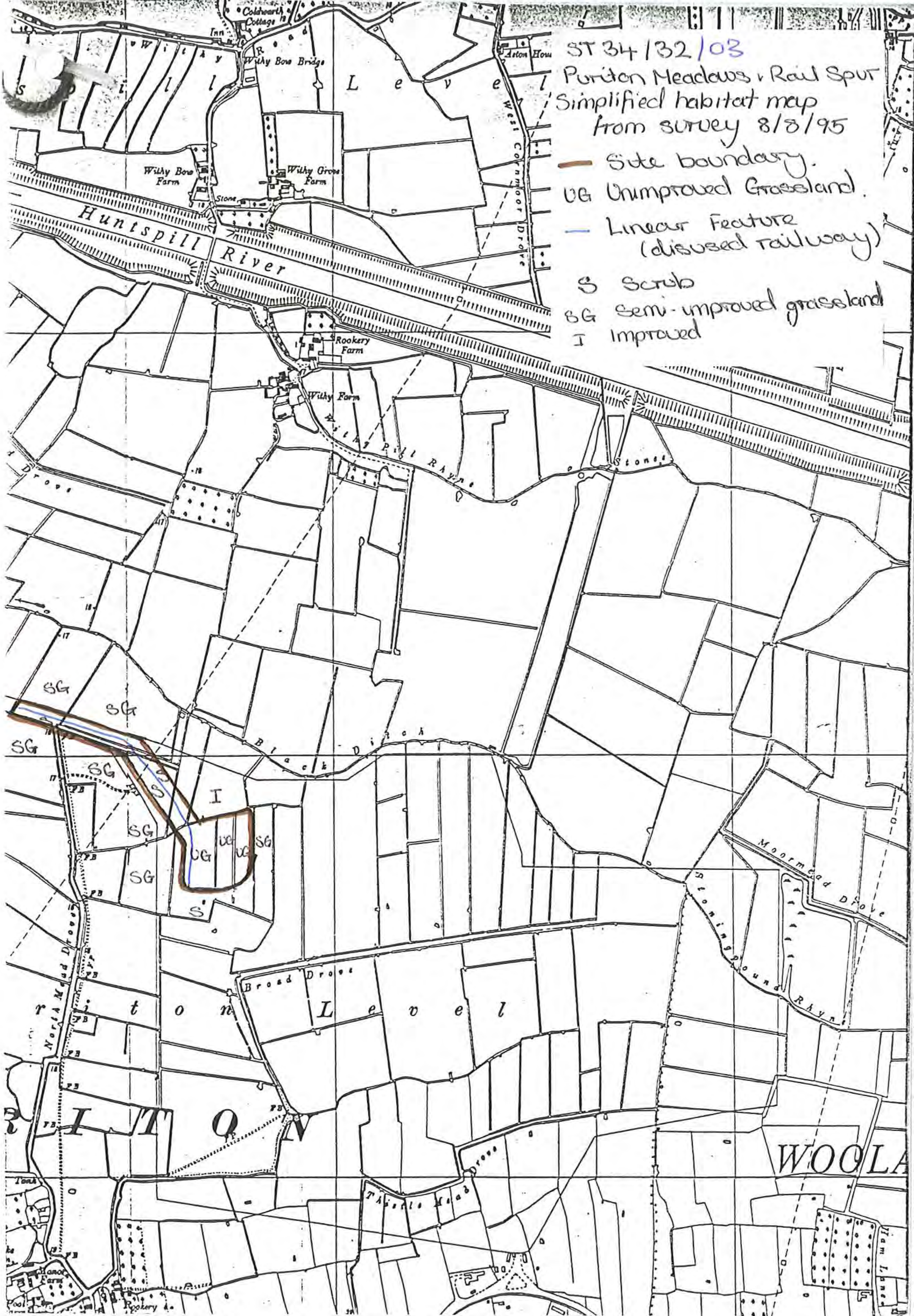
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		
Orobanche hederae		
Orobanche minor		
Oxalis acetosella		
Papaver dubium		
Papaver lecoqii		
Papaver rhoeas		
Parietaria judaica		
Pastinaca sativa		c
Pedicularis sylvatica		
Pentaglottis sempervirens		
Petasites fragrans		
Petasites hybridus		
Phalaris arundinacea		
Phleum pratense / berto.		
Phleum pratense / prate.		A
Phragmites australis		
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides		c
Picris hieracioides		
Pilosella officinarum		
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
Plantago lanceolata		c
Plantago major		
Plantago media		
Platanthera chlorantha		
Poa annua		
Poa compressa		
Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis		c
Polygala serpyllifolia		
Polygala vulgaris		
Polygonatum multiflorum		
Polygonum amphibium		c
Polygonum arenastrum		
Polygonum aviculare		
Polygonum bistorta		
Polygonum hydropiper		
Polygonum lapathifolium		
Polygonum persicaria		c
Polypodium interjectum		
Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus		
Potamogeton pusillus		
Potentilla anserina		
Potentilla erecta		
Potentilla reptans	F	
Potentilla sterilis		c
Primula veris		
Primula vulgaris		c
Prunella vulgaris		
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa	F	
Pseudotsuga menziesii		
Pteridium aquilinum		
Pulicaria dysenterica		
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris		c
Ranunculus aquatilis st		
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		c
Ranunculus flammula		
Ranunculus omiophyllus		
Ranuculus parviflorus		
Ranuculus repens		c
Ranunculus sceleratus		
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		
Reseda luteola		
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis		c
Rosa canina		
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.		A
Rubus idaeus		
Rumex acetosa		
Rumex acetosella agg.		
Rumex confertus		
Rumex crispus		
Rumex hydrolapathum		
Rumex obtusifolius		
Rumex pulcher		
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba		c
Salix caprea		c
Salix cinerea		
Salix fragilis		
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra		
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata		
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		
Sedum acre		
Sedum album		
Senecio aquaticus		
Senecio erucifolius		
Senecio jacobaea		c
Senecio squalidus		
Senecio vulgaris		
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus	F	
Silene alba		
Silene dioica		
Silene vulgaris		
Sinapis arvensis		
Sison amomum		
Sisymbrium officinale		
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara		
Solanum nigrum		
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		
Sonchus asper		
Sonchus oleraceus		c
Sorbus aria agg.		
Sorbus aucuparia		
Sparganium emersum		
Sparganium erectum		
Spergula arvensis		
Stachys officinalis		
Stachys palustris		
Stachys sylvatica		
Stellaria alsine		
Stellaria graminea		
Stellaria holostea		
Stellaria media sens. str.		
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.		c
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		
Trifolium hybridum		
Trifolium medium		
Trifolium pratense		c
Trifolium repens		
Triglochin palustris		
Tripleurosperm. mar. / ino.		
Trisetum flavescens	F	
Tsuga heterophylla		
Tussilago farfara		
Typha latifolia		
Ulex europaeus		
Ulex gallii		
Ulmus glabra		
Ulmus procera		c
Umbilicus rupestris		F
Urtica dioica		
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis		
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		R
Verbena officinalis		
Veronica anagallis-aquatica		
Veronica arvensis		
Veronica beccabunga		
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca		
Vicia hirsuta		
Vicia sativa / sativa		c
Vicia sepium		
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza		

Notables count: 4

A.V. Plant count:

Somerset notable species in **BOLD**. Ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

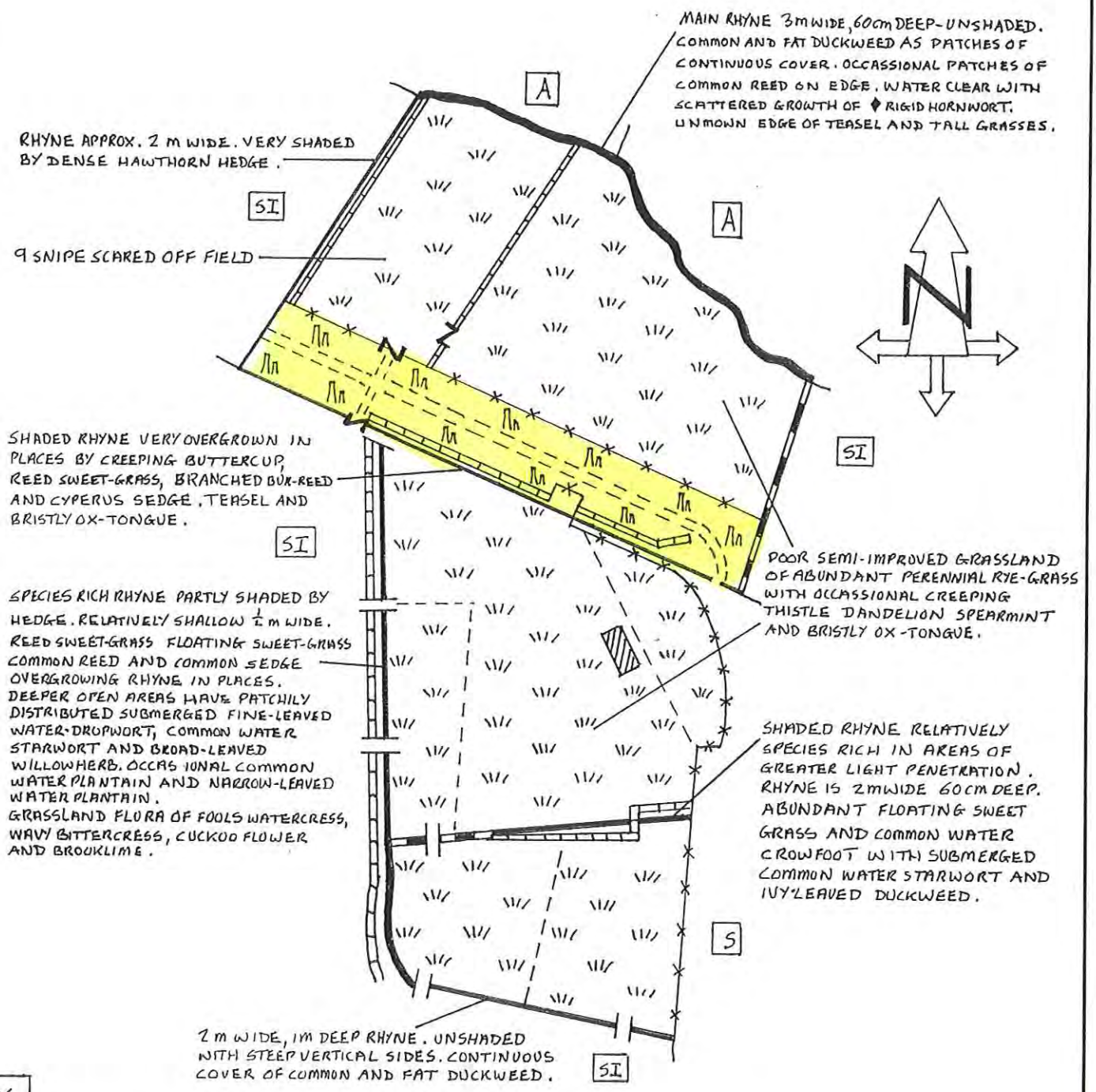

ST 34/32/03
Puriton Meadows, Rail Spur
Simplified habitat map
from survey 8/8/95
Site boundary.
UG Unimproved Grassland.
Linear Feature
(disused railway)
S Scrub
SG Semi-improved grassland
I Improved
Coldharbour Cottage
Inn
Withy Bow Bridge
Aston How
Withy Bow Farm
Withy Grove Farm
Stone
Huntspill River
Rookery Farm
Withy Farm
Withy Pill Rhyne
Stone
Black Ditch
Moormead Drove
Stoning Pound Rhyne
Broad Drove
North Mead Drove
Thistle Mead
Manor Farm
Rookery
Tank
Pool
Ham Lane
WOOLA
SG
SG
SG
SG
S
S
I
SG
UG
UG
UG
SG
SG
S

PART OF ST 34/032

ST 34/032/04

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
NORTH MEAD DROVE FIELDS	ST34/041	ST 324428
Date 21.10.97	Recorder(s) S.MAZDON, B.LAMBERT	



ST34/33/03

SERC Survey Sheet	Site Name: PURITON ASH GROUND	Site Number: ST34/033	Grid Reference(s): ST327422
	Date: 8/8/95	Recorder(s): L. GRIFFITHS, V. BASHFORD, C. BELFIELD, R. ALLEN.	

Scrub and species-rich waste ground.

Location, Topography, Boundaries and Surrounding Land Use.

Puriton Ash Ground is located within R.O.F. Puriton, 1 km. to the north-east of Puriton village. It covers an area of about 2 ha. and the geology consists of Pleistocene alluvium overlying Jurassic Blue Lias shales, mudstones and limestones. However the vegetation is more likely to have been affected by the deposition of artificial material - boiler house ash and rubble over the whole area. The site is flat, between 5 and 7 m. above sea level. The site boundaries are internal roads to the north and east, a concrete area to the north-west and a disused railway track to the south-west.

Detailed Description.

The site consists of species-rich waste ground interspersed with areas of scrub. The waste ground has frequent Vervain (*Verbena officinalis*), Fiddle Dock (*Rumex pulcher*), Biting Stonecrop (*Sedum acre*), Centaury (*Centaurium erythraea*), Cowslip (*Primula veris*), Agrimony (*Agrimonia eupatoria*), Great Mullein (*Verbascum thapsus*), Lesser Burdock (*Arctium minus* agg.), Blue Fleabane (*Erigeron acer*) and lichens (*Cladonia* sp.). Occasional Autumn Hawkbit (*Leontodon autumnalis*), Ox-eye Daisy (*Leucanthemum vulgare*), Mouse-ear Hawkweed (*Pilosella officinarum*), Weld (*Reseda luteola*), Common Stork's-bill (*Erodium cicutarium*) and Common Whitlowgrass (*Erophila verna*). Rare ♦Ploughman's-spikenard (*Inula conyza*), ♦Wild Mignonette (*Reseda lutea*), ♦Early Forget-me-not (*Myosotis ramosissima*), Pearly Everlasting (*Anaphalis margaritacea*), Bladder Campion (*Silene vulgaris*) and Maidenhair Spleenwort (*Asplenium trichomanes*).

A small damp area is situated on the eastern side of the site and is dominated by Hairy Sedge (*Carex hirta*). Hard Rush (*Juncus inflexus*) and Water Figwort (*Scrophularia auriculata*) are also found in this area.

The scrub areas are dominated by Bramble (*Rubus fruticosus* agg.), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Butterfly-bush (*Buddleja davidii*), with occasional Goat Willow (*Salix caprea*), Grey Willow (*Salix cinerea*), Bracken (*Pteridium aquilinum*), Rosebay Willowherb (*Chamerion angustifolium*) and Teasel (*Dipsacus fullonum*).

Many butterflies were observed on site including ♦Brown Argus feeding on Wild Marjoram (*Origanum vulgare*), Common Blue, Gatekeeper and Small Tortoiseshell.

♦Somerset Notable Species

Habitat[s]	A22	I142	J4								

ST34/33/03

Vascular Plant Recording Form

Site Name: PURITON ASH GROUND

File Code: ST34/033

Date: 8/8/95

Grid Ref.: S T 3 2 7 4 2 2

Recorder(s): L. GRIFFITHS, V BASHFORD, C BELFIELD, R. ALLEN.

	O	L
Acer campestre		
Acer platanoides		
Acer pseudoplatanus		
Achillea millefolium	O	
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria		
Aesculus hippocastanum	R	
Aethusa cynapium		
Agrimonia eupatoria	F	
Agrostis canina / canina		
Agrostis capillaris		
Agrostis gigantea		
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum		
Alisma plantago-aquatica		
Alliaria petiolata		
Allium ursinum		
Allium vineale		
Alnus glutinosa		
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis		
Anacamptis pyramidalis		
Anagallis arvensis		
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris		
Anthemis cotula		
Anthoxanthum odoratum		
Anthriscus caucalis		
Anthriscus sylvestris		
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum		
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.	F	
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius		
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes	R	
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis	O	
Berula erecta		
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum		
Brassica napus		
Brassica nigra		
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.		
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii	O	
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa		
Callitriche stagnalis		
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium		
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris		
Cardamine flexuosa		
Cardamine hirsuta		
Cardamine pratensis		
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis		
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca		
Carex hirta	R	E
Carex nigra		
Carex otrubae		
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra		
Centaurea scabiosa		
Centaurium erythraea	O	
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum		
Cerastium glomeratum		
Ceratophyllum demersum		
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.		
Chamaecyparis lawsonian.		
Chamaenerion angustifoli.	E	
Cheiranthus cheiri		
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana		
Cirsium acaule		
Cirsium arvense	O	
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare	O	
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum	O	
Conopodium majus		
Convolvulus arvensis		
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus		
Coronopus squamatus		
Corydalis claviculata		
Corydalis lutea		
Corylus avellana		
Crataegus monogyna	O	
Crepis capillaris		
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		
Cynosurus cristatus		
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata		
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota		
Deschampsia cespitosa		
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea		
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl	F	
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		
Eleocharis uniglumis		
Elodea canadensis		
Elymus caninus		
Elymus repens		
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum		
Epilobium lanceolatum		
Epilobium montanum		
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense		
Equisetum fluviatile		
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		F
Erodium cicutarium		O
Erophila verna sens.lat.		O
Euonymus europaeus		
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.		
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior		
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine		
Galium cruciata		
Galium mollugo agg.		
Galium odoratum		
Galium palustre agg.		
Galium saxatile		
Galium uliginosum		
Galium verum		
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum		
Geranium lucidum		
Geranium molle		O
Geranium pratense		
Geranium pyrenaicum		
Geranium robertianum		
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea		F
Glyceria declinata		
Glyceria fluitans		
Glyceria maxima		
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix		
Helianthemum nummula.		
Heracleum sphondylium		
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus		O
Holcus mollis		
Hordeum murinum		
Hordeum secalinum		
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.		
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum		F
Hypericum tetrapterum		
Hypochoeris radicata		
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus		
Juncus acutiolia		
Juncus articulatus		
Juncus conglomeratus		
Juncus effusus		
Juncus inflexus		O
Juniperus communis		
Knautia arvensis		
Koeleria macrantha		
Lamiastrum galeobdolon		
Lamium album		
Lapsana communis		
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis		
Lemna gibba		
Lemna minor		
Lemna polyrhiza		
Lemna trisulca		
Leontodon autumnalis		O
Leontodon hispidus		
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare		O
Ligustrum vulgare		
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne		
Lonicera periclymenum		
Lotus corniculatus		O
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus		
Lysimachia nemorum		
Lysimachia nummularia		
Lythrum portula		
Lythrum salicaria		
Malus sylvestris sens.lat.		
Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica		
Medicago lupulina		
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		
Melilotus officinalis		
Mentha aquatica		
Mentha arvensis		
Mentha spicata		
Mercurialis annua		
Mercurialis perennis		
Milium effusum		
Moehringia trinervia		
Molinia caerulea		
Mycelis muralis		
Myosotis arvensis		
Myosotis discolor		
Myosotis laxa		
Myosotis ramosissima		R
Myosotis scorpiodes		
Myosoton aquaticum		
Nardus stricta		
Nasturtium officinale sl		
Nasturtium microphyllum		
Nuphar lutea		
Nymphaea alba		
Odontites verna		
Oenanthe crocata		
Oenanthe fluviatilis		
Oenanthe pimpinelloides		
Oenothera erythrosepala		
Ononis repens		
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		R
Orobanche hederae		
Orobanche minor		
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Papaver dubium		
Papaver lecoqii		
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Pastinaca sativa		
Pedicularis sylvatica		
Pentaglottis sempervirens		
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Petasites hybridus		
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Phleum pratense / prate.		
Phragmites australis		
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides		O
Picris hieracioides		
Pilosella officinarum		O
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
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Plantago major		
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Platanthera chlorantha		
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Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis		
Polygala serpyllifolia		
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Polygonum bistorta		
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Polygonum lapathifolium		
Polygonum persicaria		
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Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus		
Potamogeton pusillus		
Potentilla anserina		
Potentilla erecta		
Potentilla reptans		F
Potentilla sterilis		
Primula veris		F
Primula vulgaris		
Prunella vulgaris		F
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa		F
Pseudotsuga menziesii		
Pteridium aquilinum		R
Pulicaria dysenterica		
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris		
Ranunculus aquatilis st		
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		
Ranunculus flammula		
Ranunculus omiophyllus		
Ranuculus parviflorus		
Ranuculus repens		
Ranunculus sceleratus		
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		R
Reseda luteola		O
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis		
Rosa canina		O
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.		O F
Rubus idaeus		
Rumex acetosa		
Rumex acetosella agg.		
Rumex confertus		
Rumex crispus		F
Rumex hydrolapathum		
Rumex obtusifolius		
Rumex pulcher		F
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba		
Salix caprea		O
Salix cinerea		O
Salix fragilis		
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra		
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata		O
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		
Sedum acre		F
Sedum album		
Senecio aquaticus		
Senecio erucifolius		
Senecio jacobaea		O
Senecio squalidus		
Senecio vulgaris		
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus		
Silene alba		
Silene dioica		
Silene vulgaris		R
Sinapis arvensis		
Sison amomum		
Sisymbrium officinale		R
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara		
Solanum nigrum		
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		
Sonchus asper		
Sonchus oleraceus		
Sorbus aria agg.		
Sorbus aucuparia		
Sparganium emersum		
Sparganium erectum		
Spergula arvensis		
Stachys officinalis		
Stachys palustris		
Stachys sylvatica		
Stellaria alsine		
Stellaria graminea		
Stellaria holostea		
Stellaria media sens. str.		
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.		
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		
Trifolium hybridum		
Trifolium medium		
Trifolium pratense		
Trifolium repens		
Triglochin palustris		
Tripleurosperm. mar. / ino.		O
Trisetum flavescens		
Tsuga heterophylla		
Tussilago farfara		
Typha latifolia		
Ulex europaeus		
Ulex gallii		
Ulmus glabra		
Ulmus procera		
Umbilicus rupestris		
Urtica dioica		O
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis		
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		F
Verbena officinalis		F
Veronica anagallis-aquatica		
Veronica arvensis		
Veronica beccabunga		
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca		
Vicia hirsuta		
Vicia sativa / sativa		
Vicia sepium		
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza		
HIPPOPHAE		R
RHAMNOIDES		
ANAPHALIS MARGARITACEA		R
INULA CONYZA		R

notables extracted XII/97

Notables count:	3
A.V. Plant count:	

Somerset notable species in **BOLD**. Ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

PTO

ST 34/33/03

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
PURITON ASH GROUND	ST 34/033	S T 3 2 7 4 2 2
Date 8TH AUGUST 1995	Recorder(s) V. BASHFORD, L. GRIFFITHS.	

—•—•— NO PHYSICAL BOUNDARY TO SITE

OLD RAIL TRACK

ASHY TRACK

HORSE CHESTNUT TREES

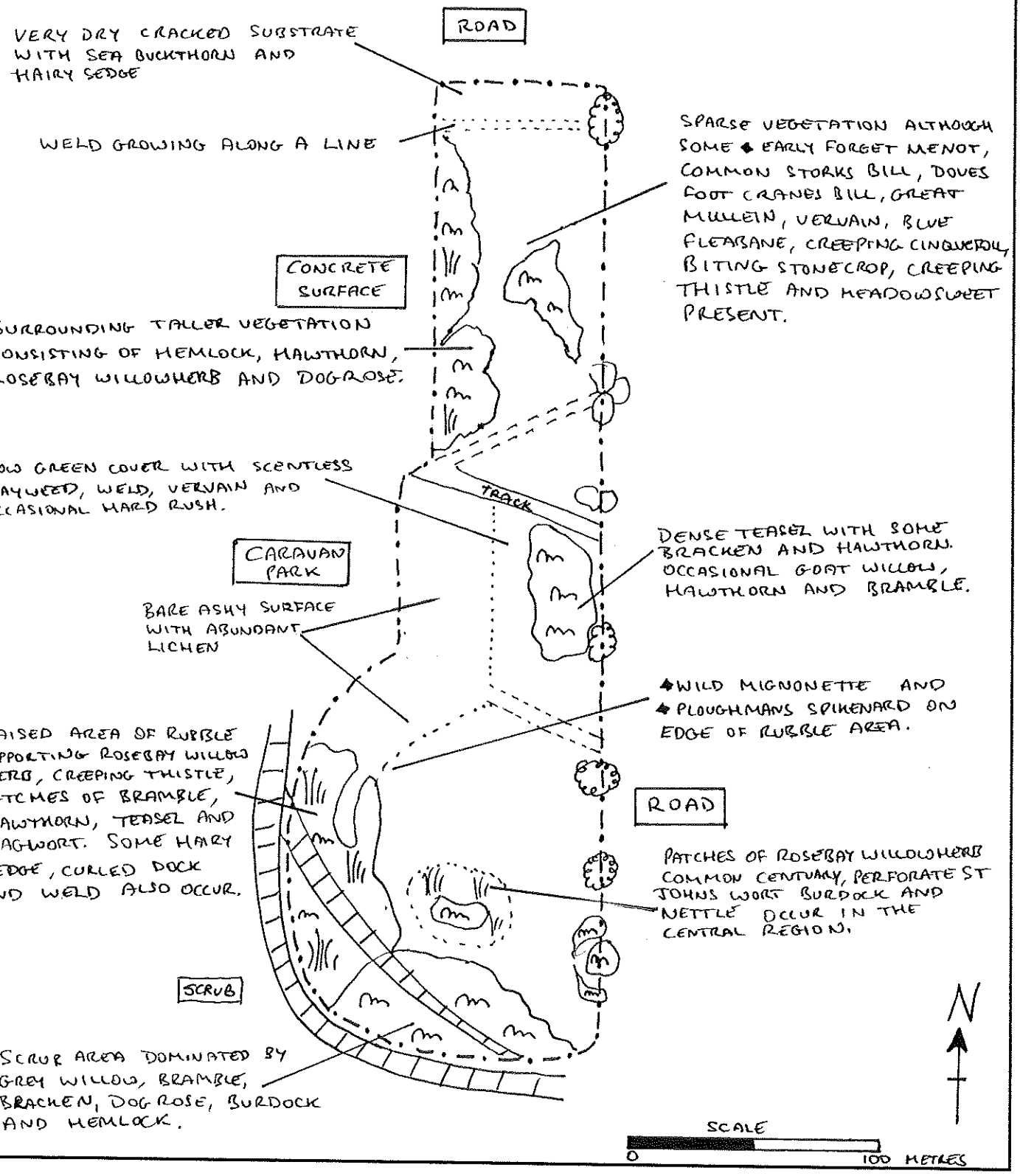
DISTINCT HABITAT BOUNDARY

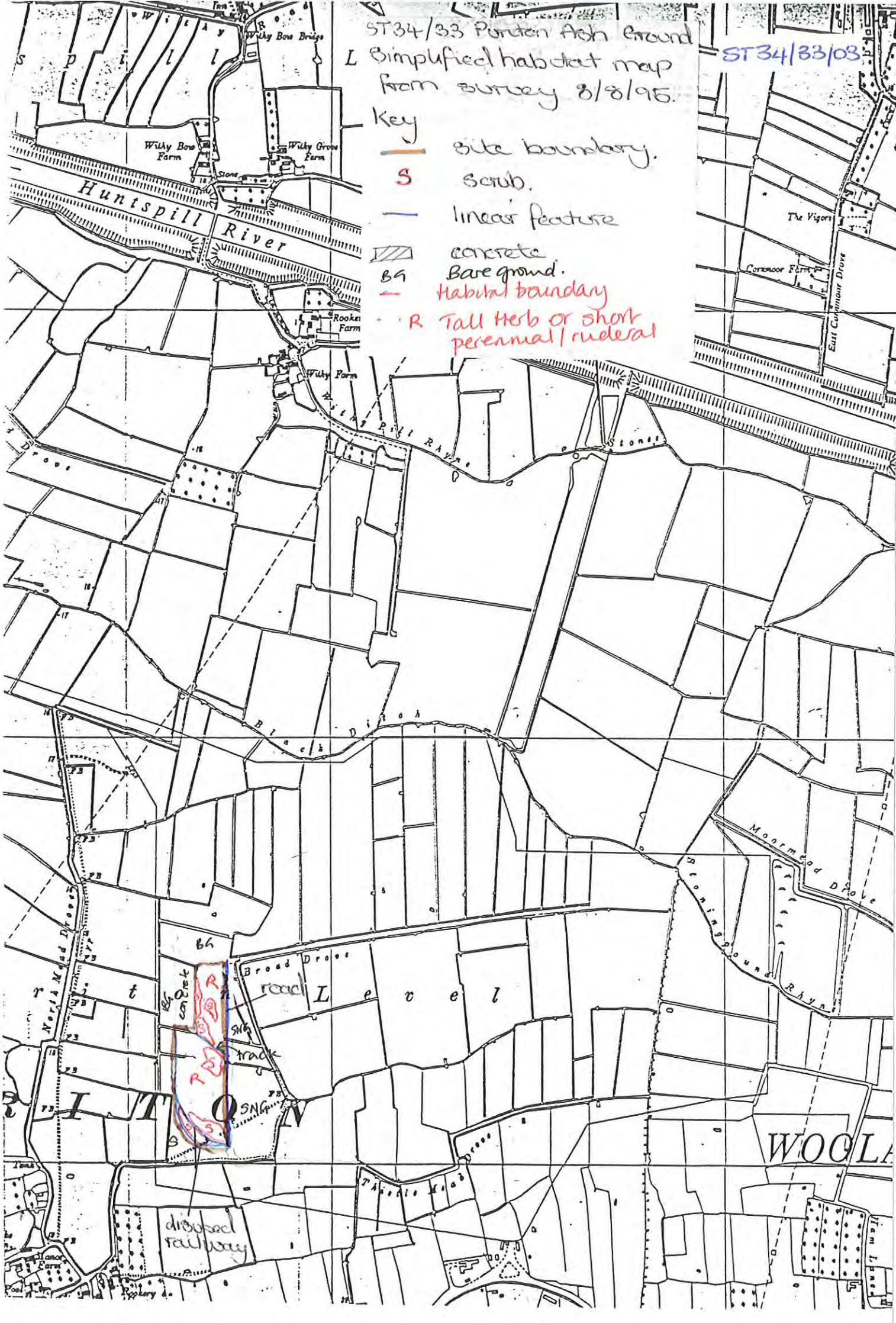
INDISTINCT HABITAT BOUNDARY

PATCHES OF SCRUB

TALL HERB

◆ SOMERSET NOTABLE SPECIES.




ST34/33 Porten Ash Ground
Simplified habitat map
from survey 8/8/95.
ST34/33/03
Key
site boundary.
S Scrub.
linear feature
concrete.
BG Bare ground.
Habitat boundary
R Tall Herb or short perennial / ruderal
Willy Bow Bridge
Willy Bow Farm
Willy Grove Farm
Huntspill River
Willy Farm
Broad Drove
Black Ditch
Moormead Drove
Broadground Rhyne
East Commoor Drove
The Vigors
Commoor Farm
road
track
Level
disused railway
WOOLA

ST34/34/03.

SERC Survey Sheet	Site Name: Puriton Cowslip Field	Site Number: ST34/034	Grid Reference(s): S T 3 3 1 4 2 0
	Date: 8/8/95	Recorder(s): R. Allen, C. Belfield, V. Bashford, L. Griffiths.	

Unimproved calcareous grassland with rhyne.

Location, topography and surrounding area.

The site is located within R.O.F. Puriton, 1 km to the north east of Puriton village. It covers an area of 1.75 ha and the geology consists of Pleistocene alluvium overlying Jurassic Blue Lias shales, mudstones and limestones. The site is flat and less than 5 m above sea level. The site boundary consists of a polluted rhyne to the north, a disused railway track to the south, a defunct hedge to the east and a raised pipeline to the west. The site is surrounded by factory buildings with earth banks and associated roads and pipelines.

Detailed description.

The site consists of 2 fields separated by a track. The eastern field is unimproved calcareous grassland, recently cut at the time of the survey apart from the field margins and a 10 m wide strip along the southern boundary containing a row of concrete pillars. The main grass species are False Oatgrass (*Arrhenatherum elatius*), Yellow Oatgrass (*Trisetum flavescens*), Cocksfoot (*Dactylis glomerata*), Yorkshire Fog (*Holcus lanatus*) and Rough Meadowgrass (*Poa trivialis*). Many broadleaved species are also present including Cowslip (*Primula veris*), Black Knapweed (*Centaurea nigra*), Agrimony (*Agrimonia eupatoria*), Rough Hawkbit (*Leontodon hispidus*), Wild Carrot (*Daucus carota*), Birdsfoot Trefoil (*Lotus corniculatus*), Common Fleabane (*Pulicaria dysenterica*) and Creeping Cinquefoil (*Potentilla reptans*). Trevor Freeston reports that ♦ Pyramidal Orchid (*Anacamptis pyramidalis*) and ♦ Bee Orchid (*Ophrys apifera*) also occur in this field, but none were recorded during this survey.

The western field is partially divided by a rhyne extending from south to north. The area to the west is unimproved grassland, recently cut at the time of the survey, with a similar species composition to the eastern field. The area between the rhyne and the track remained uncut at the time of the survey and contains a wet corner dominated by Common Reed (*Phragmites australis*). The rhyne itself also contains Common Reed, with frequent Amphibious Bistort (*Polygonum amphibium*), Common Water-plantain (*Alismo plantago-aquatica*), False Fox Sedge (*Carex otrubae*) and Great Willowherb (*Epilobium hirstutum*).

The rhyne which forms the northern boundary of the site is polluted and contains no aquatic or marginal vegetation. The disused railway line which forms the southern boundary consists of disturbed ground with sparse vegetation including Perforate St. John's-wort (*Hypericum perforatum*), Great Mullein (*Verbascum thapsus*), Weld (*Reseda luteola*), Scentless Mayweed (*Tripleurospermum inodorum*), Mousear Hawkweed (*Pilosella officinarum*), and Groundsel (*Senecio vulgaris*). The hedge at the eastern boundary consists mainly of Hawthorn (*Crataegus monogyna*) with Blackthorn (*Prunus spinosa*), Bramble (*Rubus fruticosus*), Wild Privet (*Ligustrum vulgare*), Spindle (*Euonymus europaeus*), Teasel (*Dipsacus fullonum*) and Hemlock (*Conium maculatum*).

♦ Somerset notable species.

Habitat[s]	B312	J1	F21	G125	J22	J32					

ST 34/34/03

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
Puriton Cowslip Field	ST 34/034	S T 3 3 1 4 2 0
Date 8/8/95	Recorder(s) R. Allen, C. Belfield, V. Bashford, L. Griffiths.	

Defunct Hedge
Disused Railway line
Raised Pipeline
Track
Rhyne
Surrounding land use

Indistinct Habitat Boundary
Cut Grassland
Tall Grassland

N

0m 50m

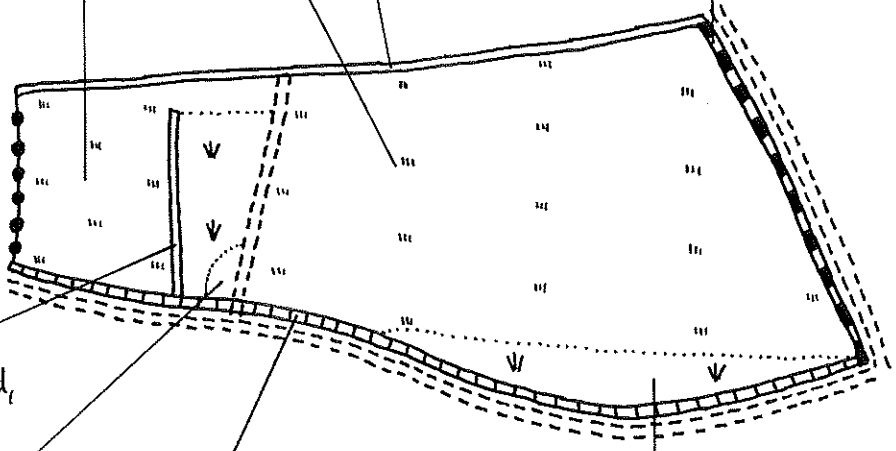
Recently mown meadow, with uncut margin, containing False Oatgrass, Yellow Oatgrass, Cocksfoot, Yorkshire Fog, Rough Meadowgrass, Black Knapweed, Cowslip, Wild Carrot, Agrimony, Birdsfoot Trefoil, Rough Hawkbit, Meadow Vetchling, Common Fleabane, Creeping Cinquefoil, Glaucous Sedge, Hairy Sedge.

Polluted Rhyne with no aquatic vegetation.

Defunct Hawthorn Hedge with Blackthorn, Bramble, Wild Privet, Spindle, Ivy, Nettle, Bittersweet, Teasel, Hemlock.

Factory Buildings

Factory Buildings



Rhyne with Common Reed, Amphibious Bistort, Common Water-Plantain, False Fox Sedge, Yellow Iris, Great Willowherb

Factory Buildings

Patch of Common Reed

Disused Railway line with rubble colonised by Perforate St. Johns Wort, Great Mullein, Weld, Scentless May Weed, Mousear Hawkweed, Groundsel.

Uncut grassland with remains of buildings.

ST34/34/03

ST 34/034 - Puriton Cowslip Field

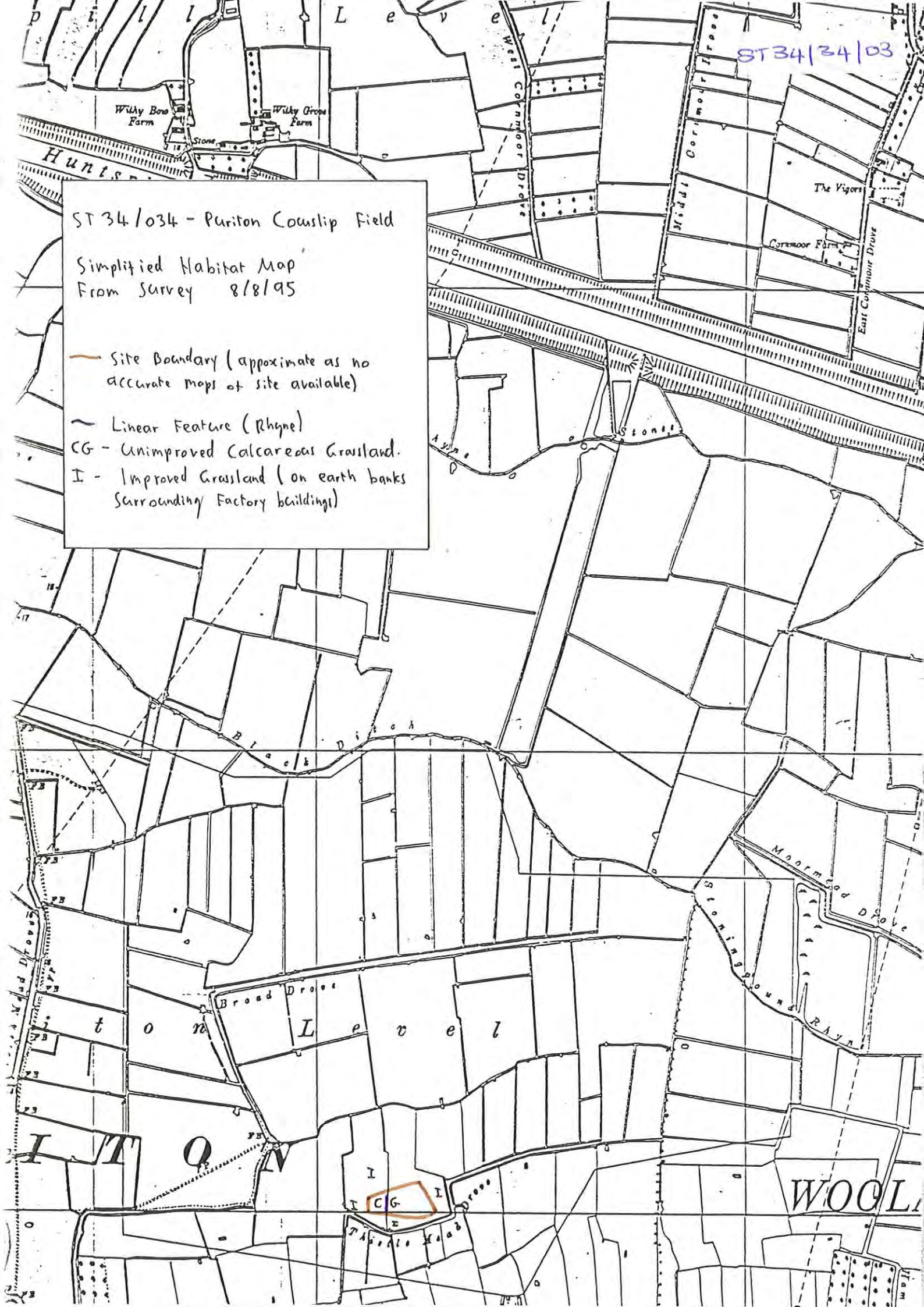
Simplified Habitat Map
From Survey 8/8/95

— Site Boundary (appoximate as no accurate maps of site available)

~ Linear Feature (Rhyne)

CG - Unimproved Calcareous Grassland.

I - Improved Grassland (on earth banks surrounding Factory buildings)



ST34/34/03

Vascular Plant Recording Form

Site Name: Puriton Cowslip Field

File Code: ST34/034

Date: 8/8/95

Grid Ref.: S T 3 3 1 4 2 0

Recorder(s): R. Allen, C. Belfield, V. Bashford, L. Griffiths.

	O	L
Acer campestre		
Acer platanoides		
Acer pseudoplatanus		
Achillea millefolium		F
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria		
Aesculus hippocastanum		
Aethusa cynapium		
Agrimonia eupatoria		F
Agrostis canina / canina		
Agrostis capillaris		
Agrostis gigantea		
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum		
Alisma plantago-aquatica	O	
Alliaria petiolata		
Allium ursinum		
Allium vineale		
Alnus glutinosa		
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis		
Anacamptis pyramidalis		
Anagallis arvensis		R
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris		
Anthemis cotula		
Anthoxanthum odoratum		
Anthriscus caucalis		
Anthriscus sylvestris		
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum		
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.		
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius		F
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes		
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis		
Berula erecta		
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum		
Brassica napus		
Brassica nigra	O	
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.		
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii		
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa		
Callitriche stagnalis		
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium	O	
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris		
Cardamine flexuosa		
Cardamine hirsuta		
Cardamine pratensis		
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis		
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca	O	
Carex hirta	O	
Carex nigra		
Carex otrubae	O	
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra	O	
Centaurea scabiosa		
Centaurium erythraea		
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum	O	
Cerastium glomeratum		
Ceratophyllum demersum		
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.		
Chamaecyparis lawsonian.		
Chamaenerion angustifoli.		
Cheiranthus cheiri		
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana		
Cirsium acaule		
Cirsium arvense	O	
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare	O	
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum	O	
Conopodium majus		
Convolvulus arvensis	O	
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus		
Coronopus squamatus		
Corydalis claviculata		
Corydalis lutea		
Corylus avellana		
Crataegus monogyna	O	
Crepis capillaris		
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		
Cynosurus cristatus		F
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata		F
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota	O	
Deschampsia cespitosa		
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea		
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl	O	
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		
Eleocharis uniglumis		
Elodea canadensis		
Elymus caninus		
Elymus repens		
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum	O	F
Epilobium lanceolatum		
Epilobium montanum		
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense	O	
Equisetum fluviatile		
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		
Erodium cicutarium		
Erophila verna sens.lat.		
Euonymus europaeus	R	
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.	O	
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior		
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine		
Gallium cruciata		
Galium mollugo agg.		
Galium odoratum		
Galium palustre agg.		
Galium saxatile		
Galium uliginosum		
Galium verum		
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum		
Geranium lucidum		
Geranium molle		
Geranium pratense		
Geranium pyrenaicum		
Geranium robertianum		
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea	O	
Glyceria declinata		
Glyceria fluitans		
Glyceria maxima	O	
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix	O	
Helianthemum nummula.		
Heracleum sphondylium	O	
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus	O	
Holcus mollis		
Hordeum murinum		
Hordeum secalinum		
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.		
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum	O	
Hypericum tetrapterum		
Hypochoeris radicata		
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus	O	
Juncus acutiflo		
Juncus articulatus		
Juncus conglomeratus		
Juncus effusus		
Juncus inflexus	O	
Juniperus communis		
Knautia arvensis		
Koeleria macrantha		
Lamiastrum galeobdolon		
Lamium album		
Lapsana communis		
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis	F	
Lemna gibba		
Lemna minor		
Lemna polyrhiza		
Lemna trisulca		
Leontodon autumnalis	O	
Leontodon hispidus	F	
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare	O	
Ligustrum vulgare	O	
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne		
Lonicera periclymenum		
Lotus corniculatus		F
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus		
Lysimachia nemorum		
Lysimachia nummularia		
Lythrum portula		
Lythrum salicaria		
Malus sylvestris sens.lat.		
Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica		
Medicago lupulina		
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		
Melilotus officinalis		
Mentha aquatica		
Mentha arvensis		
Mentha spicata		
Mercurialis annua		
Mercurialis perennis		
Milium effusum		
Moehringia trinervia		
Molinia caerulea		
Mycelis muralis		
Myosotis arvensis		R
Myosotis discolor		
Myosotis laxa		
Myosotis ramosissima		
Myosotis scorpioides		
Myosoton aquaticum		
Nardus stricta		
Nasturtium officinale sl		
Nasturtium microphyllum		
Nuphar lutea		
Nymphaea alba		
Odontites verna		
Oenanthe crocata		
Oenanthe fluviatilis		
Oenanthe pimpinelloides		
Oenothera erythrosepala		
Ononis repens		
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		
Orobanche hederae		
Orobanche minor		
Oxalis acetosella		
Papaver dubium		
Papaver lecoqii		
Papaver rhoeas		
Parietaria judaica		
Pastinaca sativa		
Pedicularis sylvatica		
Pentaglottis sempervirens		
Petasites fragrans		
Petasites hybridus		
Phalaris arundinacea		
Phleum pratense / berto.		
Phleum pratense / prate.		
Phragmites australis	O	A
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides		
Picris hieracioides		
Pilosella officinarum	O	
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
Plantago lanceolata	O	
Plantago major	O	
Plantago media		
Platanthera chlorantha		
Poa annua		
Poa compressa		
Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis	O	
Polygala serpyllifolia		
Polygala vulgaris		
Polygonatum multiflorum		
Polygonum amphibium	O	
Polygonum arenastrum		
Polygonum aviculare	O	
Polygonum bistorta		
Polygonum hydropiper		
Polygonum lapathifolium		
Polygonum persicaria	O	
Polypodium interjectum		
Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus		
Potamogeton pusillus		
Potentilla anserina		
Potentilla erecta		
Potentilla reptans		F
Potentilla sterilis		
Primula veris	O	
Primula vulgaris		
Prunella vulgaris	O	
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa	O	
Pseudotsuga menziesii		
Pteridium aquilinum		
Pulicaria dysenterica	O	
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris		F
Ranunculus aquatilis st		
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		
Ranunculus flammula		
Ranunculus omiophyllus		
Ranuculus parviflorus		
Ranuculus repens		
Ranunculus sceleratus		
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		
Reseda luteola	O	
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis		
Rosa canina		
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.	O	
Rubus idaeus		
Rumex acetosa		
Rumex acetosella agg.		
Rumex confertus		
Rumex crispus		
Rumex hydrolapathum		
Rumex obtusifolius	O	
Rumex pulcher		
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba		
Salix caprea		
Salix cinerea		
Salix fragilis		
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra		
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata	O	
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		
Sedum acre		
Sedum album		
Senecio aquaticus	O	
Senecio erucifolius		
Senecio jacobaea	O	
Senecio squalidus		
Senecio vulgaris	O	
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus		
Silene alba		
Silene dioica		
Silene vulgaris		
Sinapis arvensis		
Sison amomum		
Sisymbrium officinale		
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara	O	
Solanum nigrum		
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		
Sonchus asper		O
Sonchus oleraceus		
Sorbus aria agg.		
Sorbus aucuparia		
Sparganium emersum		
Sparganium erectum		
Spergula arvensis		
Stachys officinalis		
Stachys palustris		
Stachys sylvatica		
Stellaria alsine		
Stellaria graminea		
Stellaria holostea		
Stellaria media sens. str.		
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.		O
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		O
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		
Trifolium hybridum		
Trifolium medium		
Trifolium pratense		F
Trifolium repens		
Triglochin palustris		
Tripleurosperm. mar. / ino.		O
Trisetum flavescens		F
Tsuga heterophylla		
Tussilago farfara		
Typha latifolia		
Ulex europaeus		
Ulex gallii		
Ulmus glabra		
Ulmus procera		
Umbilicus rupestris		
Urtica dioica		O
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis		
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		O
Verbena officinalis		
Veronica anagallis-aquatica		
Veronica arvensis		
Veronica beccabunga		
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca		O
Vicia hirsuta		
Vicia sativa / sativa		
Vicia sepium		O
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza		

Notables count: 0

A.V. Plant count:

Somerset notable species in **BOLD**. Ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

ST34|35|03

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
PURITON LAKE	ST34/35	S T 3 4 2 4 2 4
Date 15/8/95	Recorder(s) C BELFIELD, R ALLEN	

Lake with extensive reed beds.

Location, Topography, Boundaries and Surrounding Land Use.

The site, area 4.0 ha, is located 1 km north of Woolavington. Boundaries to the site are a wire fence to the west, hedges to the north, hedges and a wire fence to the east and a rhyne to the south. Surrounding land use is improved grassland to the north and east, semi-improved grassland to the south and R.O.F. Puriton to the west.

Detailed Description.

Access can only be gained to the southern half of the site. The northern half appears to be dense stands of Common reed (*Phragmites australis*) with occasional Branched Bur-reed (*Sparganium erectum*) and Reedmace (*Typha latifolia*).

Much of the southern section of the site is open water which supports species such as Ivy Leaved Duckweed (*Lemna trisulca*), ♦Rigid Hornwort (*Ceratophyllum demersum*), Spiked Water Milfoil (*Myriophyllum spicatum*) and Canadian Pondweed (*Elodea canadensis*). Surrounding the open water are dense stands of Common Reed. Other species frequently found in the water margins are Water Mint (*Mentha aquatica*), Gipsywort (*Lycopus europaeus*), Great Willowherb (*Epilobium hirsutum*), Common Marsh Bedstraw (*Galium palustre*), with occasional ♦Lesser Water Parsnip (*Berula erecta*), Fools Watercress (*Apium nodiflorum*) and Celery Leaved Buttercup (*Ranunculus sceleratus*) and False Fox Sedge (*Carex obrubae*).

A path runs round most of the southern half of the lake, which is shaded by Hawthorn (*Crataegus monogyna*), Goat Willow (*Salix caprea*), Crack Willow (*Salix fragilis*) and Ash (*Fraxinus excelsior*). Species beside the path include Perennial Rye Grass (*Lolium perenne*), Greater Plantain (*Plantago major*), Selfheal (*Prunella vulgaris*), Bittersweet (*Solanum dulcamara*) and Coltsfoot (*Tusilago farfara*).

Running north to south through the site is a wooded bank which can be reached via a boardwalk from the main path. The bank supports Hawthorn, Goat Willow, Blackthorn (*Prunus spinosa*), Elder (*Sambucus nigra*) and Crack willow.

♦Somerset Notable Species.

Habitat[s]	G113	F21	J21								

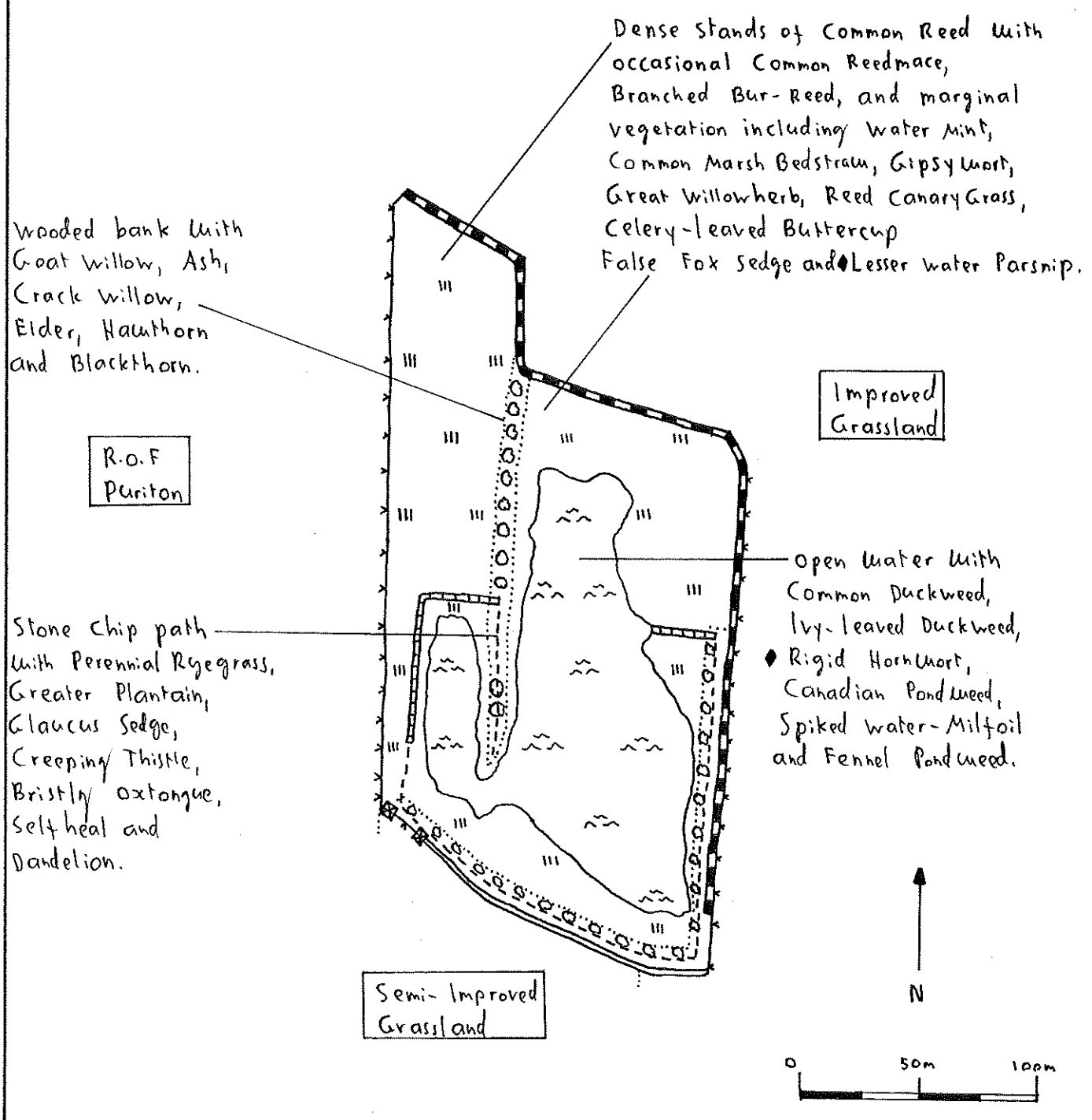
ST34|35|03

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
Puriton Lake	ST 34/035	S T 3 4 2 4 2 4
Date 15/8/95	Recorder(s) R. Allen C. Belfield.	

Hedge
Barbed wire Fence
Gate
Rhyne
Board Walk
Path

Distinct habitat boundary
Indistinct Habitat boundary
Open water
Reed Bed
Row of Trees
♦ Somerset notable species



ST34/35/03

Vascular Plant Recording Form

Site Name: PURITON LAKE

File Code: ST34/35

Date: 15/8/95

Grid Ref.: S T 3 4 2 4 2 4

Recorder(s): C BELFIELD, R ALLEN

	O	L
Acer campestre		
Acer platanoides		
Acer pseudoplatanus		
Achillea millefolium	O	
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria		
Aesculus hippocastanum		
Aethusa cynapium		
Agrimonia eupatoria	C	
Agrostis canina / canina		
Agrostis capillaris		
Agrostis gigantea		
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum		
Alisma plantago-aquatica		
Alliaria petiolata		
Allium ursinum		
Allium vineale		
Alnus glutinosa		
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis		
Anacamptis pyramidalis		
Anagallis arvensis		
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris		
Anthemis cotula		
Anthoxanthum odoratum		
Anthriscus caucalis		
Anthriscus sylvestris		
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum	C	
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.		
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius		
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes		
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis		
Berula erecta	R	
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum	F	
Brassica napus		
Brassica nigra		
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.		
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii		
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa		
Callitriche stagnalis		
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium		
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris		
Cardamine flexuosa		
Cardamine hirsuta		
Cardamine pratensis		
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis		
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca	O	
Carex hirta		
Carex nigra		
Carex otrubae	O	
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra		
Centaurea scabiosa		
Centaurium erythraea		
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum		
Cerastium glomeratum		
Ceratophyllum demersum	A	
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.		
Chamaecyparis lawsonian.		
Chamaenerion angustifoli.		
Cheiranthus cheiri		
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana		
Cirsium acaule		
Cirsium arvense	O	
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare	O	
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum		
Conopodium majus		
Convolvulus arvensis	F	
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus		
Coronopus squamatus		
Corydalis claviculata		
Corydalis lutea		
Corylus avellana		
Crataegus monogyna	F	
Crepis capillaris	R	
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		
Cynosurus cristatus		
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata	F	
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota	O	
Deschampsia cespitosa		
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea		
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl	O	
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		
Eleocharis uniglumis		
Elodea canadensis	O	
Elymus caninus		
Elymus repens	O	
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum	F	
Epilobium lanceolatum		
Epilobium montanum		
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense		
Equisetum fluviatile		
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		
Erodium cicutarium		
Erophila verna sens.lat.		
Euonymus europaeus		
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.		
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior	O	
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine	O	
Galium cruciata		
Galium mollugo agg.		
Galium odoratum		
Galium palustre agg.	F	
Galium saxatile		
Galium uliginosum		
Galium verum		
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum	R	
Geranium lucidum		
Geranium molle		
Geranium pratense		
Geranium pyrenaicum		
Geranium robertianum		
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea	O	
Glyceria declinata		
Glyceria fluitans		
Glyceria maxima		
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix	O	
Helianthemum nummula.		
Heracleum sphondylium	O	
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus		
Holcus mollis		
Hordeum murinum	R	
Hordeum secalinum		
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.		
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum		
Hypericum tetrapterum		
Hypochoeris radicata		
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus		
Juncus acutiolia		
Juncus articulatus		
Juncus conglomeratus		
Juncus effusus		
Juncus inflexus	O	
Juniperus communis		
Knautia arvensis		
Koeleria macrantha		
Lamiastrum galeobdolon		
Lamium album		
Lapsana communis		
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis	O	
Lemna gibba		
Lemna minor	A	
Lemna polyrhiza		
Lemna trisulca	O	
Leontodon autumnalis		
Leontodon hispidus		
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare	O	
Ligustrum vulgare		
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne	O	
Lonicera periclymenum		
Lotus corniculatus		
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus	F	
Lysimachia nemorum		
Lysimachia nummularia		
Lythrum portula		
Lythrum salicaria		
Malus sylvestris sens.lat.		
Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica		
Medicago lupulina		
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		
Melilotus officinalis		
Mentha aquatica	O	
Mentha arvensis		
Mentha spicata		
Mercurialis annua		
Mercurialis perennis		
Milium effusum		
Moehringia trinervia		
Molinia caerulea		
Mycelis muralis		
Myosotis arvensis		
Myosotis discolor		
Myosotis laxa	O	
Myosotis ramosissima		
Myosotis scorpiodes		
Myosoton aquaticum		
Nardus stricta		
Nasturtium officinale sl	O	
Nasturtium microphyllum		
Nuphar lutea		
Nymphaea alba		
Odontites verna		
Oenanthe crocata	C	
Oenanthe fluviatilis		
Oenanthe pimpinelloides		
Oenothera erythrosepala		
Ononis repens		
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		
Orobanche hederae		
Orobanche minor		
Oxalis acetosella		
Papaver dubium		
Papaver lecoqii		
Papaver rhoeas		
Parietaria judaica		
Pastinaca sativa		
Pedicularis sylvatica		
Pentaglottis sempervirens		
Petasites fragrans		
Petasites hybridus		
Phalaris arundinacea	F	
Phleum pratense / berto.		
Phleum pratense / prate.		
Phragmites australis	AD	
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides	O	
Picris hieracioides		
Pilosella officinarum		
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
Plantago lanceolata		
Plantago major	O	
Plantago media		
Platanthera chlorantha		
Poa annua		
Poa compressa		
Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis	O	
Polygala serpyllifolia		
Polygala vulgaris		
Polygonatum multiflorum		
Polygonum amphibium	O	
Polygonum arenastrum		
Polygonum aviculare	O	
Polygonum bistorta		
Polygonum hydropiper		
Polygonum lapathifolium		
Polygonum persicaria		
Polypodium interjectum		
Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus	O	
Potamogeton pusillus		
Potentilla anserina		
Potentilla erecta		
Potentilla reptans		
Potentilla sterilis		
Primula veris		
Primula vulgaris		
Prunella vulgaris	C	
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa		
Pseudotsuga menziesii		
Pteridium aquilinum		
Pulicaria dysenterica	C	
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris	O	
Ranunculus aquatilis st		
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		
Ranunculus flammula		
Ranunculus omiophyllus		
Ranuculus parviflorus		
Ranuculus repens		
Ranunculus sceleratus	R	
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		
Reseda luteola		
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis		
Rosa canina		
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.	F	
Rubus idaeus		
Rumex acetosa	O	
Rumex acetosella agg.		
Rumex confertus		
Rumex crispus	O	
Rumex hydrolapathum		
Rumex obtusifolius	O	
Rumex pulcher		
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba		
Salix caprea	O	
Salix cinerea		
Salix fragilis	O	
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra	O	
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata		
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		
Sedum acre		
Sedum album		
Senecio aquaticus		
Senecio erucifolius		
Senecio jacobaea	O	
Senecio squalidus		
Senecio vulgaris		
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus		
Silene alba		
Silene dioica		
Silene vulgaris		
Sinapis arvensis		
Sison amomum	O	
Sisymbrium officinale		
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara	F	
Solanum nigrum		
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		
Sonchus asper	O	
Sonchus oleraceus		
Sorbus aria agg.		
Sorbus aucuparia		
Sparganium emersum		
Sparganium erectum	F	
Spergula arvensis		
Stachys officinalis		
Stachys palustris		
Stachys sylvatica		
Stellaria alsine		
Stellaria graminea		
Stellaria holostea		
Stellaria media sens. str.		
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.	O	
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		
Trifolium hybridum		
Trifolium medium		
Trifolium pratense	O	
Trifolium repens	O	
Triglochin palustris		
Tripleurosperm. mar. / ino.	R	
Trisetum flavescens		
Tsuga heterophylla		
Tussilago farfara	O	
Typha latifolia	F	
Ulex europaeus		
Ulex gallii		
Ulmus glabra		
Ulmus procera		
Umbilicus rupestris		
Urtica dioica	O	
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis		
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		
Verbena officinalis		
Veronica anagallis-aquatica		
Veronica arvensis		
Veronica beccabunga		
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca		
Vicia hirsuta		
Vicia sativa / sativa		
Vicia sepium	O	
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza		

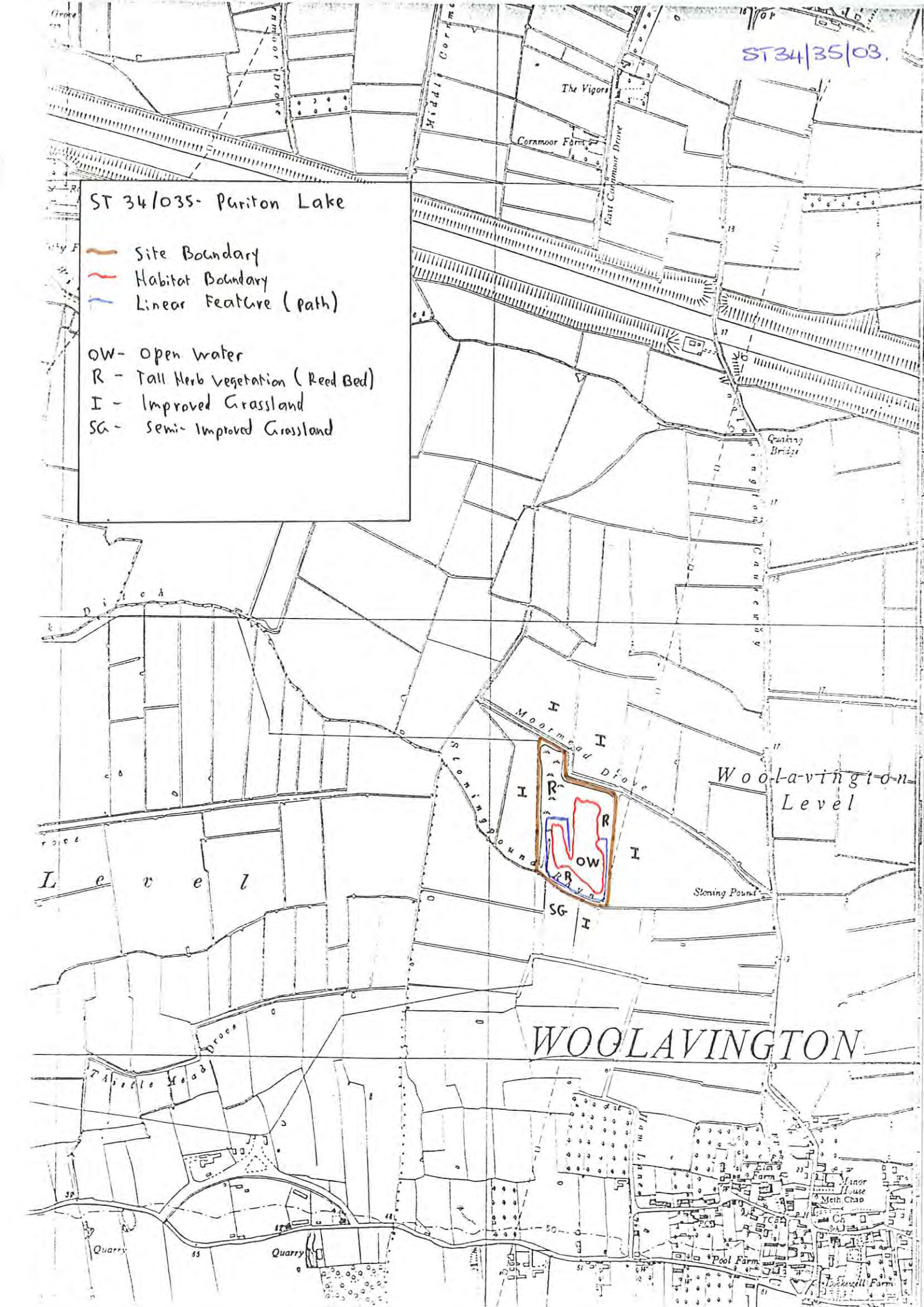
notables extracted XII/95

Notables count: 2

A.V. Plant count:

Somerset notable species in **BOLD** . Ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

ST34/35/03.


ST 34/035- Puriton Lake
Site Boundary
Habitat Boundary
Linear Feature (path)
OW- Open water
R - Tall Herb Vegetation (Reed Bed)
I - Improved Grassland
SG - Semi-Improved Grassland
The Vigors
Cornmoor Farm
East Cornmoor Drove
Quaking Bridge
Moormead Drove
Stoning Pound
Woolavington Level
Level
WOOLAVINGTON
Pool Farm
Quarry
Quarry
R
OW
I
SG

SERC Survey Sheet	Site Name: North Mead Drove Fields	Site Number: ST34/041	Grid Reference(s): S T 3 2 4 4 3 2 / T 3 2 4 4 2 8
	Date: 21/10/97	Recorder(s): B. Lambert, S. Mazdon.	

Three flat improved and grazed fields with associated rhynes and ditches.

Location, Topography, Boundaries and Surrounding Land Use.

This is a flat site of 14.5 hectares on the Somerset Levels, situated 1.5 km north of Puriton, comprising of three fields. Deep stoneless calcareous clayey soils overlie a marine alluvium geology. The boundaries consist of rhynes and /or ditches with a hedgerow, some thick scrub between the upper and lower fields, and some high wire fencing around the Royal Ordnance land.. Some rhynes that appear on the map have been removed or filled in in previous years, enlarging the fields. Surrounding land use includes a mixture of medium to heavily improved grassland and land used by the Royal Ordnance Factory.

Detailed Description.

The middle field shown on the map was the first surveyed, and displayed the highest plant diversity in and by the rhynes, especially along the western boundary. It also has an electrical sub-station in the middle of the field. Plant species found here included those commonly associated with still water, such as Wavy Bittercress (*Cardamine flexuosa),* Hemlock Water Dropwort (*Oenanthe crocata),* Fine Leaved Water Dropwort (*O. Aquatica),* Fool's Watercress (*Apium nodiflorium),* Watermint (*Mentha aquatica),* Common Reed (*Phragmites australis),* Reed Sweet Grass (*Glyceria maxima),* Floating Sweet Grass (*G. fluitans),* Water Plantain (*Alisma plantago-aquatica),* Narrow Leaved Water Plantain *(Alisma lanceolatum),* Common Waterstarwort (*Callitriche stagnalis),* Intermediate Waterstarwort (*C. hamulata),* Water Figwort (*Scrophularia auriculata),* Common Duckweed (*Lemna minor),* Fat Duckweed (*L. gibba)* Ivy Leaved Duckweed (*L. trisulca),* Soft Rush (*Juncus effusus),* Common Sedge (*Carex nigra),* Cyperus Sedge (*C. pseudocyperus),* Brooklime (*Veronica beccabunga*) and Watercrowfoot species (*Ranunculus spp.).*

Grassland species included Perennial Rye Grass (*Lolium perenne)* Cocksfoot (*Dactylis glomerata)* Annual Meadowgrass (*Poa annua),* Common Bent (*Agrostis capillaris),* Broad Leaved Dock (*Rumex obtusifolius),* Broad Leaved Plantain (*Plantago major)* Ribwort Plantain *(P. lanceolata),* Spear Thistle (*Cirsium vulgare)* Creeping Thistle (*C. arvense),* Creeping Cinquefoil (*Potentilla repens),* Scentless Mayweed (*Tripleurospernum recutita),* Prickly Sowthistle (*Sonchus asper),* Mousear (*Cerastium fontanum)* and on the edges to the north , Teasel (*Dipsacus fullonum subsp. sylvestris).*

The majority of these grassland and rhyne species were found in varying diversities throughout the remainder of the site. The north eastern most field however was the most improved, and showed a far lower diversity in both habitats, although it had attracted some snipe, and did include Rigid Hornwort◆ (*Ceratophyllum demersum)* in the rhyne.

Hedgerow species include Blackthorn (*Prunus spinosa),* Hawthorn (*Crataegus monogyna),* English Elm (*Ulnus procera)* Field Maple (*Acer campestre),* Field and Dog Rose (*Rosa arvensis and canina),* Ash (*Fraxinus excelsior),* False Brome (*Brachypodium sylvaticum*) Dovesfoot Cranesbill (*Geranium molle),* Bristly Oxtongue (*Picris echiodes)* and Agrimony (*Agrimonia eupatoria).*

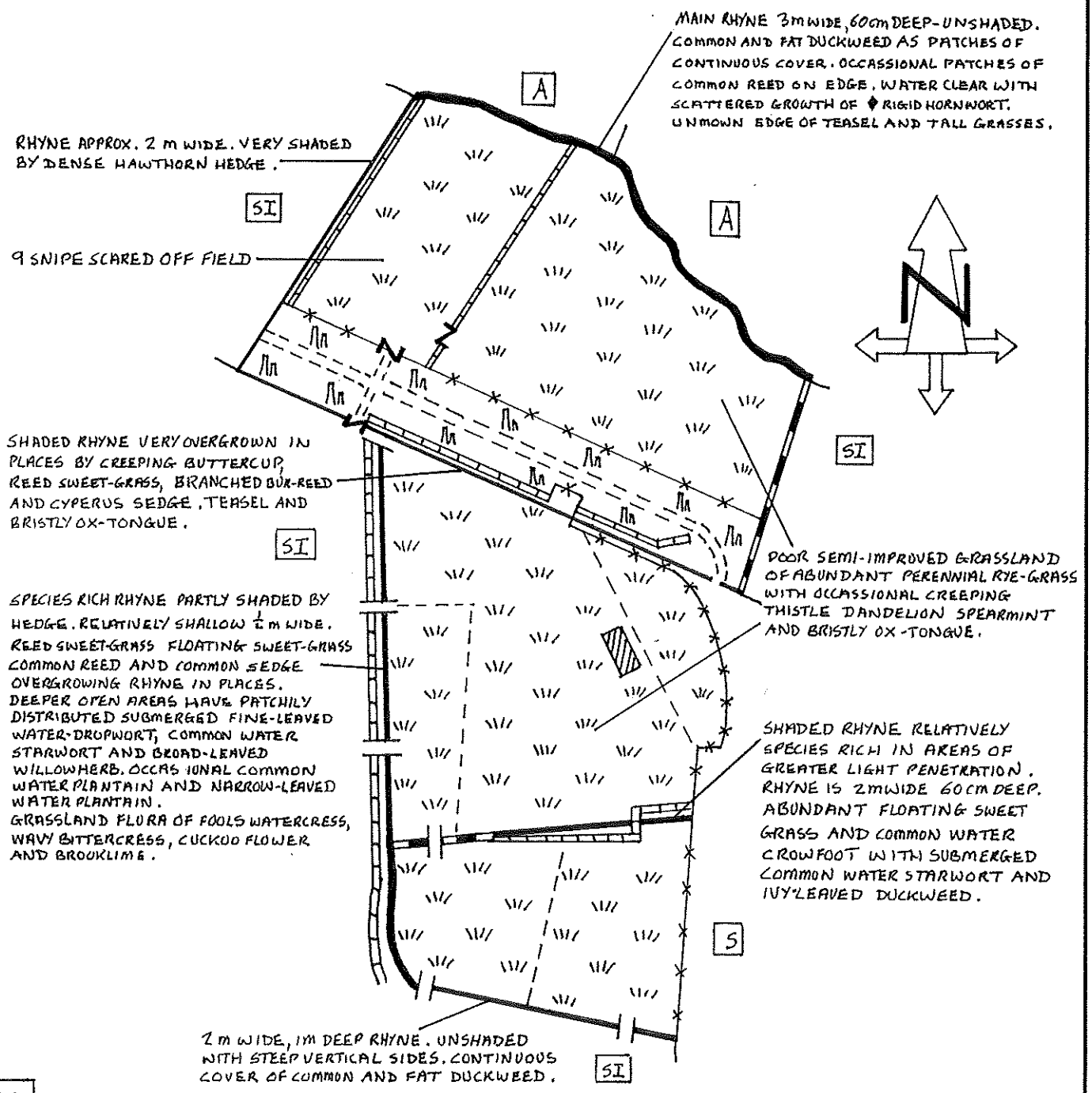
◆Somerset Notable Species – entered SER 10/5/00

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
NORTH MEAD DROVE FIELDS	ST34/041	S T 3 2 4 4 3 2 / T 3 2 4 4 2 8

Date 21.10.97

Recorder(s) S. MAZDON, B. LAMBERT



KEY

- POOR SEMI-IMPROVED GRASSLAND
- SCRUB
- BRIDGE
- GATE
- ELECTRICAL SUB STATION
- RHYNE
- HEDGE
- HEDGE OVER RHYNE
- GRAVEL ROAD
- FENCE
- DRAINED RHYNE
- ♦ SOMERSET NOTABLE SPECIES
- A ARABLE
- S SCRUB
- SI POOR SEMI-IMPROVED GRASSLAND

0 50 100 150 m

Vascular Plant Recording Form

Site Name: NORTH MENA GROVE FIELDS.

File Code: ST34/041

Date: 21/10/97

Grid Ref.: S T 3 2 5 4 2 4

Recorder(s): P. LAMBERT, S. MAZDON.

	O	L
Acer campestre	O	F
Acer platanoides		
Acer pseudoplatanus		
Achillea millefolium	O	
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria		
Aesculus hippocastanum		
Aethusa cynapium		
Agrimonia eupatoria	R	
Agrostis canina / canina		
Agrostis capillaris	O	F
Agrostis gigantea		
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum	O	
Alisma plantago-aquatica	O	
Alliaria petiolata		
Allium ursinum		
Allium vineale		
Alnus glutinosa		
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis		
Anacamptis pyramidalis		
Anagallis arvensis		
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris		
Anthemis cotula		
Anthoxanthum odoratum		
Anthriscus caucalis		
Anthriscus sylvestris		
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum	O	
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.		
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius		
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes		
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis		
Berula erecta		
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum	O	O
Brassica napus		
Brassica nigra		
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.		
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii		
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa		
Callitriche stagnalis	O	
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium		
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris		
Cardamine flexuosa	O	
Cardamine hirsuta		
Cardamine pratensis	O	
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis		
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca		
Carex hirta		
Carex nigra	O	
Carex otrubae		
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra		
Centaurea scabiosa		
Centaurium erythraea		
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum	O	
Cerastium glomeratum		
Ceratophyllum demersum	O	F
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.		
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana		
Cirsium acaule		
Cirsium arvense	O	A
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare	O	
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum		
Conopodium majus		
Convolvulus arvensis	O	
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus	O	
Coronopus squamatus		
Corydalis claviculata		
Corydalis lutea		
Corylus avellana		
Crataegus monogyna	O	F
Crepis capillaris		
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		
Cynosurus cristatus		
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata	O	
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota		
Deschampsia cespitosa		
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea		
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl	O	
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		
Eleocharis uniglumis		
Elodea canadensis		
Elymus caninus		
Elymus repens		
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum		
Epilobium lanceolatum		
Epilobium montanum	O	
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense		
Equisetum fluviatile		
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		
Erodium cicutarium		
Erophila verna sens.lat.		
Euonymus europaeus		
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.		
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior	O	
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine		
Galium cruciata		
Galium mollugo agg.		
Galium odoratum		
Galium palustre agg.		
Galium saxatile		
Galium uliginosum		
Galium verum		
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum		
Geranium lucidum		
Geranium molle	O	F
Geranium pratense		
Geranium pyrenaicum		
Geranium robertianum		
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea	O	
Glyceria declinata		
Glyceria fluitans	O	
Glyceria maxima	O	F
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix	F	
Helianthemum nummula.		
Heracleum sphondylium	O	
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus		
Holcus mollis		
Hordeum murinum		
Hordeum secalinum		
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.		
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum		
Hypericum tetrapterum		
Hypochoeris radicata	O	
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus		
Juncus acutiflorus		
Juncus articulatus		
Juncus conglomeratus		
Juncus effusus	O	F
Juncus inflexus	O	
Juniperus communis		
Knautia arvensis		
Koeleria macrantha		
Lamiastrum galeobdolon		
Lamium album	R	
Lapsana communis	O	
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis		
Lathrarea squamaria		
Lemna gibba	O	F
Lemna minor	O	A
Lemna polyrhiza		
Lemna trisulca	O	
Leontodon autumnalis		
Leontodon hispidus		
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare		
Ligustrum vulgare		
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne	D	
Lonicera periclymenum		
Lotus corniculatus		
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus		
Lysimachia nemorum		
Lysimachia nummularia		
Lythrum portula		
Lythrum salicaria		
Malus sylvestris sens.lat.		
Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica		
Medicago lupulina	D	
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		
Melilotus officinalis		
Mentha aquatica	O	
Mentha arvensis		
Mentha spicata		
Mercurialis annua		
Mercurialis perennis		
Milium effusum		
Moehringia trinervia		
Molinia caerulea		
Mycelis muralis		
Myosotis arvensis		
Myosotis discolor		
Myosotis laxa		
Myosotis ramosissima		
Myosotis scorpioides		
Myosoton aquaticum		
Nardus stricta		
Nasturtium officinale sl		
Nasturtium microphyllum		
Neottia nidus-avis		
Nuphar lutea		
Nymphaea alba		
Odontites verna		
Oenanthe crocata	O	
Oenanthe fluviatilis		
Oenanthe pimpinelloides		
Oenothera erythrosepala		
Ononis repens		
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		
Orobanche hederae		
Orobanche minor		
Oxalis acetosella		
Papaver dubium		
Papaver lecoqii		
Papaver rhoeas		
Parietaria judaica		
Pastinaca sativa		
Paris quadrifolia		
Pedicularis sylvatica		
Pentaglottis sempervirens		
Petasites fragrans		
Petasites hybridus		
Phalaris arundinacea		
Phleum pratense / berto.		
Phleum pratense / prate.		
Phragmites australis	F	
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides		
Picris hieracioides		
Pilosella officinarum		
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
Plantago lanceolata	O	
Plantago major	F	
Plantago media		
Platanthera chlorantha		
Poa annua	F	
Poa compressa		
Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis		
Polygala serpyllifolia		
Polygala vulgaris		
Polygonatum multiflorum		
Polygonum amphibium		
Polygonum arenastrum		
Polygonum aviculare		
Polygonum bistorta		
Polygonum hydropiper		
Polygonum lapathifolium		
Polygonum persicaria	O	
Polypodium interjectum		
Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus		
Potamogeton pusillus		
Potentilla anserina		
Potentilla erecta		
Potentilla reptans	O	F
Potentilla sterilis		
Primula veris		
Primula vulgaris		
Prunella vulgaris		
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa	F	
Pseudotsuga menziesii		
Pteridium aquilinum		
Pulicaria dysenterica		
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris		
Ranunculus aquatilis st		
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		
Ranunculus flammula		
Ranunculus omiophyllus		
Ranunculus parviflorus		
Ranunculus repens	F	
Ranunculus sceleratus	O	
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		
Reseda luteola		
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis	O	F
Rosa canina	O	
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.	O	
Rubus idaeus		
Rumex acetosa	F	
Rumex acetosella agg.		
Rumex conferta		
Rumex crispus		
Rumex hydrolapathum		
Rumex obtusifolius	O	
Rumex pulcher		
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba		
Salix caprea		
Salix cinerea		
Salix fragilis		
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra		
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata	O	
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		
Sedum acre		
Sedum album		
Senecio aquaticus		
Senecio erucifolius		
Senecio jacobaea	O	
Senecio squalidus		
Senecio vulgaris		
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus		
Silene alba		
Silene dioica		
Silene vulgaris		
Sinapis arvensis		
Sison amomum	O	
Sisymbrium officinale		
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara		
Solanum nigrum		
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		
Sonchus asper	O	F
Sonchus oleraceus		
Sorbus aria agg.		
Sorbus aucuparia		
Sorbus torminalis		
Sparganium emersum		
Sparganium erectum	O	
Spergula arvensis		
Stachys officinalis		
Stachys palustris		
Stachys sylvatica		
Stellaria alsine		
Stellaria graminea	O	
Stellaria holostea		
Stellaria media sens. str.	O	
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.	F	
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		
Trifolium hybridum		
Trifolium medium		
Trifolium pratense	O	
Trifolium repens	O	
Triglochin palustris		
Tripleurosperm. mar. / ino.	O	A
Trisetum flavescens		
Tsuga heterophylla		
Tussilago farfara		
Typha latifolia		
Ulex europaeus		
Ulex gallii		
Ulmus glabra		
Ulmus procera	O	F
Umbilicus rupestris		
Urtica dioica	O	F
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis	R	
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		
Verbena officinalis		
Veronica anagallis-aquati.		
Veronica arvensis		
Veronica beccabunga	O	
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca	O	
Vicia hirsuta		
Vicia sativa / sativa	O	
Vicia sepium	O	
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza		

CAREX PSEUDOCYPERUS O

OENANTHE AQUATICA O

WATERCROWFOOT (Ranunculus) SP. O

CALLITRICHE STAMULATA O

CARDAMINE AMARA NO RMS 98 O

P.T.O.

Notables count: 1

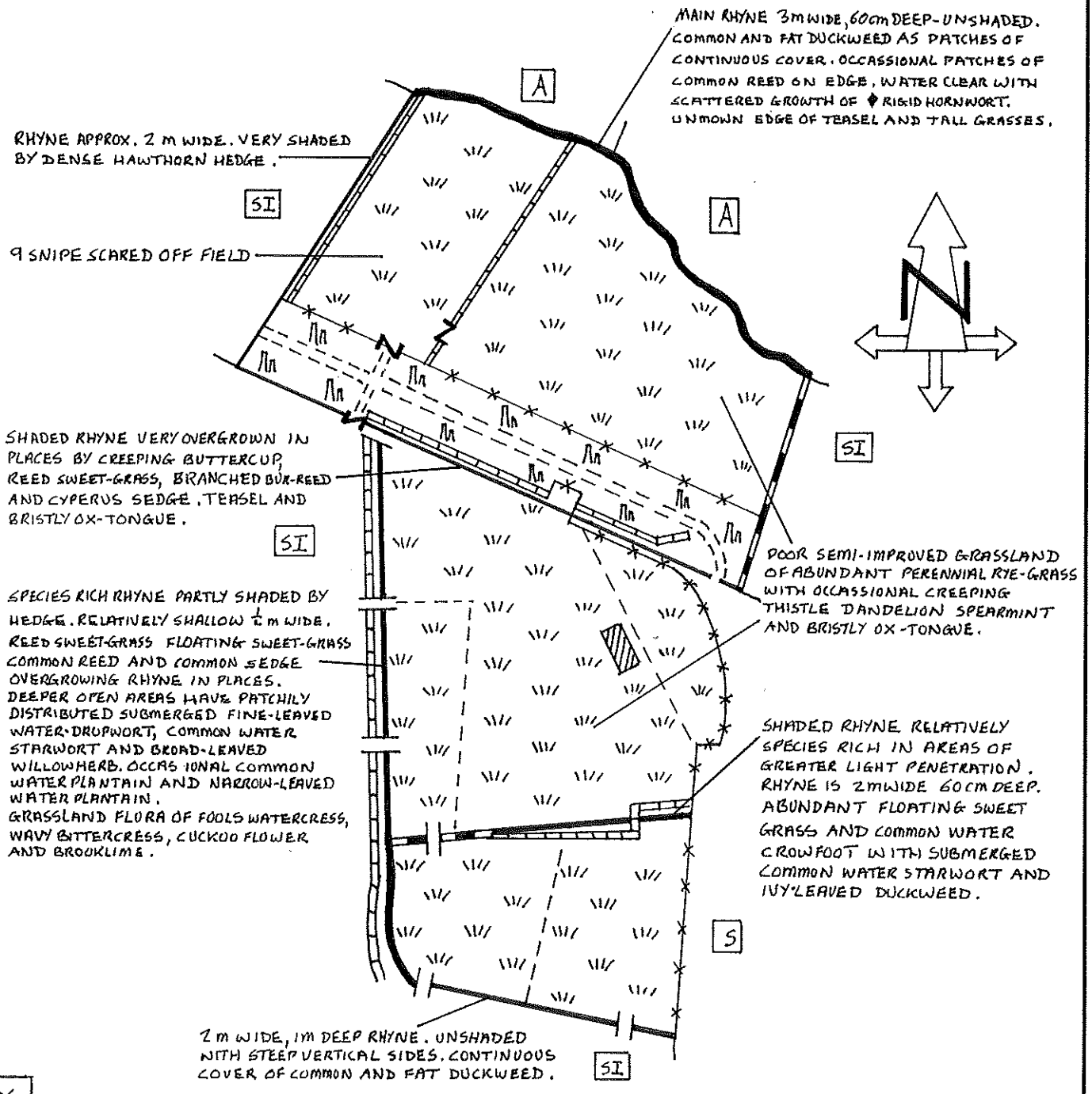
A.V. Plant count:

Somerset notable species in **BOLD**. Somerset ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
NORTH MEAD DROVE FIELDS	ST34/041	ST324428

Date	Recorder(s)
21.10.97	S.MAZDON, B.LAMBERT



KEY

- POOR SEMI-IMPROVED GRASSLAND
- SCRUB
- BRIDGE
- GATE
- ELECTRICAL SUB STATION
- RHYNE
- HEDGE
- HEDGE OVER RHYNE
- GRAVEL ROAD
- FENCE
- DRAINED RHYNE
- ♦ SOMERSET NOTABLE SPECIES
- A ARABLE
- S SCRUB
- SI POOR SEMI-IMPROVED GRASSLAND

0 50 100 150 m

ST34/043/02

SERC Survey Sheet	Site Name: STONINGPOUND FIELD SOUTH & STONING POUND RHYNE	Site Number: ST34/043	Grid Reference(s): S T 3 4 2 4 2 2
	Date: 21/10/97	Recorder(s): K. TAYLOR, L. BARTON-ALLAN.	

Semi-improved Grassland with Rhynes.

Location, Topography, Boundaries and Surrounding Land Use.
The site occupies approximately 1.7 hectares and is located 0.5 km north-west of Woolavington.The geology is marine alluvium with deep stoneless calcareous clayey soils and groundwater levels controlled by rhynes and pumps. Field boundaries consist of hedgebanks with fences and rhynes. The surrounding land-use is semi-improved grassland, open water, a track and the Royal Ordnance Factory.

Detailed Description.
The site consists of a flat semi-improved field which has been lightly grazed by cattle and horses. Perennial Ryegrass *(Lolium perenne)* and Cocksfoot *(Dactylis glomerata)* dominate the sward, with Timothy *(Phleum pratense)*, Common Couch *(Elymus repens)* and Annual Meadowgrass *(Poa annua)* in lesser quantities. Other ground flora species which are scattered throughout the site, though more abundant in the field margins include Knotgrass *(Polygonum aviculare)*, Prickly Sow Thistle *(Sonchus asper)*, Spear Thistle *(Cirsium vulgare)*, Bristly Ox-tongue *(Picris echioides)*, Scarlet Pimpernel *(Anagalis arvensis)*, Meadow Vetchling *(Lathyrus pratensis)* and Swinecress *(Coronopus squamatus)*. The field margins also include Redshank *(Polygonum persicaria)*, Hemlock *(Conium maculatum)* and Angelica *(Angelica sylvestris)*. There are frequent stands of Creeping Thistle *(Cirsium arvense)* and a dump of building rubble at the south of the site.

The hedgebanks occupy three sides of the site and are largely scrubby, dominated by Blackthorn *(Prunus spinosa)* and Bramble *(Rubus fruticosus)* with Field Rose *(Rosa arvensis)*, Elder *(Sambucus nigra)*, Hawthorn *(Crataegus monogyna)* and White Willow *(Salix alba)*, some of which are pollarded. Ground flora includes Bittersweet *(Solanum dulcamara)*, Bush Vetch *(Vicia sepium)*, Common Vetch *(Vicia sativa)*, Black Medick *(Medicago lupulina)* and Rough Chervil *(Anthriscus temulentum)*.

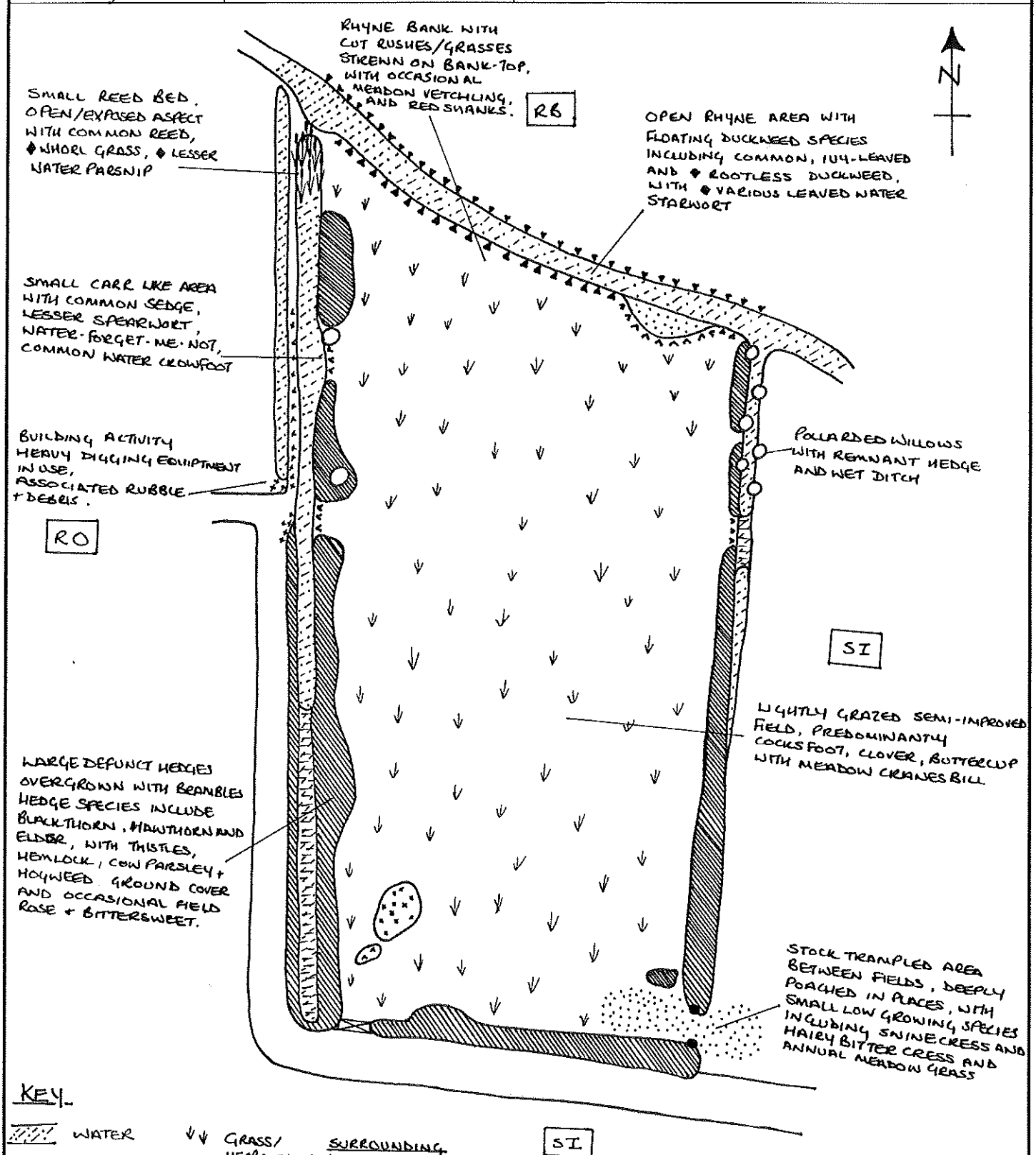
The rhynes vary from being rich in submerged and bank species to species-poor, some areas having a blanket covering of Duckweed. The most productive area was Stoningpound Rhyne to the north of the site, in which was found Lesser Spearwort *(Ranunculus flammula)*, Water Forget-me-not *(Myosotis scorpioides)*, Ivy-leaved Crowfoot *(Ranunculus hederaceus)*, Common Water Crowfoot *(Ranunculus aquatilis)*, Ivy-leaved Duckweed (Lemna triscula), Common Duckweed *(Lemna minor)*, ♦ Rootless Duckweed *(Wolffia arrhiza)* and ♦Various Leaved Water Starwort *(Callitriche platycarpa)*. Bank species include Cuckooflower *(Cardamine pratensis)*, Common Sedge *(Carex nigra)*, ♦ Lesser Water Parsnip *(Berula erecta)* and ♦ Whorl Grass *(Catabrosa aquatica)*, with Common Reed *(Phragmites australis)* and Reed Canary Grass *(Phalaris arundinacea)* forming a reed bed in the north-west corner of the site. The reeds along the field side of Stoningpound Rhyne have been cut and spread. Rabbits and a Weasel were also seen during survey.

Habitat[s]	B322	9125	J21	J23	J262						

ST34/043/02

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
STONING POUND FIELD SOUTH & STONING POUND FIELD NORTH	ST34/043	ST342422
Date: 21·10·97	Recorder(s): L. BARTON-ALLAN K. TAYLOR	



ST34/043/02

Vascular Plant Recording Form

Site Name: STONINGPOUND FIELD SOUTH / STONINGPOUND BYTYNE

File Code: ST34/043

Date: 21/10/97

Grid Ref.: S T 3 4 2 4 2 2

Recorder(s): K.TAYLOR, L. BARTON-ALLAN

	O	L
Acer campestre		
Acer platanoides		
Acer pseudoplatanus		
Achillea millefolium		
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria		
Aesculus hippocastanum		
Aethusa cynapium		
Agrimonia eupatoria		
Agrostis canina / canina		
Agrostis capillaris		F
Agrostis gigantea	O	
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum		
Alisma plantago-aquatica		
Alliaria petiolata		
Allium ursinum		
Allium vineale		
Alnus glutinosa		
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis		
Anacamptis pyramidalis		
Anagallis arvensis	O	
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris	O	F
Anthemis cotula		
Anthoxanthum odoratum		
Anthriscus caucalis		
Anthriscus sylvestris	O	F
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum		
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.		
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius		
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes		
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis		
Berula erecta	O	
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum		
Brassica napus		
Brassica nigra		
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.		
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii		
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa	O	F
Callitriche stagnalis		
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium		
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris	O	
Cardamine flexuosa		
Cardamine hirsuta	O	
Cardamine pratensis	O	
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis		
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca		
Carex hirta		
Carex nigra		F
Carex otrubae		
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra		
Centaurea scabiosa		
Centaurium erythraea		
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum		F
Cerastium glomeratum		
Ceratophyllum demersum		
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.	O	
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana		
Cirsium acaule		
Cirsium arvense		F
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare		F
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum	O	F
Conopodium majus		
Convolvulus arvensis		F
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus		
Coronopus squamatus	O	
Corydalis claviculata		
Corydalis lutea		
Corylus avellana		
Crataegus monogyna	O	F
Crepis capillaris		
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		
Cynosurus cristatus		
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata		A
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota		
Deschampsia cespitosa		
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea		
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl		
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		
Eleocharis uniglumis		
Elodea canadensis		
Elymus caninus		
Elymus repens		F
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum		
Epilobium lanceolatum		
Epilobium montanum		F
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense		
Equisetum fluviatile		
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		
Erodium cicutarium		
Erophila verna sens.lat.		
Euonymus europaeus		
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.	O	
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior		
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine	O	F
Galium cruciata		
Galium mollugo agg.		
Galium odoratum		
Galium palustre agg.		
Galium saxatile		
Galium uliginosum		
Galium verum		
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum		
Geranium lucidum		
Geranium molle		
Geranium pratense		F
Geranium pyrenaicum		
Geranium robertianum		
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea		F
Glyceria declinata		
Glyceria fluitans		
Glyceria maxima		
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix	O	F
Helianthemum nummula.		
Heracleum sphondylium		F
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus		
Holcus mollis		
Hordeum murinum		
Hordeum secalinum		
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.		
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum		
Hypericum tetrapterum		
Hypochoeris radicata		
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus		
Juncus acutiflorus		
Juncus articulatus		
Juncus conglomeratus		
Juncus effusus		
Juncus inflexus		
Juniperus communis		
Knautia arvensis		
Koeleria macrantha		
Lamiastrum galeobdolon		
Lamium album		
Lapsana communis		
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis	O	
Lathraea squamaria		
Lemna gibba		
Lemna minor	O	F
Lemna polyrhiza		
Lemna trisulca	O	F
Leontodon autumnalis	O	
Leontodon hispidus		
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare		
Ligustrum vulgare		
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne		A
Lonicera periclymenum		
Lotus corniculatus		
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus		
Lysimachia nemorum		
Lysimachia nummularia		
Lythrum portula		
Lythrum salicaria		
Malus sylvestris sens.lat.		
Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica		
Medicago lupulina	O	
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		
Melilotus officinalis		
Mentha aquatica		
Mentha arvensis		
Mentha spicata		
Mercurialis annua		
Mercurialis perennis		
Milium effusum		
Moehringia trinervia		
Molinia caerulea		
Mycelis muralis		
Myosotis arvensis		
Myosotis discolor		
Myosotis laxa		
Myosotis ramosissima		
Myosotis scorpioides	O	
Myosoton aquaticum		
Nardus stricta		
Nasturtium officinale sl	O	
Nasturtium microphyllum		
Neottia nidus-avis		
Nuphar lutea		
Nymphaea alba		
Odontites verna		
Oenanthe crocata		
Oenanthe fluviatilis		
Oenanthe pimpinelloides		
Oenothera erythrosepala		
Ononis repens		
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		
Orobanche hederae		
Orobanche minor		
Oxalis acetosella		
Papaver dubium		
Papaver lecoqii		
Papaver rhoeas		
Parietaria judaica		
Pastinaca sativa		
Paris quadrifolia		
Pedicularis sylvatica		
Pentaglottis sempervirens		
Petasites fragrans		
Petasites hybridus		
Phalaris arundinacea	O	F
Phleum pratense / berto.		
Phleum pratense / prate.	O	
Phragmites australis	O	F
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides		F
Picris hieracioides		
Pilosella officinarum		F
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
Plantago lanceolata		F
Plantago major		F
Plantago media		
Platanthera chlorantha		
Poa annua		F
Poa compressa		
Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis		
Polygala serpyllifolia		
Polygala vulgaris		
Polygonatum multiflorum		
Polygonum amphibium		
Polygonum arenastrum		
Polygonum aviculare		F
Polygonum bistorta		
Polygonum hydropiper		
Polygonum lapathifolium		
Polygonum persicaria	O	F
Polypodium interjectum		
Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus		
Potamogeton pusillus		
Potentilla anserina		
Potentilla erecta		
Potentilla reptans		F
Potentilla sterilis		
Primula veris		
Primula vulgaris		
Prunella vulgaris		
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa	O	A
Pseudotsuga menziesii		
Pteridium aquilinum		
Pulicaria dysenterica		
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris		F
Ranunculus aquatilis st	O	F
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		
Ranunculus flammula	O	
Ranunculus omiophyllus		
Ranunculus parviflorus		
Ranuculus repens		F
Ranunculus sceleratus		
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		
Reseda luteola		
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis	O	F
Rosa canina	O	
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.		F A
Rubus idaeus		
Rumex acetosa		F
Rumex acetosella agg.		
Rumex confertus		
Rumex crispus		
Rumex hydrolapathum		
Rumex obtusifolius		
Rumex pulcher		
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba	O	
Salix caprea		
Salix cinerea		
Salix fragilis		
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra	O	F
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata		
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		
Sedum acre		
Sedum album		
Senecio aquaticus		
Senecio erucifolius		
Senecio jacobaea	O	
Senecio squalidus		
Senecio vulgaris		
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus		
Silene alba		
Silene dioica		
Silene vulgaris		
Sinapis arvensis		
Sison amomum		
Sisymbrium officinale		
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara	O	
Solanum nigrum		
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		
Sonchus asper		F
Sonchus oleraceus		
Sorbus aria agg.		
Sorbus aucuparia		
Sorbus torminalis		
Sparganium emersum		
Sparganium erectum		
Spergula arvensis		
Stachys officinalis		
Stachys palustris		
Stachys sylvatica	O	
Stellaria alsine		
Stellaria graminea		
Stellaria holostea		
Stellaria media sens. str.		F
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.		
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		
Trifolium hybridum		
Trifolium medium		
Trifolium pratense		F
Trifolium repens		F
Triglochin palustris		
Tripleurosperm. mar. / ino.		
Trisetum flavescens		
Tsuga heterophylla		
Tussilago farfara		
Typha latifolia		
Ulex europaeus		
Ulex gallii		
Ulmus glabra		
Ulmus procera		
Umbilicus rupestris		
Urtica dioica		F
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis		
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		
Verbena officinalis		
Veronica anagallis-aquati.		
Veronica arvensis		
Veronica beccabunga		
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca		
Vicia hirsuta		
Vicia sativa / sativa	O	
Vicia sepium	O	
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza	O	F
Catabrosa aquatica ◆		

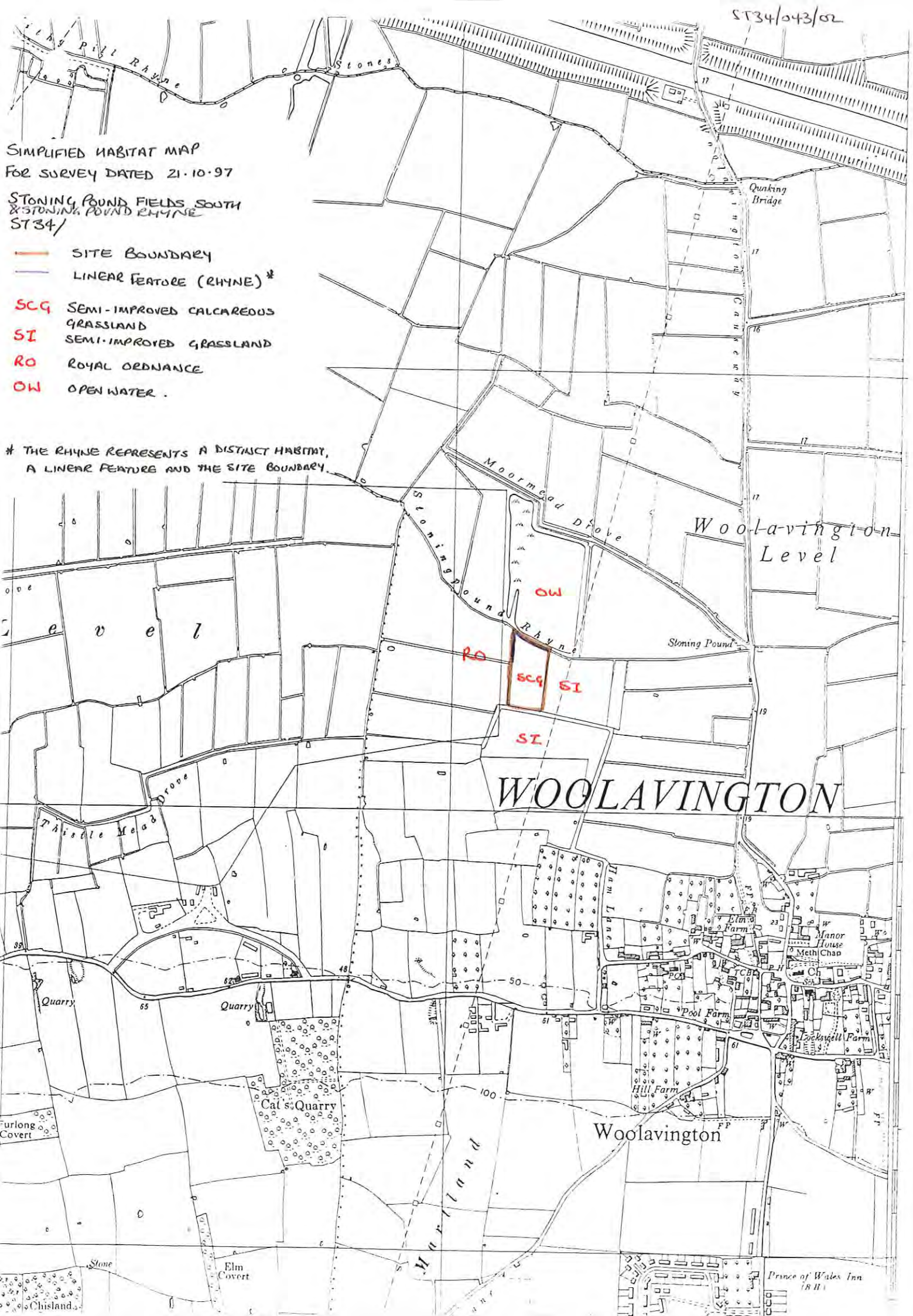
Notables count: 4

A.V. Plant count: 0

Somerset notable species in **BOLD**. Somerset ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

Vplant01.ppp V2.5

ST34/043/02


SIMPLIFIED HABITAT MAP
FOR SURVEY DATED 21·10·97
STONING POUND FIELDS SOUTH
& STONING POUND RHYNE
ST34/
SITE BOUNDARY
LINEAR FEATURE (RHYNE) #
SCG SEMI-IMPROVED CALCAREOUS GRASSLAND
SI SEMI-IMPROVED GRASSLAND
RO ROYAL ORDNANCE
OW OPEN WATER.
THE RHYNE REPRESENTS A DISTINCT HABITAT, A LINEAR FEATURE AND THE SITE BOUNDARY.
OW
RO
SCG
SI
SI
Stoning Pound Rhyne
Moormead Drove
Woolavington Level
Stoning Pound
WOOLAVINGTON
Thistle Mead
Drove
Quarry
Quarry
Cat's Quarry
Furlong Covert
Elm Covert
Stone
Chisland
Woolavington
Hill Farm
Pool Farm
Elm Farm
Manor House
Meth Chap
Lockswell Farm
Prince of Wales Inn
Quinking Bridge
Wetland

ST34/044/02

SERC Survey Sheet	Site Name: WOOLAVINGTON ROAD FIELDS SOUTH	Site Number: ST34/044	Grid Reference(s): S T 3 3 1 4 1 7
	Date: 21.10.97	Recorder(s): L.J.BARTON-ALLAN + K. TAYLOR	

Semi-improved grassland with rush pasture and reed beds

Location, Topography, Boundaries and Surrounding Land Use.

The low lying, 5.5 Ha site is situated approximately 0.5 km east of Puriton, with an altitude upto a maximum of 12 m above sea level. The soils of the highest part of the site to the South-west, are shallow brashy calcareous/clayey soils that overlie Jurassic Limestones and are associated with slowly permeable calcareous clayey soils, the remainder of the site consists of marine alluvium, a mixture of deep stoneless calcareous clayey soils and fine silty soils, where ground water levels are controlled by ditches and pumps. The boundaries are a combination of wire fencing and recently planted trees, defunct hedgebank and high chainlink fencing with barbed wire. Surrounding land use includes semi-improved grassland, the Royal Ordinance works, associated car-parking and a road.

Detailed Description.

The site can be arbitrarily divided into a higher semi-improved dry area which is north facing, and a lower wet area, each appearing as distinct habitats.

The higher fields are herb rich grazing which are predominantly Cocks-foot (*Dactylis glomerata*) and Perennial Rye grass (*Lolium perrene*) with a variety of herbaceous species including Spotted Medick (*Medicago arabica*), Doves-foot Cranesbill (*Geranium molle*), Common Sorrel (*Rumex acetosa*), Field Bindweed (*Convulvulus arvensis*) and only occasional patches of Nettles (*Uritica dioica*) and Spear Thistle (*Cirsium vulgare*). There are the remains of an old defunct hedgebank and ditch with unmanaged hedge species including English Elm (*Ulmus procera*), Blackthorn (*Prunus spinosa*) and Elder (*Sambucus nigra*), where the ground flora includes Hemlock (*Conium maculatum*), White Dead-nettle (*Lamium album*) and Hedge Garlic (*Alliaria petiolata*).

The surrounding field edges have been fenced and planted with Sycamore (*Acer pseudoplatanus*).

The western extent of the site has a large defunct hedgebank with Horse Chestnut (*Aesculus hippocastanum*), Field Maple (*Acer campestre*) and Foxglove (*Digitalis purpurea*), Cleavers (*Galium aparine*) and False Brome (*Brachypodium sylvaticum*), gradually changing to species associated with wetter conditions, with abundant Teasel (*Dispascus fullonum*) patches of Marsh Figwort (*Scrophularia auriculata*) and occassional ♦Corn Parsley (*Petroselinium segetum*). Towards the North western corner a small stream with ♦Water Parsnip (*Berula erecta*) and Brooklime (*Veronica beccabunga*), feeds into an overgrown ditch with abundant nettles and occasional ♦Marsh Dock (*Rumex palustris* hydrolapathum) and Hemlock Water Dropwort (*Onanthe crocata*). These features edge a large rush meadow dominated by Soft Rush (*Juncus effusus*) and Greater Willowherb (*Epilobium hirsutum*) with some Hairy Sedge (*Carex hirta*), Hard Rush (*Juncus inflexus*) and Compact Rush (*Juncus conglomeratus*). The northern area which has been cut is more grassy, mainly with Creeping Bent (*Agrostis*

Habitat[s]	A223	B322	B52	92-1							

ST34/044/02

SERC Survey Sheet	Site Name: WOOLAVINGTON ROAD FIELDS SOUTH	Site Number: ST34/044	Grid Reference(s): S T 3 3 1 4 1 7
	Date: 21.10.97	Recorder(s): LJBARTON-ALLAN + K TAYLOR	

stolonifera) and Common Sorrel, includes Lesser Spearwort (*Ranunculus flamula*), Creeping Thistle (*Cirsium arvense*) and Meadow Vetchling (*Lathyrus pratensis*).

A scrubby hedge separates the western rush pasture from the wetter eastern area. The hedge includes Brambles (*Rubus fruiticosus*), Field rose (*Rosa arvensis*) and Wild Privet (*Ligustrum vulgari*), mature White Willow (*Salix alba*) and Crack Willow (*S. fragilis*) with Fleabane (*Pulicaria dysenterica*) and Bittersweet (*Solanum dulcamara*). The swampy area is dominated by ♦Whorl Grass (*Catabrosa aquatica*), Yellow Flag (*Iris pseudacorus*) and Reed Canary Grass (*Phalaris arundinacia*).

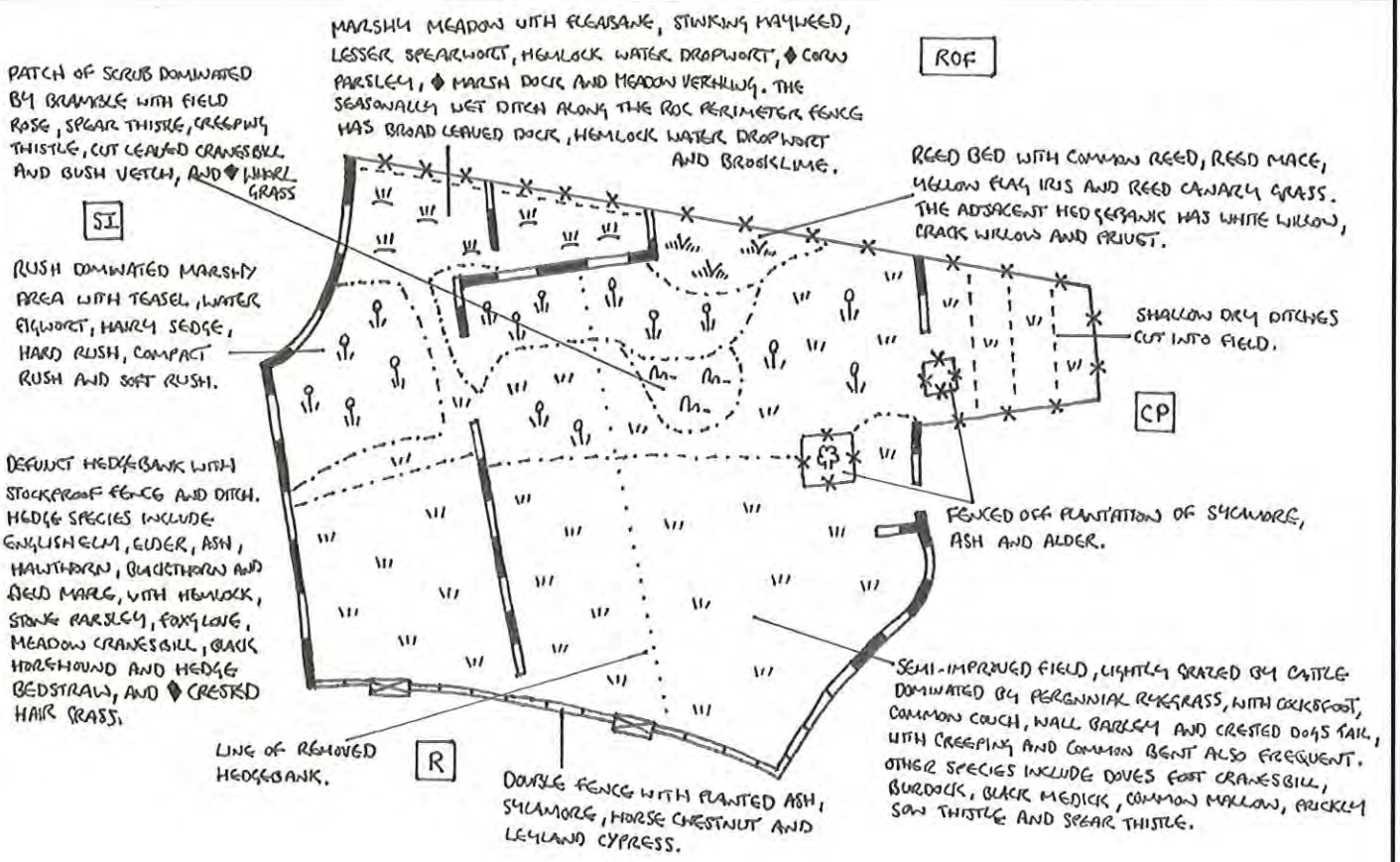
The extreme eastern area has shallow drainage channels cut into the field and two small areas fenced off for young trees including Sycamore, Ash (*Fraxinus excelsior*) and Alder (*Alnus* sp.).

♦ Denotes Somerset Notable Species

ST34/044/02

SERC Survey Sheet

Site Name	Site Number	Grid Reference(s)
WOOLAVINGTON ROAD FIELDS NORTH	ST34/044/02	S T 3 3 1 4 1 7
Date 21/10/97	Recorder(s) K. TAYLOR, L. BARTON-ALLAN	



DEFUNCT HEDGEBANK
LINE OF TREES AND FENCE
FENCE
HABITAT BOUNDARY
DITCH
BOUNDARY REMOVED
GRASSLAND
MARSHY GRASSLAND
REED BED
RUSHES
SCRUB
GRASSLAND WITH RUSHES
PLANTATION

ROF ROYAL ORDNANCE FACTORY
CP CAR PARK
R ROAD
SI SEMI-IMPROVED GRASSLAND
◆ SOMERSET NOTABLE SPECIES

N

0 50 100 150 200 250M

ST34/044/02

Vascular Plant Recording Form

Site Name: WOOLAVINGTON ROAD FIELDS SOUTH

File Code: ST34/044

Date: 21.10.97

Grid Ref.: S T 3 3 1 4 1 7

Recorder(s): L. BARTON-ALLAN, K. TAYLOR.

	O	L
Acer campestre	O	
Acer platanoides		
Acer pseudoplatanus	O	
Achillea millefolium	O	A
Achillea ptarmica		
Acinos arvensis		
Adoxa moschatellina		
Aegopodium podagraria	O	F
Aesculus hippocastanum	O	F
Aethusa cynapium		
Agrimonia eupatoria		
Agrostis canina / canina		
Agrostis capillaris	F	D
Agrostis gigantea		
Agrostis stolonifera		
Aira caryophyllea		
Aira praecox		
Ajuga reptans		
Alchemilla filicaulis / vest.		
Alisma lanceolatum		
Alisma plantago-aquatica		
Alliaria petiolata	O	
Allium ursinum		
Allium vineale		
Alnus glutinosa	O	
Alopecurus geniculatus		
Alopecurus myosuroides		
Alopecurus pratensis		
Anacamptis pyramidalis		
Anagallis arvensis		
Anagallis tenella		
Anchusa arvensis		
Anemone nemorosa		
Angelica sylvestris		
Anthemis cotula		
Anthoxanthum odoratum		
Anthriscus caucalis		
Anthriscus sylvestris	O	
Anthyllis vulneraria		
Antirrhinum majus		
Aphanes arvensis agg.		
Apium graveolens		
Apium nodiflorum		
Aquilegia vulgaris		
Arabidopsis thaliana		
Arabis hirsuta		
Arctium lappa		
Arctium minus agg.	O	F
Arenaria leptoclados		
Arenaria serpyll sens.lat.		
Armeria maritima		
Armoracia rusticana		
Arrhenatherum elatius		
Artemisia maritima		
Artemisia vulgaris		
Arum maculatum		
Asplenium ruta-muraria		
Asplenium trichomanes		
Aster novi-belgii		
Athyrium filix-femina		
Atriplex patula		
Avena fatua		
Avenula pratensis		
Avenula pubescens		
Azolla filiculoides		
Ballota nigra		
Barbarea vulgaris		
Bellis perennis		
Betula erecta	R	O
Betula pendula		
Betula pubescens		
Bidens cernua		
Blackstonia perfoliata		
Blechnum spicant		
Botrychium lunaria		
Brachypodium sylvaticum	O	F
Brassica napus		
Brassica nigra	R	
Brassica rapa		
Briza media		
Bromus commutatus		
Bromus erectus		
Bromus hordeaceus / hord.		
Bromus molis		
Bromus ramosus		
Bromus sterilis		
Bryonia dioica		
Buddleja davidii		
Butomus umbellatus		
Buxus sempervirens		
Calamintha sylvatica		
Callitriche brutia		
Callitriche obtusangu.		
Callitriche platycarpa		
Callitriche stagnalis		
Calluna vulgaris		
Caltha palustris		
Calystegia sepium / sepium		
Calystegia sepium / sil.		
Campanula glomerata		
Campanula rotundif.		
Campanula trachelium		
Capsella bursa-pastoris		
Cardamine flexuosa		
Cardamine hirsuta		
Cardamine pratensis		
Cardaria draba sens.lat.		
Carduus acanthoides		
Carduus nutans		
Carex acutiformis		
Carex arenaria		
Carex binervis		
Carex caryophyllea		
Carex demissa		
Carex distans		
Carex divulsa / divulsa		
Carex echinata		
Carex flacca		
Carex hirta	B	F
Carex nigra	O	F
Carex otrubae		
Carex ovalis		
Carex panicea		
Carex pendula		
Carex pulicaris		
Carex remota		
Carex riparia		
Carex spicata		
Carex strigosa		
Carex sylvatica		
Carlina vulgaris		
Carpinus betulus		
Castanea sativa		
Centaurea nigra		
Centaurea scabiosa		
Centaurium erythraea		
Centranthus ruber		
Cerastium diffusum		
Cerastium fontanum	O	
Cerastium glomeratum		
Ceratophyllum demersum		
Ceterach officinarum		
Chaenorhinum minus		
Chaerophyllum temu.		
Chelidonium majus		
Chenopodium alb agg.		
C. bonus-henricus.		
C. polyspermum		
Chenopodium rubrum		
Chrysosplenium alternif.		
Chrysosplenium opposit.		
Cichorium intybus		
Circaea lutetiana	R	
Cirsium acaule		
Cirsium arvense	O	F
Cirsium dissectum		
Cirsium eriophorum		
Cirsium palustre		
Cirsium vulgare	O	
Clematis vitalba		
Clinopodium vulgare		
Cochlearia danica		
Cochlearia officinalis st		
Colchicum autumnale		
Conium maculatum	O	F
Conopodium majus		
Convolvulus arvensis	O	B
Conyza canadensis		
Cornus sanguinea		
Coronopus didymus		
Coronopus squamatus		
Corydalis claviculata		
Corydalis lutea		
Corylus avellana		
Crataegus monogyna	O	F
Crepis capillaris		
Crepis vesicaria		
X Cupressocyparis leyland.		
Cuscuta epithymum		
Cymbalaria muralis		
Cynoglossum officinale		
Cynosurus cristatus		
Cystopteris fragilis		
Cytisus scoparius		
Dactylis glomerata	F	A
Dactylorhiza fuchsii / fuch.		
Dactylorhiza maculata		
Dactylorhiza praetermissa		
Danthonia decumbens		
Daphne laureola		
Daucus carota / carota		
Deschampsia cespitosa		
Deschampsia flexuosa		
Desmazeria rigida		
Digitalis purpurea	R	
Diplotaxis muralis		
Diplotaxis tenuifolia		
Dipsacus fullonum sl	O	A
Dipsacus pilosus		
Dryopteris affinis		
Dryopteris dilatata		
Dryopteris filix-mas agg.		
Echium vulgare		
Eleocharis palustris		
Eleocharis uniglumis		
Elodea canadensis		
Elymus caninus		
Elymus repens	O	
Epilobium adnatum		
Epilobium angustifolium		
Epilobium collinum		
Epilobium hirsutum	F	A
Epilobium lanceolatum		
Epilobium montanum	O	
Epilobium obscurum		
Epilobium palustre		
Epilobium parviflorum		
Epilobium roseum		
Epipactis helleborine		
Equisetum arvense		
Equisetum fluviatile		
Equisetum sylvaticum		
Equisetum palustre		
Equisetum telmateia		
Erica cinerea		
Erica tetralix		
Erigeron acer		
Erodium cicutarium		
Erophila verna sens.lat.		
Euonymus europaeus		
Eupatorium cannabinum		
Euphorbia amygdaloides		
Euphorbia exigua		
Euphorbia helioscopia		
Euphorbia peplus		
Euphrasia nemorosa		
Fagus sylvatica		
Fallopia convolvulus		
Festuca arundinacea		
Festuca gigantea		
Festuca ovina		
Festuca pratensis		
Festuca rubra sens.str.		
Filipendula ulmaria		
Fragaria vesca		
Frangula alnus		
Fraxinus excelsior		
Fumaria muralis		
Fumaria officinalis		
Galanthus nivalis		
Galeopsis tetrahit su tetra.		
Galium aparine		
Galium cruciata		
Galium mollugo agg.	O	A
Galium odoratum		
Galium palustre agg.		
Galium saxatile		
Galium uliginosum		
Galium verum		
Genista tinctoria		
Gentianella amarella agg.		
Geranium columbinum		
Geranium dissectum		
Geranium lucidum		
Geranium molle		
Geranium pratense	O	
Geranium pyrenaicum	O	
Geranium robertianum	O	
Geranium rotundifolium		
Geum rivale		
Geum urbanum		
Glechoma hederacea		
Glyceria declinata		
Glyceria fluitans		
Glyceria maxima		
Glyceria plicata		
Gnaphalium uliginosum		
Hedera helix	O	
Helianthemum nummula.		
Heracleum sphondylium	O	C
Hesperis matronalis		
Hieracium sabaudum		
Hippocrepis comosa		
Holcus lanatus	O	
Holcus mollis		
Hordeum murinum	O	
Hordeum secalinum		
Hottonia palustris		
Humulus lupulus		
Hyacinthoides non-scripta		
Hydrocharis morsus-ran.		
Hydrocotyle vulgaris		
Hypericum androsaemum		
Hypericum calycinum		
Hypericum hirsutum		
Hypericum humifusum		
Hypericum maculatum		
Hypericum perforatum		
Hypericum tetrapterum		
Hypochoeris radicata		
Ilex aquifolium		
Iris foetidissima		
Iris pseudacorus	O	F
Juncus acutiflorus		
Juncus articulatus		
Juncus conglomeratus	O	F
Juncus effusus	O	E
Juncus inflexus	F	A
Juniperus communis		
Knautia arvensis		
Koeleria macrantha	O	
Lamiastrum galeobdolon		
Lamium album	O	
Lapsana communis		
Larix sp.		
Lathyrus montanus		
Lathyrus pratensis	O	
Lathrarea squamaria		
Lemna gibba		
Lemna minor		
Lemna polyrhiza		
Lemna trisulca		
Leontodon autumnalis	R	
Leontodon hispidus		
Leontodon taraxacoides		
Lepidium campestre		
Leucanthemum vulgare		
Ligustrum vulgare	O	
Linaria purpurea		
Linaria vulgaris		
Linum bienne		
Linum catharticum		
Listera ovata		
Lithospermum officinale		
Lolium multiflorum x per.		
Lolium perenne	F	
Lonicera periclymenum		
Lotus corniculatus	O	F
Lotus uliginosus		
Luzula campestris		
Luzula forsteri		
Luzula multiflora		
Luzula pilosa		
Luzula sylvatica		
Lychnis flos-cuculi		
Lycopus europaeus		
Lysimachia nemorum		
Lysimachia nummularia		
Lythrum portula		
Lythrum salicaria		
Malus sylvestris sens.lat.		
Malva moschata		
Malva neglecta		
Malva sylvestris		
Matricaria matricarioides		
Matricaria recutita		
Medicago arabica	O	F
Medicago lupulina		
Medicago sativa sens.str.		
Melica uniflora		
Melilotus alba		
Melilotus altissima		
Melilotus officinalis		
Mentha aquatica		
Mentha arvensis		
Mentha spicata		
Mercurialis annua		
Mercurialis perennis		
Milium effusum		
Moehringia trinervia		
Molinia caerulea		
Mycelis muralis		
Myosotis arvensis		
Myosotis discolor		
Myosotis laxa		
Myosotis ramosissima		
Myosotis scorpioides		
Myosoton aquaticum		
Nardus stricta		
Nasturtium officinale sl		
Nasturtium microphyllum		
Neottia nidus-avis		
Nuphar lutea		
Nymphaea alba		
Odontites verna		
Oenanthe crocata	R	Q
Oenanthe fluviatilis		
Oenanthe pimpinelloides		
Oenothera erythrosepala		
Ononis repens		
Ononis spinosa		
Ophioglossum vulgart. sl		
Orchis mascula		
Orchis morio		
Origanum vulgare		
Orobanche hederae		
Orobanche minor		
Oxalis acetosella		
Papaver dubium		
Papaver lecoqii		
Papaver rhoeas		
Parietaria judaica		
Pastinaca sativa		
Paris quadrifolia		
Pedicularis sylvatica		
Pentaglottis sempervirens		
Petasites fragrans		
Petasites hybridus		
Phalaris arundinacea	O	F
Phleum pratense / berto.		
Phleum pratense / prate.	O	
Phragmites australis		
Phyllitis scolopendrium		
Picea abies		
Picea sitchensis		
Picris echioides		
Picris hieracioides		
Pilosella officinarum		
Pimpinella saxifraga		
Pinguicula lusitanica		
Pinus sylvestris		
Plantago coronopus		
Plantago lanceolata	O	
Plantago major		
Plantago media		
Platanthera chlorantha		
Poa annua		
Poa compressa		
Poa nemoralis		
Poa pratensis sens.lat.		
Poa trivialis		
Polygala serpyllifolia		
Polygala vulgaris		
Polygonatum multiflorum		
Polygonum amphibium		
Polygonum arenastrum		
Polygonum aviculare		
Polygonum bistorta		
Polygonum hydropiper		
Polygonum lapathifolium		
Polygonum persicaria	R	O
Polypodium interjectum		
Polypodium vulgare agg.		
Polystichum aculeatum		
Polystichum setiferum		
Populus sp.		
Populus tremula		
Porrhomma campbelli		
Potamogeton crispus		
Potamogeton natans		
Potamogeton pectinatus		
Potamogeton pusillus		
Potentilla anserina		
Potentilla erecta		
Potentilla reptans	O	F
Potentilla sterilis		
Primula veris		
Primula vulgaris		
Prunella vulgaris		
Prunus avium		
Prunus domestica / institia		
Prunus laurocerasus		
Prunus spinosa	O	F
Pseudotsuga menziesii		
Pteridium aquilinum		
Pulicaria dysenterica		
Quercus cerris		
Quercus petraea		
Quercus robur		
Ranunculus acris		
Ranunculus aquatilis st		
Ranunculus auricomus		
Ranunculus baudotii		
Ranunculus bulbosus		
Ranunculus circinatus		
Ranunculus ficaria		
Ranunculus flammula		
Ranunculus omiophyllus		
Ranunculus parviflorus		
Ranunculus repens	O	F
Ranunculus sceleratus		
Ranunculus trichophyllus		
Raphanus raphanistrum		
Reseda lutea		
Reseda luteola		
Reynoutria japonica		
Rhamnus catharticus		
Rhinanthus minor agg.		
Rhododendron ponticum		
Ribes nigrum		
Ribes rubrum sens.str.		
Ribes uva-crispa		
Rorippa sylvestris		
Rosa arvensis	O	
Rosa canina	O	
Rosa stylosa		
Rubia peregrina		
Rubus caesius		
Rubus fruticosus agg.	B	D
Rubus idaeus		
Rumex acetosa	O	F
Rumex acetosella agg.		
Rumex conferfus		
Rumex crispus		
Rumex hydrolapathum	O	F
Rumex obtusifolius	O	F
Rumex pulcher		
Rumex sanguineus		
Ruscus aculeatus		
Sagina apetala / apetala		
Sagina apetala / erecta		
Sagina procumbens		
Salix alba	O	
Salix caprea	O	
Salix cinerea		
Salix fragilis		
Salix triandra		
Salix viminalis		
Salvia verbenaca		
Sambucus nigra	O	
Sanguisorba minor / minor		
Sanguisorba minor / muric.		
Sanicula europaea		
Saponaria officinalis		
Saxifraga tridactylites		
Scabiosa columbaria		
Scrophularia auriculata	O	O
Scrophularia nodosa		
Scutellaria galericulata		
Scutellaria minor		
Sedum acre		
Sedum album		
Senecio aquaticus		
Senecio erucifolius		
Senecio jacobaea	O	
Senecio squalidus		
Senecio vulgaris		
Serratula tinctoria		
Sherardia arvensis		
Silaum silaus		
Silene alba		
Silene dioica		
Silene vulgaris		
Sinapis arvensis		
Sison amomum	O	
Sisymbrium officinale		
Sisymbrium orientale		
Smyrnium olusatrum		
Solanum dulcamara	O	O
Solanum nigrum		
Solidago canadensis		
Solidago virgaurea		
Sonchus arvensis		
Sonchus asper	O	
Sonchus oleraceus		
Sorbus aria agg.		
Sorbus aucuparia		
Sorbus torminalis		
Sparganium emersum		
Sparganium erectum		
Spergula arvensis		
Stachys officinalis		
Stachys palustris		
Stachys sylvatica		
Stellaria alsine		
Stellaria graminea		
Stellaria holostea		
Stellaria media sens. str.	O	A
Stellaria neglecta		
Succisa pratensis		
Symphoricarpus rivularis		
Tamus communis		
Tanacetum parthenium		
Taraxacum officinale agg.	O	F
Taxus baccata		
Teucrium scorodonia		
Thalictrum flavum		
Thlaspi arvense		
Thuja plicata		
Thymus praecox		
Thymus pulegioides		
Tilia cordata		
Tilia x vulgaris		
Torilis japonica		
Tragopogon pratensis		
Trifolium campestre		
Trifolium dubium		
Trifolium fragiferum		
Trifolium hybridum		
Trifolium medium		
Trifolium pratense	O	F
Trifolium repens	O	E
Triglochin palustris		
Tripleurosperm. mar. / ino.		
Trisetum flavescens		
Tsuga heterophylla		
Tussilago farfara		
Typha latifolia		
Ulex europaeus		
Ulex gallii		
Ulmus glabra		
Ulmus procera	O	F
Umbilicus rupestris		
Urtica dioica	O	A
Urtica urens		
Vaccinium myrtillus		
Valeriana dioica		
Valeriana officinalis		
Valerianella carinata		
Valerianella locusta		
Verbascum thapsus		
Verbena officinalis		
Veronica anagallis-aquati.		
Veronica arvensis		
Veronica beccabunga	R	Q
Veronica catenata		
Veronica chamaedrys		
Veronica filiformis		
Veronica hederifolia		
Veronica montana		
Veronica officinalis		
Veronica persica		
Veronica polita		
Veronica serpyllifolia		
Viburnum lantana		
Viburnum opulus		
Vicia cracca		
Vicia hirsuta		
Vicia sativa / sativa		
Vicia sepium	O	O
Vicia sylvatica		
Vicia tetrasperma		
Vinca major		
Vinca minor		
Viola arvensis		
Viola hirta		
Viola odorata		
Viola palustris		
Viola reichenbachiana		
Viola riviniana		
Viscum album		
Vulpia bromoides		
Vulpia myuros		
Wolffia arrhiza		

Petroselinum segetum O F ◆
Matricaria perforata O
Pulicaria dysenterica R O
Caralobrasica aquatica O D ◆

Notables count: 5

A.V. Plant count:

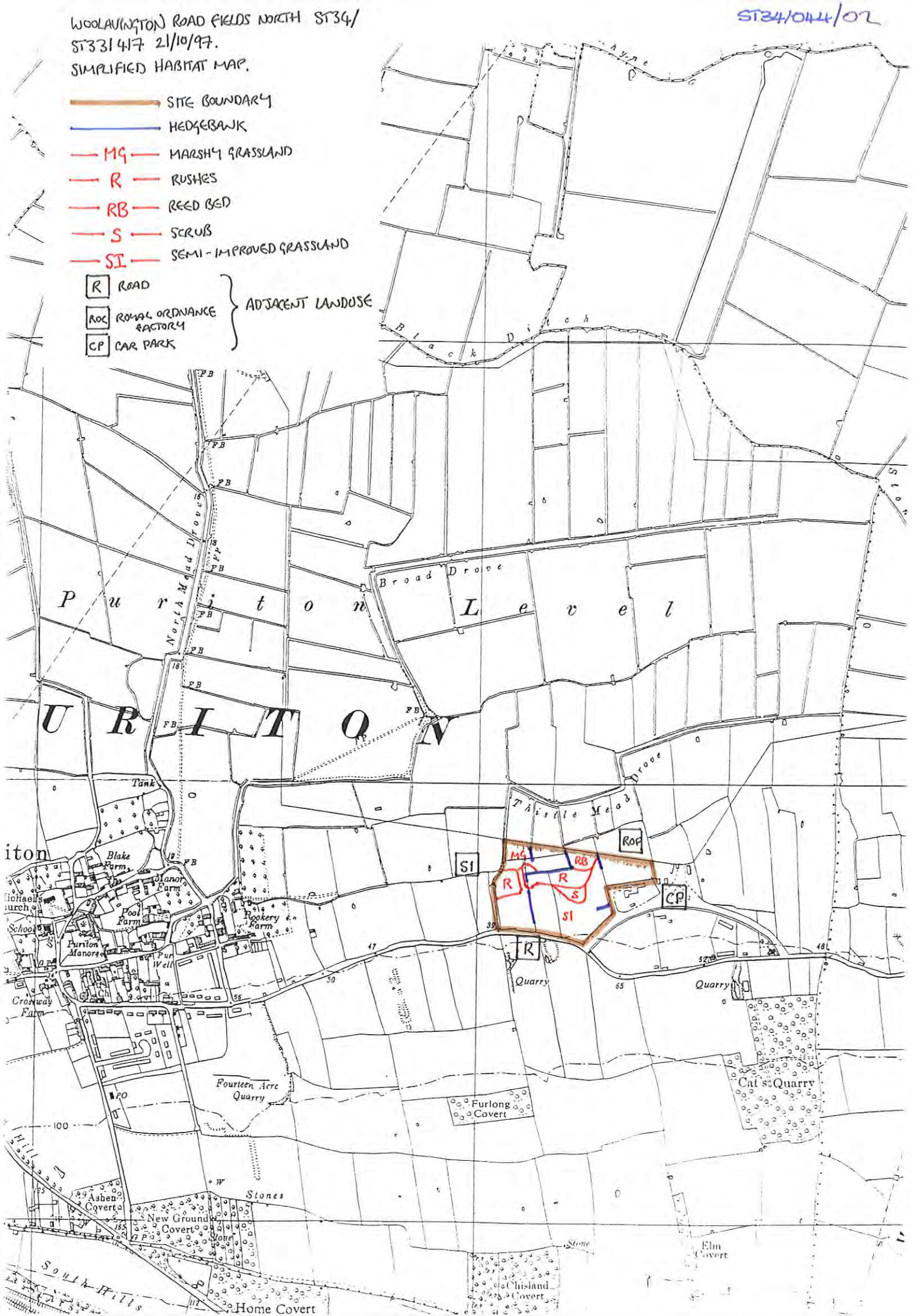
Somerset notable species in **BOLD**. Somerset ancient woodland vascular plant species [A.V. Plants] in *ITALIC*. For long names: /=ssp. sl=sens.lat. st=sens.str.

ST34/0144/07

WOOLAVINGTON ROAD FIELDS NORTH ST34/
ST33147 21/10/97.
SIMPLIFIED HABITAT MAP.

- SITE BOUNDARY
- HEDGEBANK
- MG — MARSHY GRASSLAND
- R — RUSHES
- RB — REED BED
- S — SCRUB
- SI — SEMI-IMPROVED GRASSLAND

ADJACENT LANDUSE:
- R — ROAD
- ROC — ROYAL ORDNANCE FACTORY
- CP — CAR PARK



APPENDIX 12.1E

SERC Data Search Records

Species Record Details

Provided by:-
Somerset Environmental Records Centre
34 Wellington Road, Taunton, TA1 5AW
Tel: (01823) 664450
Email: data.supply@somerc.com
www.somerc.com

Date	*06/11/2020*
Client	*Ecology Solutions*
Job Number	*5010*
Reference / Project Title	*Puriton 7761*
Location	*Puriton near Bridgwater*
Requested Records	*Standard Species Search*

Refer to the following sheets for lists of species found from the main database. The species map provided shows the location of species records identified in the search.

HiRes - records with grid references of 100m or greater precision. Low Resolution records within this dataset indicate confidential records - full details avaialble on the Data Search Guidance Notes

LoRes - records with grid references of 1km or lesser precision

Species Search Area - 6km x 4km around site at ST334425

Species Designations included in SERC's standard search

Key	Status	Assumptions Made
European Protected	Protected under European legislation	Includes:- Berne Convention Appendix 1 & 2 Bonn Convention Appendix 1 & 2 Habitats and Species Directive Annex 4
European Priority		Includes:- Birds Directive Annex Habitats and Species Directive Annex 2 Priority Species
Red Listed	Species identified by the IUCN as being threatened or having a high risk of extinction.	Lower risk - least concern IUCN species are not considered Red Listed. Includes:- Critically Endangered Endangered Vulnerable Data Deficient Near Threatened
Wildlife and Countryside Act (WACA) 1981	Legally Protected under the WACA 1981.	Includes:- Schedule 1 Part 1, Part 2 WCA: Schedule 5 Section 9.1 (killing/injuring) Schedule 5 Section 9.1 (taking) Schedule 5 Section 9.2 Schedule 5 Section 9.4a Schedule 5 Section 9.4b & Schedule 8. Protection of Badgers Act 1992
Natural Environment and Rural Communities (NERC) Act 2006 Section 41	Legally Protected under the NERC Act 2006	List of habitats and species of principal importance for the conservation of biodiversity in England. The list includes 56 habitats and 943 species draws upon the UK BAP.
Nationally Scarce	Nationally Scarce Species.	Limited to Nationally Scarce only.
Amber Birds	Medium Conservation Concern.	Amber List species.
Red Birds	High Conservation Concern.	Red List species
BAP2007	Present on the Priority Species List for the UK Biodiversity Action Plan.	Includes national Biodiversity Action Plan or Priority species.
Local BAP2009	Species of biodiversity importance designated by local ecologists.	Includes species considered of importance by a local panel of ecologists including those from local authorities and with reference to local experts. This is an update of the previous 2007 list
County Notable	County Notable from the SERC Somerset Notable Species Dictionary (Fifth Edition).	Species present on the Somerset County Notable list.

High resolution records found within search area.
Low resolution grid refs indicate confidential species records, refer to guidance n

Scientific	Common	Site/Location	Grid	Start_Date	End_Date	Abundance	EU Protected	EU Priority	Red Listed	WACA 1981	NERC Act 2006	Nationally Scarce	Amber Birds	Red Birds	BAP2007	LBAP2009	County Notable	Taxon Group
Meles meles	Eurasian Badger		ST35224116	21/06/2017	21/06/2017	Count [1]				*							*	terrestrial mammal
Meles meles	Eurasian Badger		ST35224116	21/06/2017	21/06/2017	Count [1]				*							*	terrestrial mammal
Euphorbia platyphyllos	Broad-leaved Spurge	Woolavington, S of	ST348405	04/08/2016	04/08/2016	Count [+]										*	*	flowering plant
Kickxia elatine	Sharp-leaved Fluellen	Woolavington, S of	ST349407	04/08/2016	04/08/2016	Count [+]										*		flowering plant
Kickxia elatine	Sharp-leaved Fluellen	Woolavington, S of	ST348405	04/08/2016	04/08/2016	Count [+]										*		flowering plant
Anthonomus pedicularius	Anthonomus pedicularius	Quadrat Sedgemoor BAP C17 Upper Combe	ST35904100	27/07/1998	27/07/1998												*	insect - beetle (Coleoptera)
Colchicum autumnale	Meadow Saffron	Upper Combe Plantation	ST359409	10/05/1995	10/05/1995				*							*	*	flowering plant
Meles meles	Eurasian Badger		ST35734055	05/06/2017	05/06/2017	dead; Count [1]				*							*	terrestrial mammal
Meles meles	Eurasian Badger		ST36084106	11/06/2017	11/06/2017	dead; Count [1]				*							*	terrestrial mammal
Plecotus	Long-eared Bat species	Cossington Lane, Woolavington	ST348409	03/05/2018	03/05/2018	Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Wolffia arrhiza	Rootless Duckweed	Newland's Drove	ST361425	01/01/2009	31/12/2009	present; Count [+]			*							*	*	flowering plant
Bombus sylvarum	Shrill Carder Bee	Gold Corner Bridge to Cossington	ST363420	05/08/2001	05/08/2001	Adult; Count [1]; Male; Count [1]					*				*	*	*	insect - hymenopteran
Sympetrum sanguineum	Ruddy Sympetrum		ST363420	29/09/2012	29/09/2012												*	insect - dragonfly (Odonata)
Sympetrum striolatum	Common Darter		ST363420	29/09/2012	29/09/2012				*									insect - dragonfly (Odonata)
Hydrocharis morsus-ranae	Frogbit	Cross's Land	ST3604342110	03/09/2009	03/09/2009				*							*	*	flowering plant
Bombus sylvarum	Shrill Carder Bee	Gold Corner Bridge	ST363420	05/08/2001	05/08/2001	Count [1]					*				*	*	*	insect - hymenopteran
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3604342110	31/08/2010	31/08/2010				*							*	*	flowering plant
Wolffia arrhiza	Rootless Duckweed	Cross's Land	ST3599542320	03/09/2009	03/09/2009				*							*	*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Cross's Land	ST3599542320	03/09/2009	03/09/2009											*		flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Cross's Land	ST3599542320	03/09/2009	03/09/2009											*		flowering plant
Wolffia arrhiza	Rootless Duckweed	Cross's Land	ST3599542320	03/09/2009	03/09/2009				*							*	*	flowering plant
Hippuris vulgaris	Mare's-tail	Cross's Land	ST3599542320	03/09/2009	03/09/2009												*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3599542320	01/09/2010	01/09/2010				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Cross's Land	ST3599542320	03/09/2009	03/09/2009				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Cross's Land	ST3599542320	03/09/2009	03/09/2009				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Cross's Land	ST3601842652	03/09/2009	03/09/2009				*							*	*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Cross's Land	ST3601842652	03/09/2009	03/09/2009											*		flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3597541931	31/08/2010	31/08/2010				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Cross's Land	ST3598042228	03/09/2009	03/09/2009				*							*	*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Bell's IJ & SA Son Land	ST3584742251	01/09/2010	01/09/2010											*		flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3598042228	01/09/2010	01/09/2010				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3584742251	01/09/2010	01/09/2010				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit		ST3598942814	05/09/2009	05/09/2009				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3587442042	31/08/2010	31/08/2010				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3587442142	01/09/2010	01/09/2010				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3587142353	01/09/2010	01/09/2010				*							*	*	flowering plant
Butomus umbellatus	Flowering-rush	Bell's IJ & SA Son Land	ST3587142353	01/09/2010	01/09/2010												*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Bell's IJ & SA Son Land	ST3587442142	01/09/2010	01/09/2010											*		flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Bell's IJ & SA Son Land	ST3587442042	31/08/2010	31/08/2010											*		flowering plant
Anas strepera	Gadwall	Woolavington Pit	ST356425	14/03/1986	14/03/1986	Count [4]	*						*				*	bird
Aythya ferina	Pochard	Woolavington Pit	ST356425	01/02/1986	01/02/1986	Count [24]	*							*			*	bird
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3576742373	01/09/2010	01/09/2010				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3577542371	01/09/2010	01/09/2010				*							*	*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Bell's IJ & SA Son Land	ST3577542371	01/09/2010	01/09/2010											*		flowering plant
Aythya ferina	Pochard	Woolavington Pit	ST356425	14/03/1986	14/03/1986	Count [18]	*							*			*	bird
Aythya ferina	Pochard	Woolavington Pit	ST356425	06/01/1986	06/01/1986	Count [1]	*							*			*	bird
Anas strepera	Gadwall	Woolavington Pit	ST356425	06/01/1986	06/01/1986	Count [11]	*						*				*	bird
Anas strepera	Gadwall	Woolavington Pit	ST356425	01/02/1986	01/02/1986	Count [5]	*						*				*	bird
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3575242544	01/09/2010	01/09/2010				*							*	*	flowering plant
Anas platyrhynchos	Mallard	Middlemoor Water Park, Middlemoor Drove, Woolavington TA7 DN	ST3558142518	27/01/2016	27/01/2016	Count [+]	*						*					bird
Carduelis carduelis	Goldfinch	Middlemoor Water Park, Middlemoor Drove, Woolavington TA7 DN	ST3558142518	27/01/2016	27/01/2016	Count [+]	*										*	bird
Botaurus stellaris	Bittern	Middlemoor Water Park	ST354428	06/01/1997	06/01/1997	wintering; Count [1]	*	*		*	*		*		*	*	*	bird
Euphydryas aurinia	Marsh Fritillary	Woolavington Manor	ST348417	01/01/1991	31/12/1991	Adult; Count [1]	*		*	*	*				*	*	*	insect - butterfly
Meles meles	Eurasian Badger	Woolavington Manor	ST348417	01/01/1991	31/12/1991					*							*	terrestrial mammal
Erithacus rubecula	Robin	Middlemoor Water Park, Middlemoor Drove, Woolavington TA7 DN	ST3558142518	27/01/2016	27/01/2016	Count [+]	*											bird
Turdus merula	Blackbird	Middlemoor Water Park, Middlemoor Drove, Woolavington TA7 DN	ST3558142518	27/01/2016	27/01/2016	Count [+]											*	bird
Turdus pilaris	Fieldfare	Middlemoor Water Park, Middlemoor Drove, Woolavington TA7 DN	ST3558142518	27/01/2016	27/01/2016	Count [+]				*				*			*	bird
Turdus pilaris	Fieldfare	Huntspill Moor	ST360433	11/01/2014	11/01/2014	Count [200]				*				*			*	bird
Althaea officinalis	Marsh-mallow	East Huntspill	ST358438	04/07/1959	04/07/1959	present; Count [+]											*	flowering plant
Strix aluco	Tawny Owl	River Huntspill	ST356435	23/12/2004	23/12/2004	present; Count [1]	*						*					bird
Althaea officinalis	Marsh-mallow	Huntspill Moor	ST358439	01/01/1986	31/12/1986	Count [+]											*	flowering plant
Althaea officinalis	Marsh-mallow	Huntspill Moor	ST358439	26/03/2006	26/03/2006	Count [+]											*	flowering plant
Ardea cinerea	Grey Heron		ST345436	14/09/2016	14/09/2016	Count [+]											*	bird
Lutra lutra	European Otter	Bridgwater Bay NNR / Woolavington Causeway, Hartlake R.	ST346438	01/01/1996	31/12/1998	present; Count [1]	*			*	*				*	*	*	terrestrial mammal
Anthriscus caucalis	Bur Chervil	Woolavington Bridge, Pyle Drove	ST345436	01/01/1985	31/12/1995											*	*	flowering plant
Pipistrellus	Pipistrelle Bat species	Huntspill River Bat Boxes Scheme	ST345436	23/11/2011	23/11/2011	adult; Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Arvicola amphibius	European Water Vole	Puriton	ST342436	16/01/2009	16/01/2009	Burrow; Count [Min.1]			*	*	*				*	*	*	terrestrial mammal
Rumex palustris	Marsh Dock	East Huntspill	ST352445	01/01/1985	31/12/1995												*	flowering plant
Althaea officinalis	Marsh-mallow	Huntspill Moor	ST35784386	17/08/2016	17/08/2016	Fruiting; Count [+Flowering /]											*	flowering plant
Scutellaria galericulata	Skullcap	Gold Corner	ST36034362	23/08/2016	23/08/2016	Count [+]											*	flowering plant
Althaea officinalis	Marsh-mallow	East Huntspill	ST358438	01/01/1986	31/12/1986	present; Count [+]											*	flowering plant
Lutra lutra	European Otter	Woolavington Bridge, Huntspill, Brue	ST345436	23/01/2017	23/01/2017	Droppings; Count [2F]	*			*	*				*	*	*	terrestrial mammal

Aythya ferina	Pochard	Huntspill River, near B3141	ST345436	03/12/1985	03/12/1985	Adult; Count [22]	*						*			*		bird
Lutra lutra	European Otter	Woolavington Bridge,Huntspill,South Drain,River Brue	ST345436	27/04/2019	27/04/2019	Droppings; Count [1R]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Woolavington Bridge,Huntspill,South Drain,River Brue	ST345436	23/09/2017	23/09/2017	Droppings; Count [1F 4R]	*			*	*				*	*	*	terrestrial mammal
Conocephalus fuscus	Long-winged Cone-head	Woolavington Bridge	ST345436	02/10/2005	02/10/2005											*	*	insect - orthopteran
Lutra lutra	European Otter	Huntspill R.	ST348435	03/11/1983	03/11/1983	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Cettia cetti	Cetti's Warbler	Puriton	ST343431	18/04/2008	27/05/2008	Male; Count [1]				*							*	bird
Cettia cetti	Cetti's Warbler	Puriton	ST343431	18/04/2008	16/06/2008	Male; Count [1]				*							*	bird
Lutra lutra	European Otter	Walpole Drove Tip	ST314431	01/01/1800	31/12/1985		*			*	*				*	*	*	terrestrial mammal
Arvicola amphibius	European Water Vole	Walpole Drove Tip	ST314431	01/01/1999	31/12/1999				*	*	*				*	*	*	terrestrial mammal
Numenius arquata	Curlew	Walpole Drove Tip	ST314431	10/05/1989	10/05/1989		*				*			*	*	*	*	bird
Ononis spinosa	Spiny Restharrow	Walpole Drove Tip	ST314431	01/05/1985	31/05/1985												*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3611843127	01/09/2010	01/09/2010				*							*	*	flowering plant
Sagittaria sagittifolia	Arrowhead	Bell's IJ & SA Son Land	ST3611843127	01/09/2010	01/09/2010												*	flowering plant
Oenanthe lachenalii	Parsley Water-dropwort	Walpole Drove Tip	ST314431	01/05/1985	31/05/1985												*	flowering plant
Rhinanthus minor	Yellow-rattle	Walpole Drove Tip	ST314431	01/05/1985	31/05/1985												*	flowering plant
Mergus serrator	Red-breasted Merganser	Huntspill River	ST340438	01/11/2014	01/11/2014	Count [2]	*										*	bird
Uria aalge	Guillemot	Huntspill River	ST340438	06/01/2014	06/01/2014	Count [1]						*					*	bird
Anas penelope	Wigeon	Huntspill River	ST340438	03/02/2002	03/02/2002	wintering; Count [60]	*					*					*	bird
Branta bernicla	Brent Goose	Huntspill River	ST340438	01/11/2014	01/11/2014	Count [1]	*					*					*	bird
Tringa ochropus	Green Sandpiper	Huntspill River	ST340438	01/12/1992	28/02/1993	wintering; Count [1]	*			*		*					*	bird
Alauda arvensis	Skylark	Huntspill River	ST340438	01/05/2015	31/05/2015	Count [2]					*		*			*	*	bird
Podiceps auritus	Slavonian Grebe	Bridgwater Bay SSSI / Huntspill River	ST340438	28/02/1997	02/03/1997	wintering; Count [1]	*	*		*			*				*	bird
Alauda arvensis	Skylark	Puriton	ST340434	20/05/2008	05/06/2008	Male; Count [1]					*		*			*	*	bird
Oenanthe oenanthe	Wheatear	Huntspill River	ST340438	26/03/2014	26/03/2014	Count [1]	*											bird
Linaria cannabina	Linnet	Huntspill River	ST340438	23/10/2002	23/10/2002		*						*			*	*	bird
Oenanthe oenanthe	Wheatear	Huntspill River	ST340438	14/11/2014	14/11/2014	Count [1]	*											bird
Linaria flavirostris	Twite	Huntspill River	ST340438	23/10/2002	23/10/2002	present; Count [1]	*						*				*	bird
Anthus pratensis	Meadow Pipit	Huntspill River	ST340438	02/11/2015	02/11/2015	Count [15]	*					*						bird
Falco tinnunculus	Kestrel	Huntspill River	ST340438	16/03/2015	16/03/2015	Count [1]	*					*					*	bird
Motacilla alba	White/Pied Wagtail	Huntspill River	ST340438	02/11/2015	02/11/2015	Count [10]	*											bird
Oenanthe oenanthe	Wheatear	Huntspill River	ST340438	16/03/2015	16/03/2015	Count [1]	*											bird
Emberiza schoeniclus	Reed Bunting	Huntspill River	ST340438	01/05/2015	31/05/2015	Count [10]	*				*		*		*	*	*	bird
Carduelis carduelis	Goldfinch	Huntspill River	ST340438	01/09/2015	31/10/2015	Count [50]	*										*	bird
Cettia cetti	Cetti's Warbler	Huntspill River	ST340438	01/10/2014	01/10/2014	Count [1]				*							*	bird
Cuculus canorus	Cuckoo	Huntspill River	ST340438	03/05/2015	03/05/2015	Count [2]					*			*	*	*		bird
Branta bernicla	Brent Goose	Huntspill River	ST340438	31/10/2014	31/10/2014	Count [10]	*					*					*	bird
Saxicola rubicola	Stonechat	Huntspill River	ST340438	01/11/2014	01/11/2014	Count [6]	*										*	bird
Rallus aquaticus	Water Rail	Huntspill River	ST340438	14/03/2015	14/03/2015												*	bird
Acrocephalus schoenobaenus	Sedge Warbler	Huntspill River	ST340438	13/04/2015	13/04/2015	Count [3]										*		bird
Cettia cetti	Cetti's Warbler	Huntspill River	ST340438	13/04/2015	13/04/2015	Count [1]				*							*	bird
Cettia cetti	Cetti's Warbler	Huntspill River	ST340438	01/01/2015	31/03/2015	Count [2]				*							*	bird
Arvicola amphibius	European Water Vole	Puriton	ST339437	16/01/2009	16/01/2009	Burrow; Count [Min.1]			*	*	*				*	*	*	terrestrial mammal
Arvicola amphibius	European Water Vole		ST333430	01/02/2015	01/02/2015	present; Count [1]			*	*	*				*	*	*	terrestrial mammal
Hydrocharis morsus-ranae	Frogbit	Cross's Land	ST3600543034	05/09/2009	05/09/2009				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit		ST3600543034	05/09/2009	05/09/2009				*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Bell's IJ & SA Son Land	ST3606543058	01/09/2010	01/09/2010				*							*	*	flowering plant
Aythya ferina	Pochard	Puriton Pit	ST318430	20/01/1986	20/01/1986	Count [1]	*						*				*	bird
Anas strepera	Gadwall	Puriton Pit	ST318430	30/12/1986	30/12/1986	Count [21]	*					*					*	bird
Anas strepera	Gadwall	Puriton Pit	ST318430	17/11/1986	18/11/1986	Count [8]	*					*					*	bird
Anas strepera	Gadwall	Puriton Pit	ST318430	06/01/1986	20/01/1986	Count [8]	*					*					*	bird
Cettia cetti	Cetti's Warbler	Puriton	ST336437	18/04/2008	27/05/2008	Male; Count [1]				*							*	bird
Meles meles	Eurasian Badger	Puriton	ST335438	10/07/2008	10/07/2008					*							*	terrestrial mammal
Natrix helvetica	Grass Snake	Puriton	ST336438	17/06/2008	17/06/2008	Individual; Count [1]				*	*				*	*	*	reptile
Turdus philomelos	Song Thrush	Puriton	ST336437	18/04/2008	27/05/2008	Male; Count [1]								*		*	*	bird
Arvicola amphibius	European Water Vole	Puriton	ST335438	16/01/2009	16/01/2009	Burrow; Count [Min.1]			*	*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Pawlett Mead Drove Fields	ST312432	01/10/1999	31/10/1999	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Gold Corner, Huntspill, River Brue	ST359432	01/01/2019	01/01/2019	Droppings; Count [1F 2R]	*			*	*				*	*	*	terrestrial mammal
Meles meles	Eurasian Badger		ST3475043312	19/02/2017	19/02/2017	dead; Count [1]				*							*	terrestrial mammal
Cettia cetti	Cetti's Warbler	Puriton	ST339432	18/04/2008	05/06/2008	Male; Count [1]				*							*	bird
Meles meles	Eurasian Badger	Puriton	ST331432	10/07/2008	10/07/2008	Tracks; Count [Min.1]				*							*	terrestrial mammal
Pipistrellus nathusii	Nathusius's Pipistrelle	Woolavington	ST334433	03/04/2013	03/04/2013	Count [+]	*		*	*						*	*	terrestrial mammal
Eptesicus serotinus	Serotine	Woolavington	ST334433	15/08/2012	15/08/2012	Count [+]	*		*	*						*	*	terrestrial mammal
Rhinolophus ferrumequinum	Greater Horseshoe Bat	Woolavington	ST334433	10/10/2012	10/10/2012	Count [+]	*			*	*				*	*	*	terrestrial mammal
Rhinolophus ferrumequinum	Greater Horseshoe Bat	Woolavington	ST334433	02/07/2013	02/07/2013	Count [+]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	Woolavington	ST334433	15/08/2012	15/08/2012	Count [+]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle	Woolavington	ST334433	15/08/2012	15/08/2012	Count [+]	*			*	*				*	*	*	terrestrial mammal
Rhinolophus hipposideros	Lesser Horseshoe Bat	Woolavington	ST334433	01/10/2012	01/10/2012	Count [+]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	Woolavington	ST334433	15/08/2012	15/08/2012	Count [+]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pipistrellus	Common Pipistrelle	Woolavington	ST334433	15/08/2012	15/08/2012	Count [+]	*			*						*		terrestrial mammal
Rhinolophus ferrumequinum	Greater Horseshoe Bat	Woolavington	ST334433	03/06/2013	03/06/2013	Count [+]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Puriton	ST329434	10/07/2008	10/07/2008	Adult; Count [1]	*			*	*				*	*	*	terrestrial mammal
Alauda arvensis	Skylark	Puriton	ST325434	02/05/2008	16/06/2008	Male; Count [1]					*			*		*	*	bird
Lutra lutra	European Otter	Puriton	ST323437	10/07/2008	10/07/2008	Droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Alauda arvensis	Skylark	Puriton	ST322436	18/04/2008	27/05/2008	Male; Count [1]					*			*		*	*	bird
Alauda arvensis	Skylark	Puriton	ST329433	02/05/2008	16/06/2008	Male; Count [1]					*			*		*	*	bird
Lutra lutra	European Otter	M5 /Black Ditch, Huntspill, BRUE	ST320434	13/08/2006	13/08/2006	Male; Count [dead]	*			*	*				*	*	*	terrestrial mammal
Meles meles	Eurasian Badger	Puriton	ST328437	10/07/2008	10/07/2008	Tracks; Count [Min.1]				*							*	terrestrial mammal
Lutra lutra	European Otter	River Brue	ST317436	27/07/1994	27/07/1994	droppings; Count [5]	*			*	*				*	*	*	terrestrial mammal
Helochares lividus	Helochares lividus	Pawlett Level	ST317435	31/07/1983	31/07/1983	present; Count [1]											*	insect - beetle (Coleoptera)
Emberiza schoeniclus	Reed Bunting		ST317437	26/04/2000	28/06/2000		*				*		*		*	*	*	bird
Brachytron pratense	Hairy Hawker	Pawlett Mead Drove Fields	ST316434	01/09/1999	31/07/2000	present; Count [1]											*	insect - dragonfly (Odonata)
Haliplus heydeni	Haliplus heydeni	Pawlett Level	ST317435	31/07/1983	31/07/1983	present; Count [1]											*	insect - beetle (Coleoptera)
Berosus affinis	Berosus affinis	Pawlett Level	ST317435	31/07/1983	31/07/1983	present; Count [1]											*	insect - beetle (Coleoptera)
Berosus affinis	Berosus affinis	Pawlett Mead Drove Fields / Pawlett Level.	ST317435	01/08/1983	31/08/1983	present; Count [1]											*	insect - beetle (Coleoptera)

Potamogeton pusillus	Lesser Pondweed	Pawlett Mead Drove Fields	ST316437	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Lissotriton vulgaris	Smooth Newt	Black Ditch Bridge Ponds / Walpole	ST317437	07/06/1999	07/06/1999											*	amphibian
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST316434	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST316434	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Natrix helvetica	Grass Snake	Pawlett Mead Drove Fields	ST316436	01/10/1999	31/10/1999	present; Count [1]				*	*				*	*	reptile
Wolffia arrhiza	Rootless Duckweed	Pawlett Mead Drove Fields	ST316437	01/06/2000	30/06/2000	present; Count [1]			*							*	flowering plant
Parus major	Great Tit	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [3]	*										bird
Cyanistes caeruleus	Blue Tit	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [3]	*										bird
Hydroglyphus geminus	Hydroglyphus geminus	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999											*	insect - beetle (Coleoptera)
Rhantus grapii	Rhantus grapii	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999											*	insect - beetle (Coleoptera)
Rhantus suturalis	Rhantus suturalis	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999											*	insect - beetle (Coleoptera)
Rhantus grapii	Rhantus grapii	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000											*	insect - beetle (Coleoptera)
Dytiscus dimidiatus	Dytiscus dimidiatus	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000				*						*	*	insect - beetle (Coleoptera)
Berosus affinis	Berosus affinis	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000											*	insect - beetle (Coleoptera)
Carduelis carduelis	Goldfinch	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [4]	*									*	bird
Acrocephalus schoenobaenus	Sedge Warbler	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [5]									*		bird
Gallinula chloropus	Moorhen	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [at least 3 pairs]	*										bird
Anas platyrhynchos	Mallard	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [at least 2 pairs]	*					*					bird
Berosus affinis	Berosus affinis	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999											*	insect - beetle (Coleoptera)
Carex disticha	Brown Sedge	Pawlett Mead Drove Fields	ST315435	01/06/2000	30/06/2000											*	flowering plant
Gallinula chloropus	Moorhen	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [4]	*										bird
Rhantus suturalis	Rhantus suturalis	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000											*	insect - beetle (Coleoptera)
Torilis nodosa	Knotted Hedge-parsley	Pawlett Mead Drove Fields	ST315435	01/06/2000	30/06/2000										*		flowering plant
Hydroglyphus geminus	Hydroglyphus geminus	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000											*	insect - beetle (Coleoptera)
Ilybius chalconatus	Ilybius chalconatus	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000											*	insect - beetle (Coleoptera)
Ilybius chalconatus	Ilybius chalconatus	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999											*	insect - beetle (Coleoptera)
Alauda arvensis	Skylark	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [7]				*			*		*	*	bird
Erithacus rubecula	Robin	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [15]	*										bird
Chloris chloris	Greenfinch	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [6]	*										bird
Rhinanthus minor	Yellow-rattle	Pawlett Mead Drove Fields	ST315435	01/05/1985	31/05/1985											*	flowering plant
Lymnocryptes minimus	Jack Snipe	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [1]	*									*	bird
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST315435	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Buteo buteo	Buzzard	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [1]	*										bird
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST315435	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Passer domesticus	House Sparrow	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [2]				*			*	*	*		bird
Troglodytes troglodytes	Wren	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [10]	*										bird
Alauda arvensis	Skylark	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [at least 2 pairs]				*			*		*	*	bird
Prunella modularis	Dunnock	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [13]	*					*				*	bird
Arvicola amphibius	European Water Vole	Pawlett Mead Drove Fields	ST315435	01/06/2000	30/06/2000				*	*	*			*	*	*	terrestrial mammal
Anacaena bipustulata	Anacaena bipustulata	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000											*	insect - beetle (Coleoptera)
Parus major	Great Tit	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [6]	*										bird
Prunella modularis	Dunnock	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [11]	*					*				*	bird
Anas crecca	Teal	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [18]	*					*				*	bird
Regulus regulus	Goldcrest	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [3]	*										bird
Turdus iliacus	Redwing	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [193]				*			*			*	bird
Cuculus canorus	Cuckoo	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [1]					*		*	*	*		bird
Linaria cannabina	Linnet	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [3]	*						*		*	*	bird
Pyrrhula pyrrhula	Bullfinch	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [1]						*			*	*	bird
Anas platyrhynchos	Mallard	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [4]	*					*					bird
Troglodytes troglodytes	Wren	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [33]	*										bird
Cyanistes caeruleus	Blue Tit	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [6]	*										bird
Turdus pilaris	Fieldfare	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [105]				*			*			*	bird
Emberiza schoeniclus	Reed Bunting	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [3]	*				*	*		*	*	*	bird
Turdus merula	Blackbird	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [21]										*	bird
Motacilla alba subsp. yarrellii	Pied Wagtail	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [6]	*										bird
Buteo buteo	Buzzard	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [2]	*										bird
Pyrrhula pyrrhula	Bullfinch	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [1]						*			*	*	bird
Erithacus rubecula	Robin	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [13]	*										bird
Falco tinnunculus	Kestrel	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [1]	*					*				*	bird
Phylloscopus collybita	Chiffchaff	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [1]									*		bird
Gallinago gallinago	Snipe	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [97]	*					*				*	bird
Turdus merula	Blackbird	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [5]										*	bird
Turdus philomelos	Song Thrush	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [5]							*		*	*	bird
Chloris chloris	Greenfinch	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [3]	*										bird
Phylloscopus collybita	Chiffchaff	Pawlett Mead Drove Fields	ST315435	01/03/2000	30/06/2000	breeding probable; Count [7]									*		bird
Anthus pratensis	Meadow Pipit	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [2]	*					*					bird
Vanellus vanellus	Lapwing	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [8]	*				*		*	*	*	*	bird
Columba oenas	Stock Dove	Pawlett Mead Drove Fields	ST315435	01/11/1999	29/02/2000	present; Count [37]						*				*	bird
Natrix helvetica	Grass Snake	Pawlett Mead Drove Fields	ST315436	13/10/1999	13/10/1999					*	*			*	*	*	reptile
Natrix helvetica	Grass Snake	Walpole Landfill extension	ST314437	07/06/2000	07/06/2000					*	*			*	*	*	reptile
Lutra lutra	European Otter	Pawlett Mead Drove Fields	ST315436	01/10/1999	31/10/1999	Tracks; Count [1]	*			*	*			*	*	*	terrestrial mammal
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST315437	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Berula erecta	Lesser Water-parsnip	Pawlett Mead Drove Fields	ST315436	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST315436	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST315437	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Lissotriton vulgaris	Smooth Newt	Pawlett Mead Drove Fields	ST315437	28/05/2000	28/05/2000	adult; Count [2]										*	amphibian
Potamogeton pusillus	Lesser Pondweed	Pawlett Mead Drove Fields	ST315437	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Natrix helvetica	Grass Snake	Pawlett Mead Drove Fields	ST315437	07/06/2000	07/06/2000	present; Count [1]				*	*			*	*	*	reptile
Wolffia arrhiza	Rootless Duckweed	Pawlett Mead Drove Fields	ST315437	01/06/2000	30/06/2000	present; Count [1]			*						*	*	flowering plant
Lutra lutra	European Otter	Pawlett Mead Drove Fields	ST315433	01/10/1999	31/10/1999	droppings; Count [1]	*			*	*			*	*	*	terrestrial mammal
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST312433	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST312433	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Meles meles	Eurasian Badger	Pawlett Mead Drove Fields	ST313433	01/05/2000	31/05/2000	droppings; Count [1]				*						*	terrestrial mammal
Scirtes orbicularis	Scirtes orbicularis	Pawlett Mead Drove Fields	ST311438	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)

Berula erecta	Lesser Water-parsnip	Pawlett Mead Drove Fields	ST313437	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Odontomyia tigrina	Black Colonel	Pawlett Mead Drove Fields	ST311438	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Potamogeton pusillus	Lesser Pondweed	Pawlett Mead Drove Fields	ST313438	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST312439	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST312437	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST312439	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST311438	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Cercyon ustulatus	Cercyon ustulatus	Pawlett Mead Drove Fields	ST312439	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST311438	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST312437	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Meles meles	Eurasian Badger	Pawlett Mead Drove Fields	ST310438	01/05/2000	31/05/2000	droppings; Count [1]				*						*	terrestrial mammal
Meles meles	Eurasian Badger	Pawlett Mead Drove Fields	ST312437	01/05/2000	31/05/2000	Tracks; Count [1]				*						*	terrestrial mammal
Berula erecta	Lesser Water-parsnip	Pawlett Mead Drove Fields	ST311436	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Berula erecta	Lesser Water-parsnip	Pawlett Mead Drove Fields	ST310436	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Stratiomys singularior	Flecked General	Pawlett Mead Drove Fields	ST310434	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Butomus umbellatus	Flowering-rush	Pawlett Mead Drove Fields	ST311436	01/06/2000	30/06/2000	present; Count [1]										*	flowering plant
Micromorphus albipes	Micromorphus albipes	Pawlett Mead Drove Fields	ST310434	01/09/1999	31/07/2000	present; Count [1]										*	insect - true fly (Diptera)
Longitarsus parvulus	Flax Flea Beetle	Pawlett Mead Drove Fields	ST310434	01/09/1999	31/07/2000	present; Count [1]										*	insect - beetle (Coleoptera)
Lutra lutra	European Otter	Pawlett Mead Drove Fields	ST310436	01/10/1999	31/10/1999	droppings; Count [1]	*			*	*			*	*	*	terrestrial mammal
Meles meles	Eurasian Badger	Pawlett Mead Drove Fields	ST309436	01/05/2000	31/05/2000	droppings; Count [1]				*						*	terrestrial mammal
Meles meles	Eurasian Badger	Pawlett Mead Drove Fields	ST312434	01/05/2000	31/05/2000	droppings; Count [1]				*						*	terrestrial mammal
Lutra lutra	European Otter	(and B3141)	ST346419	14/04/1999	14/04/1999	colony; Count [1]	*			*	*			*	*	*	terrestrial mammal
Euphydryas aurinia	Marsh Fritillary	The Manor ,Woolavington.	ST347418	01/01/1992	31/12/1992		*		*	*	*			*	*	*	insect - butterfly
Stagnicola palustris/fuscus/corvus	Marsh Pond Snail	Woolavington	ST346419	17/05/1983	17/05/1983	Adult; Count [1]			*								mollusc
Helochares lividus	Helochares lividus	Woolavington	ST346419	17/05/1983	17/05/1983	Adult; Count [1]										*	insect - beetle (Coleoptera)
Euphydryas aurinia	Marsh Fritillary	The Manor Woolavington	ST347418	01/01/1992	31/12/1992	Adult; Count [1]	*		*	*	*			*	*	*	insect - butterfly
Euphydryas aurinia	Marsh Fritillary	The Manor ,Woolavington	ST347418	01/01/1992	31/12/1992	Adult; Count [1]	*		*	*	*			*	*	*	insect - butterfly
Podiceps cristatus	Great Crested Grebe	Borrow Pit, Puriton	ST348417	01/06/1993	31/08/1993	nest; Count [1 pair]										*	bird
Natrix helvetica	Grass Snake	Woolavington	ST345415	08/05/2008	08/05/2008					*	*			*	*	*	reptile
Streptopelia turtur	Turtle Dove	Woolavington	ST347416	03/06/2000	03/06/2000	present; Count [1]					*		*	*	*	*	bird
Erinaceus europaeus	West European Hedgehog		ST348415	01/01/2016	31/12/2016	present; Count [1]			*		*			*	*		terrestrial mammal
Spilosoma lutea	Buff Ermine	Woolavington	ST34764161	04/08/2007	04/08/2007	mine vacated; Count [5]					*			*	*		insect - moth
Hoplodrina blanda	Rustic	Woolavington	ST34764161	04/08/2007	04/08/2007	adult; Count [1]					*			*	*		insect - moth
Euphydryas aurinia	Marsh Fritillary	Woolavington Manor	ST348417	01/01/1991	31/12/1991		*		*	*	*			*	*	*	insect - butterfly
Chloris chloris	Greenfinch	Woolavington	ST347416	01/05/2014	01/05/2014	Count [6]	*										bird
Anacamptis pyramidalis	Pyramidal Orchid	Woolavington	ST348417	01/06/2011	30/06/2011	present; Count [+]										*	flowering plant
Anacamptis pyramidalis	Pyramidal Orchid	The Manor - lawn, Woolavington	ST348417	01/07/2011	01/07/2011	adult; Count [3]										*	flowering plant
Ennomos fuscantaria	Dusky Thorn	Woolavington	ST34764161	10/08/2007	10/08/2007	adult; Count [1]					*			*	*		insect - moth
Earias clorana	Cream-bordered Green Pea	Woolavington	ST34764161	10/08/2007	10/08/2007	adult; Count [1]										*	insect - moth
Euphydryas aurinia	Marsh Fritillary	The Manor ,Woolavington	ST348417	01/01/1991	31/12/1991	Adult; Count [1]	*		*	*	*			*	*	*	insect - butterfly
Pipistrellus pipistrellus	Pipistrelle		ST345415	10/07/1992	10/07/1992	Count [+]	*			*						*	terrestrial mammal
Petroselinum segetum	Corn Parsley	Woolavington Bridge, Pyle Drove	ST346426	01/01/1985	31/12/1995										*		flowering plant
Falco tinnunculus	Kestrel	Battleborough	ST344416	23/06/2015	23/06/2015	Count [1]	*						*			*	bird
Triturus cristatus	Great Crested Newt	Woolavington Road, Woolavington	ST343417	31/05/2018	31/05/2018	present; Count [1]	*			*	*			*	*	*	amphibian
Triturus cristatus	Great Crested Newt	Crockers Hill, Woolavington	ST34294202	15/07/2014	15/07/2014	larva; Count [1]	*			*	*			*	*	*	amphibian
Triturus cristatus	Great Crested Newt	Woolavington	ST34294203	01/05/2013	30/06/2013	present; Count [1]	*			*	*			*	*	*	amphibian
Triturus cristatus	Great Crested Newt	Crockers Hill, Woolavington.	ST34274197	15/07/2014	15/07/2014	larva; Count [1]	*			*	*			*	*	*	amphibian
Anas acuta	Pintail	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994	wintering; Count [1]	*			*			*			*	bird
Berula erecta	Lesser Water-parsnip	Borrow Pit, Puriton	ST342424	15/08/1995	15/08/1995	present; Count [rare]										*	flowering plant
Cettia cetti	Cetti's Warbler	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994	male; Count [4]				*						*	bird
Anas clypeata	Shoveler	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994		*						*			*	bird
Bucephala clangula	Goldeneye	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994		*			*			*			*	bird
Ceratophyllum demersum	Rigid Hornwort	Borrow Pit, Puriton	ST342424	15/08/1995	15/08/1995	present; Count [abundant]										*	flowering plant
Lutra lutra	European Otter	Borrow Pit, Puriton	ST342424	01/06/1983	30/06/1983	Tracks; Count [1]	*			*	*			*	*	*	terrestrial mammal
Mergus serrator	Red-breasted Merganser	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994	male; Count [1]	*										bird
Podiceps grisegena	Red-necked Grebe	Borrow Pit, Puriton	ST342424	28/02/1995	03/03/1995	summer plumage/pelage; Count [1]								*		*	bird
Aythya ferina	Pochard	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994		*							*		*	bird
Anas strepera	Gadwall	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994	wintering; Count [1]	*						*			*	bird
Botaurus stellaris	Bittern	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994		*	*		*	*		*		*	*	bird
Anas crecca	Teal	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994	wintering; Count [1]	*						*			*	bird
Podiceps cristatus	Great Crested Grebe	Borrow Pit, Puriton	ST342424	01/01/1972	31/12/1994	proved breeding; Count [1 pair]										*	bird
Anas strepera	Gadwall	Borrow Pit, Puriton	ST342424	01/01/1992	31/12/1992	present; Count [2]	*						*			*	bird
Lutra lutra	European Otter	Borrow Pit, Puriton	ST342425	01/01/1983	31/12/1984	present; Count [1]; Tracks; Count [1]	*			*	*			*	*	*	terrestrial mammal
Sympetrum striolatum	Common Darter		ST342426	31/12/1976	31/12/1976				*								insect - dragonfly (Odonata)
Aeshna mixta	Scarce Hawker		ST342426	31/12/1976	31/12/1976											*	insect - dragonfly (Odonata)
Sympetrum striolatum	Common Darter		ST342426	12/08/1981	12/08/1981				*								insect - dragonfly (Odonata)
Sympetrum sanguineum	Ruddy Sympetrum		ST342426	12/08/1981	12/08/1981											*	insect - dragonfly (Odonata)
Berula erecta	Lesser Water-parsnip	Stoning Pound Field South and Stoning Pound Rhyne	ST34164231	21/10/1997	21/10/1997											*	flowering plant
Callitriche platycarpa	Various-leaved Water-starwort	Stoning Pound Field South and Stoning Pound Rhyne	ST34164231	21/10/1997	21/10/1997											*	flowering plant
Catabrosa aquatica	Whorl-grass	Stoning Pound Field South and Stoning Pound Rhyne	ST34164231	21/10/1997	21/10/1997											*	flowering plant
Triturus cristatus	Great Crested Newt	Crockers Hill, Woolavington.	ST34164171	15/07/2014	15/07/2014	larva; Count [1]	*			*	*			*	*	*	amphibian
Wolffia arrhiza	Rootless Duckweed	Stoning Pound Field South and Stoning Pound Rhyne	ST34164231	21/10/1997	21/10/1997				*						*	*	flowering plant
Lutra lutra	European Otter	CATCOTT BRIDGE S DRAIN (BRUE)	ST340424	03/12/2000	03/12/2000	droppings; Count [2]	*			*	*			*	*	*	terrestrial mammal
Elytrigia juncea	Sand Couch	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present occasional; Count [1]										*	flowering plant
Wolffia arrhiza	Rootless Duckweed	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present; Count [occasional]			*						*	*	flowering plant
Scutellaria minor	Lesser Skullcap	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present; Count [rare]										*	flowering plant
Carex acutiformis	Lesser Pond-sedge	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present; Count [occasional]										*	flowering plant
Pastinaca sativa	Wild Parsnip	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present; Count [locally dominant]										*	flowering plant
Sium latifolium	Greater Water-parsnip	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present; Count [locally dominant]			*		*			*	*	*	flowering plant
Elytrigia juncea	Sand Couch	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present; Count [occasional]										*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present; Count [occasional]			*						*	*	flowering plant
Arvicola amphibius	European Water Vole		ST340428	01/02/2015	01/02/2015	present; Count [1]			*	*	*			*	*	*	terrestrial mammal
Lemna trisulca	Ivy-leaved Duckweed	Puriton Rhynes	ST339429	08/08/1995	08/08/1995	present occasional; Count [1]									*		flowering plant
Pipistrellus pipistrellus	Common Pipistrelle	ROF Puriton	ST339419	10/05/2017	10/05/2017	Count [1]	*			*					*		terrestrial mammal

Rhinolophus ferrumequinum	Greater Horseshoe Bat	ROF Puriton	ST339419	10/05/2017	10/05/2017	Count [1]	*			*	*				*	*	*	terrestrial mammal
Barbastella barbastellus	Western Barbastelle	ROF Puriton	ST339419	10/05/2017	10/05/2017	Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	ROF Puriton	ST339419	10/05/2017	10/05/2017	Count [1]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle	ROF Puriton	ST339419	10/05/2017	10/05/2017	Count [1]	*			*	*				*	*	*	terrestrial mammal
Eptesicus serotinus	Serotine	ROF Puriton	ST339419	10/05/2017	10/05/2017	Count [1]	*		*	*						*	*	terrestrial mammal
Pyrgus malvae	Grizzled Skipper	ROF Puriton	ST333425	01/01/1988	31/12/1988	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Pyrgus malvae	Grizzled Skipper	ROF Puriton	ST333425	01/01/1992	31/12/1992				*		*				*	*	*	insect - butterfly
Lutra lutra	European Otter	ROF Puriton	ST333425	01/01/1800	31/12/1988		*			*	*				*	*	*	terrestrial mammal
Bucephala clangula	Goldeneye	ROF Puriton	ST333425	01/01/1800	31/12/1988		*			*			*				*	bird
Saxicola rubicola	Stonechat	ROF Puriton	ST333425	01/01/1800	31/12/1988		*										*	bird
Accipiter nisus	Sparrowhawk	ROF Puriton	ST333425	01/01/1800	31/12/1988		*											bird
Cettia cetti	Cetti's Warbler	ROF Puriton	ST333425	01/01/1800	31/12/1988					*							*	bird
Arvicola amphibius	European Water Vole		ST334426	01/02/2015	01/02/2015	present; Count [1]			*	*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	ROF Puriton	ST333425	01/06/1983	30/06/1983	Tracks; Count [1]; juvenile; Count [1]	*			*	*				*	*	*	terrestrial mammal
Tyria jacobaeae	Cinnabar	Puriton	ST335420	09/07/2009	09/07/2009	Adult; Count [1]					*				*	*		insect - moth
Tyria jacobaeae	Cinnabar	Puriton	ST335420	09/07/2009	09/07/2009	Adult; Count [1]					*				*	*		insect - moth
Anacamptis pyramidalis	Pyramidal Orchid	Puriton	ST335420	09/07/2009	09/07/2009												*	flowering plant
Scotopteryx chenopodiata	Shaded Broad-bar	Puriton	ST335420	30/07/2011	30/07/2011	Adult; Count [1]					*				*	*		insect - moth
Scotopteryx chenopodiata	Shaded Broad-bar	Puriton	ST335420	30/07/2011	30/07/2011	Adult; Count [1]					*				*	*		insect - moth
Tyria jacobaeae	Cinnabar	Puriton	ST335420	30/07/2011	30/07/2011	Adult; Count [1]					*				*	*		insect - moth
Tyria jacobaeae	Cinnabar	Puriton	ST335420	30/07/2011	30/07/2011	Adult; Count [1]					*				*	*		insect - moth
Rhinolophus hipposideros	Lesser Horseshoe Bat	ROF Puriton	ST336417	01/06/2017	01/06/2017	Count [1]	*			*	*				*	*	*	terrestrial mammal
Arvicola amphibius	European Water Vole		ST331420	01/02/2015	01/02/2015	present; Count [1]			*	*	*				*	*	*	terrestrial mammal
Anacamptis pyramidalis	Pyramidal Orchid	Puriton Cowslip Field	ST331420	01/01/1800	31/12/1992												*	flowering plant
Anacamptis pyramidalis	Pyramidal Orchid	Puriton	ST335420	23/06/2008	23/06/2008												*	flowering plant
Aeshna mixta	Scarce Hawker	Puriton	ST335420	30/07/2011	30/07/2011												*	insect - dragonfly (Odonata)
Ophrys apifera	Bee Orchid	Puriton Cowslip Field	ST331420	01/01/1800	31/12/1992												*	flowering plant
Cettia cetti	Cetti's Warbler	ROF Puriton	ST333425	01/01/1800	31/12/1988					*							*	bird
Rallus aquaticus	Water Rail	ROF Puriton	ST333425	01/01/1800	31/12/1988												*	bird
Aricia agestis	Brown Argus	Puriton Levels	ST333425	01/01/1988	31/12/1988	Adult; Count [1]											*	insect - butterfly
Lutra lutra	European Otter	ROF Puriton	ST333425	01/01/1800	31/12/1988		*			*	*				*	*	*	terrestrial mammal
Pyrgus malvae	Grizzled Skipper	Puriton Levels	ST333425	01/01/1988	31/12/1988	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Saxicola rubicola	Stonechat	ROF Puriton	ST333425	01/01/1800	31/12/1988		*										*	bird
Accipiter nisus	Sparrowhawk	ROF Puriton	ST333425	01/01/1800	31/12/1988		*										*	bird
Rallus aquaticus	Water Rail	ROF Puriton	ST333425	01/01/1800	31/12/1988												*	bird
Coenonympha pamphilus	Small Heath	ROF Puriton	ST333425	01/01/1992	31/12/1992				*		*				*	*		insect - butterfly
Numenius phaeopus	Whimbrel	ROF Puriton	ST333425	01/01/1987	31/12/1987		*			*				*			*	bird
Falco tinnunculus	Kestrel	ROF Puriton	ST333425	01/01/1988	31/12/1988		*						*				*	bird
Rhinanthus minor	Yellow-rattle	ROF Puriton	ST333425	01/01/1800	31/12/1992												*	flowering plant
Podiceps cristatus	Great Crested Grebe	ROF Puriton	ST333425	01/01/1800	31/12/1988												*	bird
Falco tinnunculus	Kestrel	ROF Puriton	ST333425	01/01/1800	31/12/1988		*						*				*	bird
Pyrgus malvae	Grizzled Skipper	Puriton Levels	ST333425	01/01/1988	31/12/1988	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Aricia agestis	Brown Argus	ROF Puriton	ST333425	01/01/1992	31/12/1992												*	insect - butterfly
Aricia agestis	Brown Argus	Puriton Levels	ST333425	01/01/1988	31/12/1988	Adult; Count [1]											*	insect - butterfly
Triturus cristatus	Great Crested Newt	ROF Puriton	ST333425	01/01/1800	31/12/1988		*			*	*				*	*	*	amphibian
Luscinia megarhynchos	Nightingale	ROF Puriton	ST333425	01/03/1999	31/05/1999	singing/mating calls; Count [1]	*							*			*	bird
Pyrgus malvae	Grizzled Skipper	ROF Puriton	ST333425	01/01/1988	31/12/1988	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Coenonympha pamphilus	Small Heath	Puriton Levels	ST333425	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*		insect - butterfly
Aricia agestis	Brown Argus	Puriton Levels	ST333425	01/01/1992	31/12/1992	Adult; Count [1]											*	insect - butterfly
Bucephala clangula	Goldeneye	ROF Puriton	ST333425	01/01/1800	31/12/1988		*			*			*				*	bird
Lasiommata megera	Wall	ROF Puriton	ST333425	01/01/1992	31/12/1992				*		*				*	*		insect - butterfly
Coenonympha pamphilus	Small Heath	ROF Puriton	ST333425	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*		insect - butterfly
Bufo bufo	Common Toad	ROF Puriton	ST333425	01/01/1800	31/12/1988						*				*	*		amphibian
Aricia agestis	Brown Argus	ROF Puriton	ST333425	01/01/1988	31/12/1988	Adult; Count [1]											*	insect - butterfly
Ophrys apifera	Bee Orchid	ROF Puriton	ST333425	01/01/1988	31/12/1988												*	flowering plant
Pyrgus malvae	Grizzled Skipper	Puriton Levels	ST333425	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Aricia agestis	Brown Argus	ROF Puriton	ST333425	01/01/1992	31/12/1992	Adult; Count [1]											*	insect - butterfly
Falco tinnunculus	Kestrel	ROF Puriton	ST333425	01/01/1988	31/12/1988	proved breeding; Count [1]	*						*				*	bird
Pyrgus malvae	Grizzled Skipper	ROF Puriton	ST333425	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Pyrgus malvae	Grizzled Skipper	ROF Puriton	ST333425	01/01/1800	31/12/1988				*		*				*	*	*	insect - butterfly
Pyrgus malvae	Grizzled Skipper	ROF Puriton	ST333425	01/01/1800	31/12/1988				*		*				*	*	*	insect - butterfly
Gallinago gallinago	Snipe	ROF Puriton	ST333425	01/01/1800	31/12/1987		*						*				*	bird
Aricia agestis	Brown Argus	ROF Puriton	ST333425	01/01/1988	31/12/1988	Adult; Count [1]											*	insect - butterfly
Podiceps cristatus	Great Crested Grebe	ROF Puriton	ST333425	01/01/1800	31/12/1986												*	bird
Ophrys apifera	Bee Orchid	ROF Puriton	ST333425	01/01/1988	31/12/1988												*	flowering plant
Lasiommata megera	Wall	ROF Puriton	ST333425	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*		insect - butterfly
Meles meles	Eurasian Badger	ROF Puriton	ST333425	01/01/1988	31/12/1988					*							*	terrestrial mammal
Aricia agestis	Brown Argus	ROF Puriton	ST333425	01/01/1800	31/12/1988												*	insect - butterfly
Triturus cristatus	Great Crested Newt	ROF Puriton	ST333425	01/01/1800	31/12/1988		*			*	*				*	*	*	amphibian
Bufo bufo	Common Toad	ROF Puriton	ST333425	01/01/1800	31/12/1988						*				*	*		amphibian
Aricia agestis	Brown Argus	ROF Puriton	ST333425	01/01/1800	31/12/1988												*	insect - butterfly
Gallinago gallinago	Snipe	ROF Puriton	ST333425	01/01/1800	31/12/1987		*						*				*	bird
Lasiommata megera	Wall	Puriton Levels	ST333425	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*		insect - butterfly
Arvicola amphibius	European Water Vole		ST332427	01/02/2015	01/02/2015	present; Count [1]			*	*	*				*	*	*	terrestrial mammal
Pyrgus malvae	Grizzled Skipper	Puriton Levels	ST327422	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Aricia agestis	Brown Argus	Puriton Levels	ST327422	01/01/1992	31/12/1992	Adult; Count [1]											*	insect - butterfly
Pyrgus malvae	Grizzled Skipper	Puriton Ash Ground	ST327422	01/01/1800	31/12/1992				*		*				*	*	*	insect - butterfly
Plecotus auritus	Brown Long-eared Bat	New Road, East Huntspill	ST327426	22/05/2016	22/05/2016	Count [1]	*			*	*				*	*	*	terrestrial mammal
Pyrgus malvae	Grizzled Skipper	Puriton Ash Ground	ST327422	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Aricia agestis	Brown Argus	Puriton Ash Ground	ST327422	01/01/1992	31/12/1992	Adult; Count [1]											*	insect - butterfly
Sium latifolium	Greater Water-parsnip	Puriton R.O.F.	ST324429	01/01/1985	31/12/1995				*		*				*	*	*	flowering plant
Luscinia megarhynchos	Nightingale	Puriton Meadows &	ST327427	01/01/1800	31/12/1992		*							*			*	bird
Sium latifolium	Greater Water-parsnip	R O F Puriton	ST324429	18/06/1989	18/06/1989	present; Count [+]			*		*				*	*	*	flowering plant
Lutra lutra	European Otter	Huntspill	ST322422	07/10/2004	07/10/2004	dead; Count [1]	*			*	*				*	*	*	terrestrial mammal

Ceratophyllum demersum	Rigid Hornwort	North Mead Drove Fields	ST324428	21/10/1997	21/10/1997											*		flowering plant
Pastinaca sativa	Wild Parsnip	Puriton Meadows &	ST327427	08/08/1995	08/08/1995	present; Count [occasional]										*		flowering plant
Petroselinum segetum	Corn Parsley	East Huntspill / Huntspill River	ST33324405	29/08/2016	29/08/2016	Fruiting; Count [+]									*			flowering plant
Aythya ferina	Pochard	Huntspill R. / Puriton Road	ST332444	14/03/1986	14/03/1986	Count [21]	*						*			*		bird
Anchusa arvensis	Bugloss	Hackness	ST327445	01/01/1985	31/12/1995										*	*		flowering plant
Eptesicus serotinus	Serotine	Withybow Barn, Withy Grove, East Huntspill, Highbridge TA9 NP	ST326443	24/08/2016	24/08/2016	Count [1]	*		*	*					*	*		terrestrial mammal
Anchusa arvensis	Bugloss	Hackness	ST327443	01/01/1985	31/12/1995										*	*		flowering plant
Carduus tenuiflorus	Slender Thistle	Hackness	ST327443	01/01/1985	31/12/1995											*		flowering plant
Apium graveolens	Wild Celery	East Huntspill / Huntspill River	ST33104418	29/08/2016	29/08/2016	Fruiting; Count [+Flowering /]										*		flowering plant
Lutra lutra	European Otter	Puriton road, Huntspill	ST327443	14/04/2012	14/04/2012	Droppings; Count [2F]	*			*	*				*	*	*	terrestrial mammal
Scutellaria galericulata	Skullcap	East Huntspill / Huntspill River	ST32804420	29/08/2016	29/08/2016	Flowering; Count [1]											*	flowering plant
Butomus umbellatus	Flowering-rush	East Huntspill / Huntspill River	ST32804420	29/08/2016	29/08/2016	Flowering; Count [1]											*	flowering plant
Lutra lutra	European Otter		ST327441	05/03/1984	05/03/1984	droppings; Count [7]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	River Huntspill, M5 W Huntspill	ST323444	01/10/2002	01/10/2002	dead; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	M5 bridge, Huntspill R.	ST324442	14/12/1977	14/12/1977	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Meles meles	Eurasian Badger	Puriton	ST325441	10/07/2008	10/07/2008	Tracks; Count [Min.1]				*							*	terrestrial mammal
Ardea cinerea	Grey Heron	Huntspill River / M5	ST325442	06/11/1986	06/11/1986	Count [1]											*	bird
Ardea cinerea	Grey Heron	R. Huntspill at M5	ST323443	09/07/1986	09/07/1986	Count [2]											*	bird
Lutra lutra	European Otter	Railway Bridge M5 Huntspill Brue - River Brue	ST318445	23/04/2016	23/04/2016	Droppings; Count [4R 1F AJ]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Railway Bridge Brue/Rhyne	ST318445	26/04/2014	26/04/2014	Droppings; Count [1F]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	HUNTSPILL RAILWAY BRIDGE (BRUE)	ST318445	16/05/1999	16/05/1999	droppings; Count [several]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	River Huntspill, Rly Bridge	ST318445	15/07/2002	15/07/2002	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	River Huntspill Rly Br	ST318445	17/09/2002	17/09/2002	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Railway Bridge, Huntspill R.	ST318444	25/05/1975	25/05/1975	droppings; Count [4]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Railway bridge, Huntspill R.	ST318444	30/04/1982	30/04/1982	droppings; Count [2]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Bridgwater Bay NNR (Subsite outside SSSI) / Railway bridge, Huntspill R.	ST318444	13/09/2003	13/09/2003	droppings; Count [8]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Railway bridge, Huntspill R.	ST318444	02/11/1982	02/11/1982	droppings; Count [several]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Huntspill Rail bridge	ST318444	14/05/1972	14/05/1972	droppings; Count [2]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Railway Bridge, Huntspill R.	ST318444	19/10/1974	19/10/1974	Tracks; Count [1]; droppings; Count [4]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	HUNTSPILL RAILWAY BRIDGE(BRUE)	ST318444	09/08/1998	09/08/1998	droppings; Count [3]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Railway bridge, Huntspill	ST318444	24/03/1973	24/03/1973	droppings; Count [1]; Tracks; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	HUNTSPILL RAILWAY BRIDGE (BRUE)	ST318444	23/11/1997	23/11/1997	droppings; Count [4]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	RAILWAY BRIDGE HUNTSPILL(BRUE)	ST318444	08/02/1998	08/02/1998	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Railway bridge, Huntspill R.	ST318444	06/12/1977	06/12/1977	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Myotis mystacinus/brandtii	Whiskered/Brandt's Bat		ST357405	20/05/1995	20/05/1995	dead; Count [1]	*			*								terrestrial mammal
Pipistrellus pipistrellus	Pipistrelle		ST357406	03/06/1987	03/06/1987	Count [13]	*			*							*	terrestrial mammal
Rhinolophus ferrumequinum	Greater Horseshoe Bat	Cossington Lane, Woolavington	ST350408	03/05/2018	03/05/2018	Count [1]	*			*	*				*	*	*	terrestrial mammal
Euphorbia platyphyllos	Broad-leaved Spurge	Cossington	ST355408	04/08/2016	04/08/2016	Count [+]										*	*	flowering plant
Erinaceus europaeus	West European Hedgehog	Woolavington	ST344407	08/11/2015	08/11/2015	Count [1]			*		*				*	*		terrestrial mammal
Nyctalus noctula	Noctule Bat	Cossington Lane, Woolavington	ST350408	03/05/2018	03/05/2018	Count [1]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pipistrellus	Common Pipistrelle	Cossington Lane, Woolavington	ST348409	03/05/2018	03/05/2018	Count [1]	*			*						*		terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle	Cossington Lane, Woolavington	ST348409	03/05/2018	03/05/2018	Count [1]	*			*	*				*	*	*	terrestrial mammal
Eptesicus serotinus	Serotine	Cossington Lane, Woolavington	ST348409	03/05/2018	03/05/2018	Count [1]	*		*	*						*	*	terrestrial mammal
Pipistrellus nathusii	Nathusius's Pipistrelle	Cossington Lane, Woolavington	ST350408	03/05/2018	03/05/2018	Count [1]	*		*	*						*	*	terrestrial mammal
Lasiommata megera	Wall		ST345405	26/07/2014	26/07/2014	Count [1]			*		*				*	*		insect - butterfly
Chiroptera	Bats	Woolavington	ST344408	15/06/2018	15/06/2018	present; Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Erinaceus europaeus	West European Hedgehog	Woolavington	ST344407	08/11/2015	08/11/2015	Count [1]			*		*				*	*		terrestrial mammal
Natrix helvetica	Grass Snake	Woolavington	ST345408	29/02/2012	29/02/2012					*	*				*	*	*	reptile
Chiroptera	Bats	Woolavington	ST345409	04/07/2018	04/07/2018	present; Count [1]; Evidence of bat roost [undetermined]	*		*	*	*				*	*	*	terrestrial mammal
Pipistrellus	Pipistrelle Bat species		ST347411	19/01/2004	19/01/2004	Adult; Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Thecla betulae	Brown Hairstreak	Woolavington	ST345413	06/04/2007	06/04/2007	egg/ovum; Count [1]			*		*				*	*	*	insect - butterfly
Torilis nodosa	Knotted Hedge-parsley	North Somerset / Woolavington	ST347414	10/11/2015	10/11/2015	Count [+]										*		flowering plant
Chiroptera	Bats	Woolavington	ST345409	16/02/2018	16/02/2018	present; Count [1]; Evidence of bat roost [undetermined]	*		*	*	*				*	*	*	terrestrial mammal
Chiroptera	Bats	Woolavington	ST345409	18/06/2018	18/06/2018	present; Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Puriton Hill, Woolavington	ST336404	11/05/2017	11/05/2017	Count [+]	*			*	*				*	*	*	amphibian
Myotis nattereri	Natterer's Bat	Chisland Covert	ST330407	10/10/2014	10/10/2014	Count [1]	*			*						*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Purlton Hill, Puriton.	ST33124072	01/05/2013	30/06/2013	present; Count [3]	*			*	*				*	*	*	amphibian
Platanthera chlorantha	Greater Butterfly-orchid	Chisland Covert	ST331408	17/06/1998	17/06/1998	present; Count [1]			*							*	*	flowering plant
Daphne laureola	Spurge-laurel	North Somerset / Chisland Covert	ST331408	16/03/2014	16/03/2014	Count [+]											*	flowering plant
Quercus petraea	Sessile Oak	Chisland Covert	ST331408	17/06/1998	17/06/1998	present; Count [1]											*	flowering plant
Daphne laureola	Spurge-laurel	Chisland Covert	ST331408	17/06/1998	17/06/1998	present; Count [1]											*	flowering plant
Platanthera chlorantha	Greater Butterfly-orchid	Chisland Covert	ST33104075	27/04/2013	27/04/2013	present; Count [+]			*							*	*	flowering plant
Myotis nattereri	Natterer's Bat	Chisland Covert	ST330407	10/10/2014	10/10/2014	Count [1]	*			*						*	*	terrestrial mammal
Daphne laureola	Spurge-laurel	North Somerset / Chisland Covert	ST330408	16/03/2014	16/03/2014	Count [+]											*	flowering plant
Myotis nattereri	Natterer's Bat	Chisland Covert	ST330408	24/03/2015	24/03/2015	Count [1]	*			*						*	*	terrestrial mammal
Myotis nattereri	Natterer's Bat	Chisland Covert	ST330408	24/03/2015	24/03/2015	Count [1]	*			*						*	*	terrestrial mammal
Myotis nattereri	Natterer's Bat	Chisland Covert	ST330407	11/11/2012	11/11/2012	Count [1]	*			*						*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Chrisland Covert, Puriton.	ST3300540886	14/07/2014	14/07/2014	present; Count [1]	*			*	*				*	*	*	amphibian
Myotis nattereri	Natterer's Bat	Chisland Covert	ST330407	11/11/2012	11/11/2012	Count [1]	*			*						*	*	terrestrial mammal
Myotis nattereri	Natterer's Bat	North Somerset	ST330407	19/03/2016	19/03/2016	Count [1]	*			*						*	*	terrestrial mammal
Platanthera chlorantha	Greater Butterfly-orchid	Chisland Covert	ST33054090	27/04/2013	27/04/2013	present; Count [+]			*							*	*	flowering plant
Triturus cristatus	Great Crested Newt	Puriton	ST3291841088	01/04/2014	01/04/2014	present; Count [4]	*			*	*				*	*	*	amphibian
Daphne laureola	Spurge-laurel	North Somerset / Puriton (south east of)	ST328408	16/03/2014	16/03/2014	Count [+]											*	flowering plant
Lutra lutra	European Otter	A39 Knowle Hall, PARRETT	ST328404	14/06/2005	14/06/2005	dead; Count [1]	*			*	*				*	*	*	terrestrial mammal
Daphne laureola	Spurge-laurel	Home Covert	ST326408	10/05/1995	10/05/1995												*	flowering plant
Plecotus auritus	Brown Long-eared Bat	New Ground Covert	ST324409	13/06/2014	13/06/2014	Count [+]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	Home Covert	ST325408	24/02/2013	24/02/2013	Count [2]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	Home Covert	ST325408	24/02/2013	24/02/2013	Count [2]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	New Ground Covert	ST324409	13/06/2014	13/06/2014	Count [+]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	North Somerset	ST325408	19/03/2016	19/03/2016	Count [2]	*			*	*				*	*	*	terrestrial mammal
Beta vulgaris subsp. maritima	Sea Beet	North Somerset / Puriton (south east of)	ST325407	16/03/2014	16/03/2014	Count [+]											*	flowering plant
Plantago coronopus	Buck's-horn Plantain	North Somerset / Puriton (south east of)	ST325407	16/03/2014	16/03/2014	Count [+]											*	flowering plant

Lasiommata megera	Wall	Puriton Wood	ST325414	01/01/1997	31/12/1997	Adult; Count [1]			*		*				*	*		insect - butterfly
Myotis nattereri	Natterer's Bat	New Ground Covert	ST324409	13/06/2014	13/06/2014	Count [+]	*			*						*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Woolavington	ST3269641082	01/04/2013	01/04/2013	present; Count [7]	*			*	*				*	*	*	amphibian
Myotis nattereri	Natterer's Bat	New Ground Covert	ST324409	13/06/2014	13/06/2014	Count [+]	*			*						*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	New Ground Covert	ST324409	03/06/2014	03/06/2014	Count [10]	*			*	*				*	*	*	terrestrial mammal
Myotis nattereri	Natterer's Bat	New Ground Covert	ST324409	04/06/2014	04/06/2014	Count [1]	*			*						*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	Home Covert	ST324408	10/10/2014	10/10/2014	Count [2]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	Home Covert	ST324408	10/10/2014	10/10/2014	Count [2]	*			*	*				*	*	*	terrestrial mammal
Myotis nattereri	Natterer's Bat	New Ground Covert	ST324409	04/06/2014	04/06/2014	Count [1]	*			*						*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	New Ground Covert	ST324409	03/06/2014	03/06/2014	Count [10]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	New Ground Covert	ST323410	09/05/2015	09/05/2015	Count [1]	*			*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	New Ground Covert	ST323410	09/05/2015	09/05/2015	Count [1]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	New Ground Covert	ST323409	02/06/2014	02/06/2014	Count [50]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	New Ground Covert	ST323409	02/06/2014	02/06/2014	Count [30]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	New Ground Covert	ST323409	02/06/2014	02/06/2014	Count [30]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	New Ground Covert	ST323409	02/06/2014	02/06/2014	Count [50]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pipistrellus	Pipistrelle	North Somerset	ST323409	21/02/2016	21/02/2016	Count [2]	*			*							*	terrestrial mammal
Phylloscopus collybita	Chiffchaff	New Ground Covert	ST323409	16/05/1995	16/05/1995											*		bird
Plecotus auritus	Brown Long-eared Bat	North Somerset	ST323409	14/02/2016	14/02/2016	Count [1]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pipistrellus	Pipistrelle		ST322413	07/08/1988	07/08/1988	Count [135]	*			*							*	terrestrial mammal
Pipistrellus pipistrellus	Pipistrelle		ST322413	25/06/1994	25/06/1994	Count [250]	*			*							*	terrestrial mammal
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST320407	02/08/2011	02/08/2011	adult; Count [1]											*	insect - butterfly
Ardea cinerea	Grey Heron	Stile, Kings Sedgemoor Drain, River Parrett	ST320407	27/11/2019	27/11/2019	Adult; Count [1]											*	bird
Anguilla anguilla	European Eel	King's Sedgemoor Drain [KS1J], u/s Puriton	ST322407	01/01/1990	31/12/1990	present; Count [1]					*				*	*		bony fish (Actinopterygii)
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST320407	17/09/2011	17/09/2011	adult; Count [1]											*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST320407	19/08/2011	19/08/2011	adult; Count [2]											*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST320407	03/05/2011	03/05/2011	adult; Count [1]											*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST320407	31/08/2011	31/08/2011	adult; Count [1]											*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST320407	11/09/2011	11/09/2011	adult; Count [1]											*	insect - butterfly
Daphne laureola	Spurge-laurel	New Ground Covert	ST323409	16/05/1995	16/05/1995												*	flowering plant
Myotis nattereri	Natterer's Bat	North Somerset	ST323409	28/02/2016	28/02/2016	Count [1]	*			*						*	*	terrestrial mammal
Myotis nattereri	Natterer's Bat	North Somerset	ST323409	19/03/2016	19/03/2016	Count [1]	*			*						*	*	terrestrial mammal
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST320407	04/09/2011	04/09/2011	adult; Count [1]											*	insect - butterfly
Lutra lutra	European Otter	Stile Area, Ksd, Kings Sedgemoor, River Parrett	ST320407	24/02/2020	24/02/2020	Droppings; Count [2]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Stile Area, Kings Sedgemoor Drain, River Parrett	ST320407	01/11/2019	01/11/2019	Droppings; Count [2T]	*			*	*				*	*	*	terrestrial mammal
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST318408	19/08/2011	19/08/2011	adult; Count [1]											*	insect - butterfly
Ophrys apifera	Bee Orchid	North Somerset / Dunball	ST317409	16/06/2005	16/06/2005	Flowering; Count [+]											*	flowering plant
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST318408	03/05/2011	03/05/2011	adult; Count [1]											*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST318408	06/05/2011	06/05/2011	adult; Count [2]											*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST318408	05/08/2011	05/08/2011	adult; Count [3]											*	insect - butterfly
Daphne laureola	Spurge-laurel	North Somerset / Dunball	ST31874087	11/02/2016	11/02/2016	vegetative; Count [+]											*	flowering plant
Pastinaca sativa	Wild Parsnip	South Hills Wood	ST319409	01/05/1995	31/05/1995												*	flowering plant
Cerastium arvense	Field Mouse-ear	South Hills Wood	ST319409	01/05/1995	31/05/1995												*	flowering plant
Centaurea scabiosa	Greater Knapweed	South Hills Wood	ST319409	01/05/1995	31/05/1995												*	flowering plant
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST318408	09/08/2012	09/08/2012	adult; Count [2]											*	insect - butterfly
Forficula lesnei	Lesne's Earwig	South Hills Wood	ST319411	29/07/1995	29/07/1995											*	*	insect - earwig (Dermaptera)
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST318408	31/08/2011	31/08/2011	adult; Count [1]											*	insect - butterfly
Erithacus rubecula	Robin	Puriton Hill, Puriton	ST31824128	29/05/2018	29/05/2018	adult; Count [1]	*											bird
Troglodytes troglodytes	Wren	Puriton Hill, Puriton	ST31824128	29/05/2018	29/05/2018	adult; Count [1]	*											bird
Eptesicus serotinus	Serotine	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*						*	*	terrestrial mammal
Nyctalus leisleri	Lesser Noctule	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*						*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus nathusii	Nathusius's Pipistrelle	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*						*	*	terrestrial mammal
Nyctalus leisleri	Lesser Noctule	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*						*	*	terrestrial mammal
Pipistrellus pipistrellus	Pipistrelle	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*							*	terrestrial mammal
Myotis	Unidentified Bat	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*	*				*	*	*	terrestrial mammal
Myotis	Unidentified Bat	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*	*				*	*	*	terrestrial mammal
Passer domesticus	House Sparrow	Puriton Hill, Puriton	ST317413	24/11/2014	24/11/2014						*			*	*	*		bird
Plecotus auritus	Brown Long-eared Bat	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pipistrellus	Pipistrelle	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*							*	terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*	*				*	*	*	terrestrial mammal
Eptesicus serotinus	Serotine	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*						*	*	terrestrial mammal
Pipistrellus nathusii	Nathusius's Pipistrelle	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*		*	*						*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	Puriton Hill	ST317413	30/04/2015	15/06/2015	Count [+]	*			*	*				*	*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt		ST3172140551	01/05/2015	01/05/2015	Count [7]	*			*	*				*	*	*	amphibian
Lutra lutra	European Otter	KSD Bridgwater near junc M5	ST31634131	30/11/2013	30/11/2013	dead; Count [1 Count of]	*			*	*				*	*	*	terrestrial mammal
Lathyrus aphaca	Yellow Vetchling	Puriton	ST316413	12/09/2009	12/09/2009	present; Count [+]			*							*	*	flowering plant
Lathyrus nissolia	Grass Vetchling	Puriton	ST316413	12/09/2009	12/09/2009	present; Count [+]											*	flowering plant
Lutra lutra	European Otter	J23 Dunball, A39.East of J23 M5, BRUE	ST316413	30/11/2012	30/11/2012	dead; Count [1M]	*			*	*				*	*	*	terrestrial mammal
Myotis daubentonii	Daubenton's Bat		ST314409	01/06/2015	01/06/2015	Count [1]	*			*						*	*	terrestrial mammal
Ononis spinosa	Spiny Restharrow	North Somerset / Puriton	ST31524105	11/02/2016	11/02/2016	Count [+]											*	flowering plant
Lutra lutra	European Otter	Dunball, near roundabout and KSD	ST31494110	28/11/2004	28/11/2004	dead; Count [1]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pipistrellus	Pipistrelle		ST314409	01/06/2015	01/06/2015	Count [1]	*			*							*	terrestrial mammal
Eptesicus serotinus	Serotine		ST314409	01/06/2015	01/06/2015	Count [1]	*		*	*						*	*	terrestrial mammal
Lutra lutra	European Otter	Puriton Hill Fields / M5 / King's Sedgemoor Drain	ST315410	12/09/2003	12/09/2003	droppings; Count [several]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat		ST314409	01/06/2015	01/06/2015	Count [1]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle		ST314409	01/06/2015	01/06/2015	Count [1]	*			*	*				*	*	*	terrestrial mammal
Falco tinnunculus	Kestrel	Dunball	ST315413	26/05/2015	26/05/2015	Count [2]	*						*				*	bird
Circus cyaneus	Hen Harrier	Dunball	ST315413	01/10/1993	30/11/1993	female; Count [1]	*	*		*	*			*		*	*	bird
Hordeum marinum	Sea Barley	North Somerset / Down End	ST314414	17/08/2015	17/08/2015	Fruiting; Count [+Flowering /]			*		*				*	*	*	flowering plant
Hordeum marinum	Sea Barley	Down End	ST314414	07/06/1998	07/06/1998	present frequent; Count [1]			*		*				*	*	*	flowering plant
Lutra lutra	European Otter	Brue KSD M5	ST315414	22/10/2011	22/10/2011	dead; Count [1 Count of]	*			*	*				*	*	*	terrestrial mammal

Hirundo rustica	Swallow	Junc. , M5	ST315413	06/04/2014	06/04/2014	Count [12]	*									*	bird
Haematopus ostralegus	Oystercatcher	Dunball	ST315413	01/06/2014	01/06/2014	Count [2]						*			*	*	bird
Meles meles	Eurasian Badger		ST3145940999	01/06/2015	01/06/2015	Count [1]				*						*	terrestrial mammal
Lutra lutra	European Otter		ST3145940999	01/06/2015	01/06/2015	Count [1]	*			*	*				*	*	terrestrial mammal
Meles meles	Eurasian Badger		ST3147540964	01/03/2015	01/03/2015	Count [1]				*						*	terrestrial mammal
Arvicola amphibius	European Water Vole		ST3147540964	01/05/2015	01/05/2015	Count [1]			*	*	*				*	*	terrestrial mammal
Cettia cetti	Cetti's Warbler		ST3145940999	01/05/2015	01/05/2015	Count [1]				*						*	bird
Lutra lutra	European Otter	M5 Motorway,Ksd,Kings Sedgemoor,River Parrett	ST314410	23/01/2020	23/01/2020	Droppings; Count [2R]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	M5 Motorway,Ksd,Kings Sedgemoor,River Parrett	ST314410	26/10/2019	26/10/2019	Droppings; Count [2R]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	M5 Motorway,Ksd,Kings Sedgemoor,River Parrett	ST314410	27/04/2019	27/04/2019	Droppings; Count [1R]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	M5 Motorway,Ksd,Kings Sedgemoor,River Parrett	ST314410	29/11/2019	29/11/2019	Droppings; Count [2R]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	M5 Motorway,Ksd,Kings Sedgemoor,River Parrett	ST314410	28/09/2019	28/09/2019	Droppings; Count [2R]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	King Sedgemoor drain - Parrett catchment. Beside a pedestrian crossing across the railway line.	ST3134041046	02/04/2017	02/04/2017	dead; Count [1 adult female]	*			*	*				*	*	terrestrial mammal
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST313411	31/08/2011	31/08/2011	adult; Count [2]										*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST312412	24/05/2011	24/05/2011	adult; Count [1]										*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST313413	11/09/2011	11/09/2011	adult; Count [1]										*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST313413	15/07/2011	15/07/2011	adult; Count [1]										*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST313413	09/08/2012	09/08/2012	adult; Count [2]										*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST313413	17/09/2011	17/09/2011	adult; Count [2]										*	insect - butterfly
Aricia agestis	Brown Argus	Dunball-Puriton Access Land	ST312412	13/08/2009	13/08/2009	Adult; Count [1]										*	insect - butterfly
Aricia agestis	Brown Argus	Dunball-Puriton Access Land	ST312412	08/09/2009	08/09/2009	Adult; Count [1]										*	insect - butterfly
Aricia agestis	Brown Argus	Dunball-Puriton Access Land	ST313413	08/09/2009	08/09/2009	Adult; Count [1]										*	insect - butterfly
Argynnis aglaja	Dark Green Fritillary	North Somerset / Dunball-Puriton Access Land	ST312412	04/07/2011	04/07/2011	adult; Count [1]										*	insect - butterfly
Stellaria pallida	Lesser Chickweed	North Somerset / Down End, nr Puriton	ST31274142	18/04/2014	18/04/2014	Count [+]										*	flowering plant
Aricia agestis	Brown Argus	Dunball-Puriton Access Land	ST313413	27/08/2009	27/08/2009	Adult; Count [1]										*	insect - butterfly
Aricia agestis	Brown Argus	Dunball-Puriton Access Land	ST312412	13/08/2009	13/08/2009	Adult; Count [1]										*	insect - butterfly
Aricia agestis	Brown Argus	North Somerset / Dunball-Puriton Access Land	ST313413	19/08/2011	19/08/2011	adult; Count [1]										*	insect - butterfly
Lutra lutra	European Otter	Dunball ROW upstream, Parrett, Kings Sedgemoor's Drain	ST312409	19/03/2016	19/03/2016	Droppings; Count [1F]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	A38 bridge (E),Dunball	ST311408	20/03/1978	20/03/1978	droppings; Count [3]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	KSD Bridgwater	ST311409	06/11/2012	06/11/2012	dead; Count [1 Count of]	*			*	*				*	*	terrestrial mammal
Ophrys apifera	Bee Orchid	Dunball Industrial Estate near Night Freight	ST311410	17/06/2002	17/06/2002	present; Count [24]										*	flowering plant
Lutra lutra	European Otter	DUNBALL HUNTSPILL (BRUE)	ST311408	01/04/1999	01/04/1999	droppings; Count [5]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	K S Drain, Dunball	ST310408	17/09/2002	17/09/2002	Tracks; Count [1]; droppings; Count [1]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	05/01/2020	05/01/2020	Droppings; Count [2T]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	14/12/2019	14/12/2019	Droppings; Count [2T]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	21/05/2020	21/05/2020	Droppings; Count [2T]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	20/12/2019	20/12/2019	Droppings; Count [2T]	*			*	*				*	*	terrestrial mammal
Rosa rubiginosa	Sweet-briar	Dunball Wharf	ST310408	18/10/2009	18/10/2009	Count [+]										*	flowering plant
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	22/05/2020	22/05/2020	Droppings; Count [2T]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	A38 NrDunball sluice, KS Drain, PARRETT	ST310408	27/09/2007	27/09/2007	dead; Count [1]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	Bridgwater, under bridge near Hanson Aggregates, on the bank reinforcements by River Parrett.	ST310408	07/10/2018	07/10/2018	Adult; Count [1 dead]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	A38 Dunball, PARRETT	ST310409	28/05/2004	28/05/2004	dead; Count [1]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball, K S Drain	ST310409	18/01/2002	18/01/2002	Tracks; Count [1]	*			*	*				*	*	terrestrial mammal
Lutra lutra	European Otter	KSD A38 at Dunball	ST3098340960	24/08/2015	24/08/2015	dead; Count [1 Count of]	*			*	*				*	*	terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle	Adjacent to A38 and north of Dunball Roundabout, Puriton	ST310412	21/05/2018	21/05/2018	Count [1]	*			*	*				*	*	terrestrial mammal
Meles meles	Eurasian Badger	Horsey Level	ST315407	17/06/2014	17/06/2014	present; Count [1]				*						*	terrestrial mammal
Arvicola amphibius	European Water Vole		ST3141640579	01/05/2015	01/05/2015	Count [1]			*	*	*				*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Dunball	ST31484069	19/04/2016	19/04/2016	Count [2]	*			*	*				*	*	amphibian
Arvicola amphibius	European Water Vole		ST3147340589	01/05/2015	01/05/2015	Count [1]			*	*	*				*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt		ST31484069	19/04/2016	19/04/2016	present; Count [2]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31354067	26/04/2016	26/04/2016	present; Count [14]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31354067	05/04/2016	05/04/2016	Count [83]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31354067	24/03/2016	24/03/2016	present; Count [77]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31354067	05/04/2016	05/04/2016	present; Count [83]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31354067	26/04/2016	26/04/2016	Count [14]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31354067	03/05/2016	03/05/2016	Count [4]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31354067	09/06/2016	09/06/2016	present; Count [6]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31354067	03/05/2016	03/05/2016	present; Count [4]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31354067	09/06/2016	09/06/2016	Count [6]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31354067	24/03/2016	24/03/2016	Count [77]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31334069	26/04/2016	26/04/2016	Count [2]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31334069	03/05/2016	03/05/2016	Count [1]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31334069	23/03/2016	23/03/2016	Count [11]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31334069	23/03/2016	23/03/2016	present; Count [11]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31334069	26/04/2016	26/04/2016	present; Count [2]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31334069	03/05/2016	03/05/2016	present; Count [1]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3132840655	28/05/2012	28/05/2012	Adult; Count [18]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3132840655	03/05/2012	03/05/2012	Adult; Count [49]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball, Bridgewater	ST31324065	02/06/2015	02/06/2015	present; Count [1]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3132840655	31/05/2012	31/05/2012	Adult; Count [31]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball	ST31334065	25/03/2016	25/03/2016	Count [42]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3132840655	26/05/2012	26/05/2012	Adult; Count [20]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31334065	25/03/2016	25/03/2016	present; Count [42]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3131640623	26/05/2012	26/05/2012	Adult; Count [15]	*			*	*				*	*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31324062	14/04/2015	14/04/2015	present; Count [1]										*	amphibian
Lissotriton helveticus	Palmate Newt	Dunball, Bridgewater	ST31324062	14/04/2015	14/04/2015	present; Count [55]										*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31334063	08/06/2015	08/06/2015	present; Count [5]										*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31314063	05/05/2015	05/05/2015	present; Count [2]										*	amphibian
Triturus cristatus	Great Crested Newt	Dunball, Bridgewater	ST31324062	14/04/2015	14/04/2015	present; Count [35]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3131640623	31/05/2012	31/05/2012	Adult; Count [6]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3131640623	11/06/2012	11/06/2012	Adult; Count [5]	*			*	*				*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3131640623	28/05/2012	28/05/2012	Adult; Count [6]	*			*	*				*	*	amphibian

Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31334063	02/06/2015	02/06/2015	present; Count [2]										*		amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3131640623	03/05/2012	03/05/2012	Adult; Count [15]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31324065	02/06/2015	02/06/2015	present; Count [13]											*	amphibian
Bufo bufo	Common Toad	Dunball, Bridgewater	ST31314064	14/04/2015	14/04/2015	present; Count [1]					*				*	*		amphibian
Triturus cristatus	Great Crested Newt	Dunball, Bridgewater	ST31314064	14/04/2015	14/04/2015	present; Count [80]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31324064	08/06/2015	08/06/2015	present; Count [4]											*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31314064	14/04/2015	14/04/2015	present; Count [146]											*	amphibian
Lissotriton helveticus	Palmate Newt	Dunball, Bridgewater	ST31314064	14/04/2015	14/04/2015	present; Count [1]											*	amphibian
Triturus cristatus	Great Crested Newt	Dunball, Bridgewater	ST31314065	05/05/2015	05/05/2015	present; Count [17]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31314065	05/05/2015	05/05/2015	present; Count [5]											*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3132840655	11/06/2012	11/06/2012	Adult; Count [7]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball, Bridgewater	ST31314067	14/04/2015	14/04/2015	present; Count [3]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31314067	14/04/2015	14/04/2015	present; Count [13]											*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3131340666	03/05/2012	03/05/2012	Adult; Count [3]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt	Dunball.	ST3131340666	26/05/2012	26/05/2012	Adult; Count [1]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt	Dunball, Bridgewater	ST31314067	19/05/2015	19/05/2015	present; Count [4]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31254072	27/03/2018	27/03/2018	present; Count [2]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31254072	19/04/2017	19/04/2017	present; Count [6]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31254071	02/05/2017	02/05/2017	present; Count [7]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31254072	01/05/2018	01/05/2018	present; Count [25]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31254072	01/05/2018	01/05/2018	present; Count [15]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt	Bridgwater	ST312407	30/06/2018	30/06/2018	present; Count [1]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31234072	07/04/2017	07/04/2017	present; Count [20]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31224073	24/04/2018	24/04/2018	present; Count [10]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31224073	12/04/2018	12/04/2018	present; Count [4]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31244071	12/04/2018	12/04/2018	present; Count [77]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31244071	16/04/2018	16/04/2018	present; Count [17]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31224070	09/03/2017	09/03/2017	present; Count [2]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31224073	16/04/2018	16/04/2018	present; Count [6]	*			*	*				*	*	*	amphibian
Anguis fragilis	Slow-worm	Bridgwater	ST312407	30/06/2018	30/06/2018	present; Count [1]				*	*				*	*	*	reptile
Lissotriton vulgaris	Smooth Newt		ST31224070	09/03/2017	09/03/2017	present; Count [39]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31224073	16/04/2018	16/04/2018	present; Count [2]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31214073	07/04/2017	07/04/2017	present; Count [6]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31224072	09/03/2017	09/03/2017	present; Count [19]	*			*	*				*	*	*	amphibian
Bufo bufo	Common Toad	Bridgwater	ST312407	30/06/2018	30/06/2018	present; Count [1]					*				*	*		amphibian
Bufo bufo	Common Toad		ST31224070	09/03/2017	09/03/2017	present; Count [4]					*				*	*		amphibian
Lissotriton vulgaris	Smooth Newt		ST31224072	09/03/2017	09/03/2017	present; Count [12]											*	amphibian
Arvicola amphibius	European Water Vole	Bridgwater	ST312407	30/06/2018	30/06/2018	present; Count [1]			*	*	*				*	*	*	terrestrial mammal
Bufo bufo	Common Toad		ST31234071	24/04/2018	24/04/2018	present; Count [1]					*				*	*		amphibian
Lissotriton vulgaris	Smooth Newt		ST31224073	23/03/2017	23/03/2017	present; Count [6]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234071	24/04/2018	24/04/2018	present; Count [101]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234072	01/05/2018	01/05/2018	present; Count [4]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234072	07/04/2017	07/04/2017	present; Count [24]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31224073	12/04/2018	12/04/2018	present; Count [7]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31234071	24/04/2018	24/04/2018	present; Count [18]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31224073	23/03/2017	23/03/2017	present; Count [6]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31214073	07/04/2017	07/04/2017	present; Count [4]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31254071	02/05/2017	02/05/2017	present; Count [3]	*			*	*				*	*	*	amphibian
Bufo bufo	Common Toad		ST31254072	05/04/2018	05/04/2018	present; Count [2]					*				*	*		amphibian
Triturus cristatus	Great Crested Newt		ST31254072	05/04/2018	05/04/2018	present; Count [18]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31254072	27/03/2018	27/03/2018	present; Count [1]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31254072	19/04/2017	19/04/2017	present; Count [2]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31254072	05/04/2018	05/04/2018	present; Count [35]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31244071	12/04/2018	12/04/2018	present; Count [105]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31244071	16/04/2018	16/04/2018	present; Count [52]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234068	19/04/2017	19/04/2017	present; Count [1]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234068	16/04/2018	16/04/2018	present; Count [161]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234069	12/04/2018	12/04/2018	present; Count [57]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31234069	05/04/2018	05/04/2018	present; Count [30]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31234069	12/04/2018	12/04/2018	present; Count [42]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31244069	01/05/2018	01/05/2018	present; Count [36]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31244069	27/03/2018	27/03/2018	present; Count [20]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31244069	01/05/2018	01/05/2018	present; Count [1]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31244069	27/03/2018	27/03/2018	present; Count [7]	*			*	*				*	*	*	amphibian
Triturus cristatus	Great Crested Newt		ST31234068	16/04/2018	16/04/2018	present; Count [34]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234069	05/04/2018	05/04/2018	present; Count [138]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31234068	19/04/2017	19/04/2017	present; Count [5]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31234068	02/05/2017	02/05/2017	present; Count [1]											*	amphibian
Bufo bufo	Common Toad	Land off A38 Bristol Road, Dunball	ST31234066	01/01/2017	31/12/2017	Adult; Count [>262]; juvenile; Count [1]					*				*	*		amphibian
Lissotriton vulgaris	Smooth Newt		ST31224068	23/03/2017	23/03/2017	present; Count [3]											*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31214067	09/03/2017	09/03/2017	present; Count [28]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31224068	07/04/2017	07/04/2017	present; Count [25]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31224068	07/04/2017	07/04/2017	present; Count [9]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31224068	24/04/2018	24/04/2018	present; Count [9]	*			*	*				*	*	*	amphibian
Lissotriton vulgaris	Smooth Newt		ST31224068	24/04/2018	24/04/2018	present; Count [172]											*	amphibian
Triturus cristatus	Great Crested Newt		ST31214067	09/03/2017	09/03/2017	present; Count [6]	*			*	*				*	*	*	amphibian
Bufo bufo	Common Toad		ST31214067	09/03/2017	09/03/2017	present; Count [11]					*				*	*		amphibian
Bufo bufo	Common Toad		ST31224068	23/03/2017	23/03/2017	present; Count [2]					*				*	*		amphibian
Lissotriton vulgaris	Smooth Newt	Land off A38 Bristol Road, Dunball	ST31244055	09/07/2018	09/07/2018	juvenile; Count [1]											*	amphibian
Anguis fragilis	Slow-worm	Land off A38 Bristol Road, Dunball	ST31204055	01/07/2017	01/07/2017	female; Count [1]; juvenile; Count [2]				*	*				*	*	*	reptile
Arvicola amphibius	European Water Vole	Land off A38 Bristol Road, Dunball	ST31164054	21/06/2018	21/06/2018	Adult; Count [1]			*	*	*				*	*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Land off A38 Bristol Road, Dunball	ST31244055	09/07/2018	09/07/2018	subadult; Count [1]; female; Count [5]	*			*	*				*	*	*	amphibian
Lutra lutra	European Otter	Dunball lrd, KSDr	ST311407	14/04/2012	14/04/2012	Droppings; Count [3R]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball sluice, KSDr	ST310407	14/04/2012	14/04/2012	Droppings; Count [1F]; Tracks; Count [Min.1]	*			*	*				*	*	*	terrestrial mammal

Lutra lutra	European Otter	Dunball Sluice	ST310407	12/09/2003	12/09/2003	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	09/05/2020	09/05/2020	Droppings; Count [2T]	*			*	*				*	*	*	terrestrial mammal
Beta vulgaris subsp. maritima	Sea Beet	Dunball Wharf	ST310408	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Lutra lutra	European Otter	K S Drain, Dunball	ST310408	15/07/2002	15/07/2002	Tracks; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	26/10/2019	26/10/2019	Droppings; Count [2R]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	25/12/2019	25/12/2019	Droppings; Count [2T]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Wharf,Dunball,Kings Sedgemoor,River Parrett	ST310408	31/05/2020	31/05/2020	Droppings; Count [2T]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Dunball Sluice, King's Sedgemoor Drain	ST310408	11/04/2003	11/04/2003	Tracks; Count [1]	*			*	*				*	*	*	terrestrial mammal
Valerianella rimosa	Broad-fruited Cornsalad	Puriton, Downend	ST307408	01/01/1985	31/12/1995				*		*				*	*	*	flowering plant
Lutra lutra	European Otter	Dunball, A38 bridge	ST311408	17/08/1978	18/08/1978	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Aricia agestis	Brown Argus	Puriton Levels	ST327422	08/08/1995	08/08/1995	Adult; Count [1]											*	insect - butterfly
Aricia agestis	Brown Argus	Puriton Ash Ground	ST327422	08/08/1995	08/08/1995	Adult; Count [1]											*	insect - butterfly
Aricia agestis	Brown Argus	Puriton Ash Ground	ST327422	01/01/1800	31/12/1992												*	insect - butterfly
Aricia agestis	Brown Argus	Puriton Ash Ground	ST327422	08/08/1995	08/08/1995	adult; Count [1]											*	insect - butterfly
Inula conyzae	Ploughman's-spikenard	Puriton Ash Ground	ST327422	08/08/1995	08/08/1995	present; Count [rare]											*	flowering plant
Myosotis ramosissima	Early Forget-me-not	Puriton Ash Ground	ST327422	08/08/1995	08/08/1995	present; Count [rare]											*	flowering plant
Reseda lutea	Wild Mignonette	Puriton Ash Ground	ST327422	08/08/1995	08/08/1995	present; Count [rare]											*	flowering plant
Sympetrum sanguineum	Ruddy Sympetrum		ST317427	25/08/1983	25/08/1983												*	insect - dragonfly (Odonata)
Aeshna mixta	Scarce Hawker		ST318428	17/09/1982	17/09/1982												*	insect - dragonfly (Odonata)
Aeshna mixta	Scarce Hawker		ST317427	25/08/1983	25/08/1983												*	insect - dragonfly (Odonata)
Carex acutiformis	Lesser Pond-sedge	Puriton Meadows &	ST327427	08/08/1995	08/08/1995	present; Count [occasional]											*	flowering plant
Anacamptis pyramidalis	Pyramidal Orchid	Puriton Meadows &	ST327427	08/08/1995	08/08/1995	present; Count [occasional]											*	flowering plant
Sympetrum sanguineum	Ruddy Sympetrum	Old gravel pit N of Puriton	ST317427	25/08/1983	25/08/1983												*	insect - dragonfly (Odonata)
Rhinanthus minor	Yellow-rattle	Puriton Meadows &	ST327427	01/01/1800	31/12/1992												*	flowering plant
Ophioglossum vulgatum	Adder's-tongue	Puriton Meadows &	ST327427	01/01/1800	31/12/1992											*	*	fern
Satyrium w-album	White-letter Hairstreak	Puriton Wood	ST328415	01/01/1992	31/12/1992	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Mustela putorius	Polecat	M5 junct	ST315416	19/08/2012	19/08/2012	Adult; Count [1]					*				*	*		terrestrial mammal
Falco tinnunculus	Kestrel	M5 near Puriton	ST316418	02/01/2014	02/01/2014	present; Count [1]	*						*				*	bird
Falco tinnunculus	Kestrel	Puriton	ST325415	02/01/2014	02/01/2014	Count [1]	*						*				*	bird
Erinaceus europaeus	West European Hedgehog		ST322416	01/01/2015	31/12/2015	present; Count [1]			*		*				*	*		terrestrial mammal
Arvicola amphibius	European Water Vole	Rhyne adjacent to Rye, Puriton	ST323418	21/04/2005	21/04/2005	present; Count [1]			*	*	*				*	*	*	terrestrial mammal
Meles meles	Eurasian Badger	Junction of M5 Northbound	ST316415	28/03/1998	28/03/1998	dead; Count [1]				*							*	terrestrial mammal
Lathyrus nissolia	Grass Vetchling	Dunball	ST314415	01/01/1985	31/12/1995												*	flowering plant
Cygnus olor	Mute Swan	Mobile-ST3141	ST315417	21/09/2014	21/09/2014	present; Count [2]	*						*					bird
Hordeum marinum	Sea Barley	North Somerset / Down End, nr Puriton	ST315415	17/08/2015	17/08/2015	Fruiting; Count [+Flowering /]			*		*				*	*	*	flowering plant
Podiceps cristatus	Great Crested Grebe	Old Clay Pit, Puriton	ST318429	08/05/1989	08/05/1989												*	bird
Bucephala clangula	Goldeneye	Old Clay Pit, Puriton	ST318429	01/01/1985	31/12/1985		*			*			*				*	bird
Mergus serrator	Red-breasted Merganser	Old Clay Pit, Puriton	ST318429	01/01/1973	31/12/1973		*											bird
Perdix perdix	Grey Partridge	Old Clay Pit, Puriton	ST318429	01/01/1975	31/12/1975						*			*	*	*	*	bird
Cettia cetti	Cetti's Warbler	Old Clay Pit, Puriton	ST318429	01/01/1985	31/12/1985					*							*	bird
Larus argentatus	Herring Gull	Old Clay Pit, Puriton	ST318429	01/01/1973	31/12/1973								*				*	bird
Gallinago gallinago	Snipe	Old Clay Pit, Puriton	ST318429	01/01/1900	31/12/1973		*						*				*	bird
Anas crecca	Teal	Old Clay Pit, Puriton	ST318429	01/01/1973	31/12/1973		*						*				*	bird
Bucephala clangula	Goldeneye	Old Clay Pit, Puriton	ST318429	01/01/1900	31/12/1973		*			*			*				*	bird
Saxicola rubicola	Stonechat	Old Clay Pit, Puriton	ST318429	01/01/1900	31/12/1973		*										*	bird
Lanius excubitor	Great Grey Shrike	Old Clay Pit, Puriton	ST318429	01/01/1900	31/12/1973		*										*	bird
Phylloscopus collybita	Chiffchaff	Old Clay Pit, Puriton	ST318429	01/01/1973	31/12/1973											*		bird
Larus fuscus subsp. graellsii	British Lesser Black-Backed Gull	Old Clay Pit, Puriton	ST318429	01/01/1973	31/12/1973								*				*	bird
Aeshna mixta	Scarce Hawker		ST318428	28/09/1981	28/09/1981												*	insect - dragonfly (Odonata)
Lutra lutra	European Otter	M5 Blackditch, Huntspill, BRUE	ST318425	18/06/2002	18/06/2002	Male; Count [dead]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	River Huntspill, M5/Black Ditch	ST318425	18/06/2002	18/06/2002	male; Count [1]; dead; Count [1]	*			*	*				*	*	*	terrestrial mammal
Sympetrum striolatum	Common Darter		ST317427	25/08/1983	25/08/1983				*									insect - dragonfly (Odonata)
Arvicola amphibius	European Water Vole		ST3168842272	01/05/2015	01/05/2015	Count [1]			*	*	*				*	*	*	terrestrial mammal
Phylloscopus collybita	Chiffchaff	Batch Road Fields	ST318420	16/05/1995	16/05/1995											*		bird
Ranunculus trichophyllus subsp. trichophyllus	Thread-Leaved Water-Crowfoot	Batch Road Fields	ST318420	16/05/1995	16/05/1995												*	flowering plant
Ranunculus baudotii	Brackish Water-crowfoot	Batch Road Fields	ST318420	16/05/1995	16/05/1995												*	flowering plant
Arvicola amphibius	European Water Vole	Walpole Rhyne	ST3148642447	08/04/2014	08/04/2014				*	*	*				*	*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt		ST3187641980	01/05/2015	01/05/2015	Count [1]	*			*	*				*	*	*	amphibian
Arvicola amphibius	European Water Vole	Walpole Rhyne	ST3146442406	08/04/2014	08/04/2014				*	*	*				*	*	*	terrestrial mammal
Carex hostiana	Tawny Sedge	Batch Road Fields	ST318420	05/05/1989	05/05/1989	present; Count [rare]											*	flowering plant
Rhinolophus ferrumequinum	Greater Horseshoe Bat	ROF Puriton	ST330426	10/05/2017	10/05/2017	Count [1]	*			*	*				*	*	*	terrestrial mammal
Barbastella barbastellus	Western Barbastelle	ROF Puriton	ST330426	10/05/2017	10/05/2017	Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Plecotus auritus	Brown Long-eared Bat	ROF Puriton	ST330426	11/05/2017	11/05/2017	Count [1]	*			*	*				*	*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	New Road, East Huntspill	ST327426	22/05/2016	22/05/2016	Count [1]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pygmaeus	Soprano Pipistrelle	New Road, East Huntspill	ST327426	22/05/2016	22/05/2016	Count [1]	*			*	*				*	*	*	terrestrial mammal
Pipistrellus pipistrellus	Common Pipistrelle	New Road, East Huntspill	ST327426	22/05/2016	22/05/2016	Count [1]	*			*						*		terrestrial mammal
Sympetrum sanguineum	Ruddy Sympetrum	Walpole Drove Tip	ST314431	01/01/1800	31/12/1986												*	insect - dragonfly (Odonata)
Cettia cetti	Cetti's Warbler	Puriton	ST322437	18/04/2008	16/06/2008	Male; Count [1]				*							*	bird
Alauda arvensis	Skylark	Puriton	ST324438	20/05/2008	16/06/2008	Male; Count [1]					*			*		*	*	bird
Lutra lutra	European Otter	Huntspill R.	ST327441	14/12/1977	14/12/1977	droppings; Count [several]	*			*	*				*	*	*	terrestrial mammal
Meles meles	Eurasian Badger	Puriton	ST321435	10/07/2008	10/07/2008	Tracks; Count [Min.1]				*							*	terrestrial mammal
Lutra lutra	European Otter	HUNTSPILL RAILWAY BRIDGE (BRUE)	ST318444	05/04/1998	05/04/1998	droppings; Count [2]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Bridgwater Bay NNR / Huntspill Railway bridge	ST319445	31/01/2003	31/01/2003	droppings; Count [6]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Puriton Road Bridge	ST316444	29/12/1972	29/12/1972	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST316444	17/02/1973	17/02/1973	droppings; Count [1]; Tracks; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	RAILWAY BRIDGE, HUNTSPILL (BRUE)	ST317445	01/04/1999	01/04/1999	droppings; Count [14]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Huntspill River	ST317444	07/02/1992	07/02/1992	present; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	SIDE LANE, HUNTSPILL (BRUE)	ST316445	01/04/1999	01/04/1999	droppings; Count [2]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	Bridgwater Bay NNR / Huntspill Road bridge	ST316445	31/01/2003	31/01/2003	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	HUNTSPILL RAILWAY BRIDGE, HUNTSPILL(BRUE)	ST318445	14/06/1998	14/06/1998	droppings; Count [3]	*			*	*				*	*	*	terrestrial mammal
Lutra lutra	European Otter	huntspill railway br	ST318444	12/07/1998	12/07/1998	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Helochares lividus	Helochares lividus	Pawlett Mead Drove Fields / Pawlett Level	ST317435	01/08/1983	31/08/1983	present; Count [1]											*	insect - beetle (Coleoptera)
Ceratophyllum demersum	Rigid Hornwort	Black Ditch Bridge Ponds	ST317437	06/10/1995	06/10/1995												*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Black Ditch Bridge Ponds	ST317437	06/10/1995	06/10/1995				*							*	*	flowering plant

Cettia cetti	Cetti's Warbler	Black Ditch Bridge Ponds	ST317436	01/04/1992	30/04/1992	singing/mating calls; Count [1]				*							*	bird
Beris clavipes	Scarce Orange Legionnaire	Pawlett Mead Drove Fields	ST316434	01/09/1999	31/07/2000	present; Count [1]											*	insect - true fly (Diptera)
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST316444	25/05/1975	25/05/1975	droppings; Count [1]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST315444	06/12/1977	06/12/1977	droppings; Count [3]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST316444	19/10/1974	19/10/1974	Tracks; Count [1]; droppings; Count [10]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Puriton Road Bridge	ST316444	14/07/1972	14/07/1972	droppings; Count [3]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Puriton Road Bridge	ST316444	12/11/1972	12/11/1972	droppings; Count [3]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST316444	24/03/1973	24/03/1973	droppings; Count [1]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST316444	28/04/1973	28/04/1973	droppings; Count [1]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Puriton Road Bridge	ST316444	20/02/1972	20/02/1972	droppings; Count [6]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST316444	14/11/1982	14/11/1982	droppings; Count [1]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST315444	14/12/1977	14/12/1977	Tracks; Count [1]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Seven Stones, Huntspill R.	ST316444	10/12/1980	10/12/1980	droppings; Count [1]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	Puriton Road Bridge	ST316444	03/12/1972	03/12/1972	droppings; Count [3]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter	R. Huntspill, Seven Stones	ST315444	10/12/1980	10/12/1980	droppings; Count [1]	*			*	*					*	*	terrestrial mammal
Peltodytes caesus	Peltodytes caesus	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999												*	insect - beetle (Coleoptera)
Epistrophe diaphana	Epistrophe diaphana	Pawlett Mead Drove Fields	ST315435	01/09/1999	31/07/2000	present; Count [1]											*	insect - true fly (Diptera)
Hydaticus transversalis	Hydaticus transversalis	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000											*	*	insect - beetle (Coleoptera)
Anacaena bipustulata	Anacaena bipustulata	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999												*	insect - beetle (Coleoptera)
Helochares lividus	Helochares lividus	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999												*	insect - beetle (Coleoptera)
Hydaticus transversalis	Hydaticus transversalis	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999											*	*	insect - beetle (Coleoptera)
Helochares lividus	Helochares lividus	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000												*	insect - beetle (Coleoptera)
Limnebius nitidus	Limnebius nitidus	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999												*	insect - beetle (Coleoptera)
Hydrophilus piceus	Great Silver Water Beetle	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000				*							*	*	insect - beetle (Coleoptera)
Hydraena testacea	Hydraena testacea	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000												*	insect - beetle (Coleoptera)
Hydraena testacea	Hydraena testacea	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999												*	insect - beetle (Coleoptera)
Peltodytes caesus	Peltodytes caesus	Pawlett Mead Drove Fields	ST315435	01/07/2000	31/07/2000												*	insect - beetle (Coleoptera)
Hydrophilus piceus	Great Silver Water Beetle	Pawlett Mead Drove Fields	ST315435	01/10/1999	31/10/1999				*							*	*	insect - beetle (Coleoptera)
Cantharis fusca	Cantharis fusca	Pawlett Mead Drove Fields	ST315435	01/09/1999	31/07/2000	present; Count [1]										*	*	insect - beetle (Coleoptera)
Ophioglossum vulgatum	Adder's-tongue	Pawlett Mead Drove Fields	ST315435	01/06/2000	30/06/2000											*	*	fern
Scirtes orbicularis	Scirtes orbicularis	Chilton Moor	ST31374419	01/01/1990	31/12/1990	present; Count [1]											*	insect - beetle (Coleoptera)
Lathyrus nissolia	Grass Vetchling	Huntspill	ST314443	01/01/1985	31/12/1995												*	flowering plant
Epistrophe diaphana	Epistrophe diaphana	Pawlett Mead Drove Fields	ST314433	01/09/1999	31/07/2000	present; Count [1]											*	insect - true fly (Diptera)
Scirtes orbicularis	Scirtes orbicularis	Catcott Heath	ST31404415	01/01/1990	31/12/1990	present; Count [1]											*	insect - beetle (Coleoptera)
Lutra lutra	European Otter	Pawlett Mead Drove Fields	ST313438	01/06/1999	30/06/1999	droppings; Count [1]	*			*	*					*	*	terrestrial mammal
Meles meles	Eurasian Badger	Huntspill Levels	ST309441	22/11/2002	22/11/2002					*							*	terrestrial mammal
Odontomyia ornata	Ornate Brigadier	Pawlett Mead Drove Fields	ST311438	01/09/1999	31/07/2000	present; Count [1]										*	*	insect - true fly (Diptera)
Larus melanocephalus	Mediterranean Gull	West Huntspill	ST305445	01/05/2004	15/05/2004	present; Count [1]	*	*		*			*			*	*	bird
Prunella modularis	Dunnock	West Huntspill	ST305445	11/01/2015	11/01/2015	Count [1]	*						*				*	bird
Passer domesticus	House Sparrow	West Huntspill	ST305445	11/01/2015	11/01/2015	Count [10]					*			*	*	*		bird
Carduelis carduelis	Goldfinch	West Huntspill	ST305445	11/01/2015	11/01/2015	Count [1]	*										*	bird
Tringa ochropus	Green Sandpiper	West Huntspill	ST305445	01/12/1991	31/12/1991	wintering; Count [1]	*			*			*				*	bird
Ardea cinerea	Grey Heron	West Huntspill Heronry	ST305445	01/06/2004	31/08/2004	nest; Count [1]; proved breeding; Count [2]											*	bird
Hirundo rustica	Swallow	West Huntspill	ST305445	31/10/2015	31/10/2015	Count [2]	*										*	bird
Ardea cinerea	Grey Heron	West Huntspill	ST305445	01/03/1999	31/05/1999												*	bird
Tringa ochropus	Green Sandpiper	West Huntspill & nearby	ST305445	01/12/1992	31/12/1992	wintering; Count [1]	*			*			*				*	bird
Erithacus rubecula	Robin	West Huntspill	ST305445	11/01/2015	11/01/2015	Count [1]	*											bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST305445	11/01/2015	11/01/2015	Count [1]	*											bird
Ardea cinerea	Grey Heron	West Huntspill	ST305445	01/06/2003	31/08/2003	proved breeding; Count [2]											*	bird
Ardea cinerea	Grey Heron	West Huntspill Churchyard	ST305445	01/03/2000	31/05/2000	nest; Count [1]											*	bird
Larus melanocephalus	Mediterranean Gull	West Huntspill	ST305445	23/12/1991	23/12/1991	1st year plumage; Count [1]	*	*		*			*			*	*	bird
Ardea cinerea	Grey Heron	West Huntspill	ST305445	01/04/2014	01/04/2014	Count [4]											*	bird
Buteo buteo	Buzzard	West Huntspill	ST305445	01/01/2014	01/01/2014	Count [1]	*											bird
Ardea cinerea	Grey Heron	West Huntspill	ST305445	01/03/1998	31/05/1998	nest; Count [2]											*	bird
Arvicola amphibius	European Water Vole	Huntspill Levels	ST304441	22/11/2002	22/11/2002	latrine; Count [1]; Burrow; Count [5]			*	*	*					*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Pond South of Bannock Drove.	ST31284206	15/04/2014	18/05/2014	Adult Female; Count [3]	*			*	*					*	*	amphibian
Arvicola amphibius	European Water Vole	Walpole Rhyne	ST3145042383	08/04/2014	08/04/2014				*	*	*					*	*	terrestrial mammal
Triturus cristatus	Great Crested Newt	Pond South of Bannock Drove.	ST31284206	15/04/2014	18/05/2014	Adult Male; Count [9]	*			*	*					*	*	amphibian
Triturus cristatus	Great Crested Newt	Pond North of Pawlett Road.	ST31054211	15/04/2014	18/05/2014	Adult Male; Count [1]	*			*	*					*	*	amphibian
Ononis spinosa	Spiny Restharrow	North Somerset / Pawlett (E)	ST30534236	23/08/2014	23/08/2014	Count [1]											*	flowering plant
Triturus cristatus	Great Crested Newt	Pond North of Pawlett Road.	ST31054211	15/04/2014	18/05/2014	Adult Female; Count [1]	*			*	*					*	*	amphibian
Triturus cristatus	Great Crested Newt	Pond South of Bannock Drove.	ST31434219	15/04/2014	18/05/2014	Adult Female; Count [8]	*			*	*					*	*	amphibian
Triturus cristatus	Great Crested Newt	Pond South of Bannock Drove.	ST31434219	15/04/2014	18/05/2014	Adult Male; Count [12]	*			*	*					*	*	amphibian
Triturus cristatus	Great Crested Newt	Pond at Junction A39/Puriton Road, Pawlett.	ST30494230	01/04/2013	01/04/2013	Count [6]	*			*	*					*	*	amphibian
Rhinolophus hipposideros	Lesser Horseshoe Bat	Starsland Clyce	ST304406	21/09/2015	21/09/2015	Count [1]	*			*	*					*	*	terrestrial mammal
Falco tinnunculus	Kestrel	Walpole	ST307416	17/10/2015	17/10/2015	Count [1]	*						*				*	bird
Lutra lutra	European Otter	Dunball	ST310418	31/01/2003	31/01/2003	Tracks; Count [1]	*			*	*					*	*	terrestrial mammal
Lutra lutra	European Otter		ST3085141283	29/09/2015	29/09/2015	Count [1]	*			*	*					*	*	terrestrial mammal
Nyctalus noctula	Noctule Bat	Adjacent to A38 and north of Dunball Roundabout, Puriton	ST310412	21/05/2018	21/05/2018	Count [1]	*			*	*					*	*	terrestrial mammal
Falco tinnunculus	Kestrel	Walpole	ST307416	27/02/2015	27/02/2015	Count [1]	*						*				*	bird
Pipistrellus pipistrellus	Common Pipistrelle	Adjacent to A38 and north of Dunball Roundabout, Puriton	ST310412	21/05/2018	21/05/2018	Count [1]	*			*						*		terrestrial mammal
Barbastella barbastellus	Western Barbastelle	Starsland Clyce	ST304406	21/09/2015	21/09/2015	Count [1]	*		*	*	*					*	*	terrestrial mammal
Barbastella barbastellus	Western Barbastelle	Starsland Clyce	ST304406	21/09/2015	21/09/2015	Count [1]	*		*	*	*					*	*	terrestrial mammal
Geranium pusillum	Small-flowered Crane's-bill	Dunball	ST305407	01/01/1985	31/12/1995											*	*	flowering plant
Larus argentatus	Herring Gull	Walpole	ST307416	05/02/2015	05/02/2015	Count [2000]								*			*	bird
Larus argentatus	Herring Gull	Walpole	ST307416	20/01/2015	20/01/2015	Count [2000]								*			*	bird
Ardea cinerea	Grey Heron	Puriton Rhynes	ST305442	28/07/2015	28/07/2015												*	bird
Falco tinnunculus	Kestrel	West Huntspill	ST305440	24/09/2002	24/09/2002	adult; Count [2]	*						*				*	bird
Arvicola amphibius	European Water Vole	Corner of Old Pawlett Road, Henstspill	ST3046444284	28/03/2011	28/03/2011	Individual; Count [1]			*	*	*					*	*	terrestrial mammal
Arvicola amphibius	European Water Vole	West Huntspill	ST305440	24/09/2002	24/09/2002	Individual; Count [1]; latrine; Count [3]; Burrow; Count [4]			*	*	*					*	*	terrestrial mammal
Orthetrum cancellatum	Black-tailed Skimmer	Puriton Rhynes	ST305442	28/07/2015	28/07/2015												*	insect - dragonfly (Odonata)
Volucella zonaria	Hornet Mimic Hoverfly	Puriton Rhynes	ST305442	28/07/2015	28/07/2015												*	insect - true fly (Diptera)
Lemna trisulca	Ivy-leaved Duckweed	Puriton Rhynes	ST305442	28/07/2015	28/07/2015											*		flowering plant
Brassica nigra	Black Mustard	Puriton Rhynes	ST305442	28/07/2015	28/07/2015											*		flowering plant

Alopecurus bulbosus	Bulbous Foxtail	Dunball	ST304407	01/01/1985	31/12/1995											*		flowering plant
Alopecurus bulbosus	Bulbous Foxtail	Dunball	ST304407	02/06/1991	02/06/1991	present; Count [+]										*		flowering plant
Alopecurus bulbosus	Bulbous Foxtail	Dunball Wharf	ST305408	18/10/2009	18/10/2009	Count [+]										*		flowering plant
Rhinolophus hipposideros	Lesser Horseshoe Bat	Starsland Clyce	ST304406	21/09/2015	21/09/2015	Count [1]	*			*	*				*	*	*	terrestrial mammal

High resolution records found within search area.
Low resolution grid refs indicate confidential species records, refer to guidance n

Low resolution records found within search a

Scientific	Common	Site/Location	Grid	Start_Date	End_Date	Abundance	EU Protected	EU Priority	Red Listed	WACA 1981	NERC Act 2006	Nationally Scarce	Amber Birds	Red Birds	BAP2007	LBAP2009	County Notable	Taxon Group
Rumex palustris	Marsh Dock		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34S	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Carduus tenuiflorus	Slender Thistle		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Callitriche obtusangula	Blunt-fruited Water-starwort		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Meles meles	Eurasian Badger		ST3644	18/03/1990	18/03/1990	badger sett; Count [1]				*							*	terrestrial mammal
Petroselinum segetum	Corn Parsley	North Somerset / Long Moor Drove	ST3644	27/02/2014	27/02/2014	Count [+]										*		flowering plant
Galium uliginosum	Fen Bedstraw		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	Riverbridge	ST34S	28/10/2004	28/10/2004	in flight; Count [1]; hunting; Count [1]; perching; Count [1]	*			*						*	*	bird
Eleocharis multicaulis	Many-stalked Spike-rush		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Mergus merganser	Goosander	Cripps River	ST34S	01/01/1998	01/01/1998	wintering; Count [1]	*									*	*	bird
Rumex hydrolapathum	Water Dock	North Somerset / Long Moor Drove	ST3644	27/02/2014	27/02/2014	Count [+]											*	flowering plant
Coenagrion pulchellum	Variable Damselfly		ST3644	31/12/1943	31/12/1943				*							*	*	insect - dragonfly (Odonata)
Berula erecta	Lesser Water-parsnip		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Meles meles	Eurasian Badger		ST3644	01/01/1995	31/12/1995	Evidence of badger sett [subsidiary]				*							*	terrestrial mammal
Carex disticha	Brown Sedge		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Veronica anagallis-aquatica	Blue Water-Speedwell		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	Mark Moor, Somerset	ST34S	08/02/2013	08/02/2013	Adult; Count [1]	*			*						*	*	bird
Aeshna mixta	Scarce Hawker		ST3644	08/07/1936	08/07/1936												*	insect - dragonfly (Odonata)
Sagittaria sagittifolia	Arrowhead		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Spergula arvensis	Corn Spurrey		ST34S	01/01/1989	31/12/1997	present; Count [+]			*							*		flowering plant
Veronica polita	Grey Field-speedwell		ST34S	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Callitriche platycarpa	Various-leaved Water-starwort		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Butomus umbellatus	Flowering-rush		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Cirsium dissectum	Meadow Thistle		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Oenanthe fistulosa	Tubular Water-dropwort		ST34S	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Malva neglecta	Dwarf Mallow		ST34S	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Alcedo atthis	Kingfisher	Cripps River	ST34S	22/08/2005	22/08/2005	Count [Present]	*	*		*			*			*	*	bird
Petroselinum segetum	Corn Parsley		ST34S	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Zannichellia palustris	Horned Pondweed		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Papaver dubium subsp. lecoqii	Yellow-juiced Poppy		ST34S	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Chenopodium bonus-henricus	Good-King-Henry		ST34S	01/01/1989	31/12/1997	present; Count [+]			*									flowering plant
Lysimachia vulgaris	Yellow Loosestrife		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Liberty Moor	ST34S	09/11/2014	09/11/2014	Count [1]	*	*		*			*			*	*	bird
Brassica nigra	Black Mustard		ST34S	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Scutellaria galericulata	Skullcap		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Cripps River Bridge, Long Drove, Nr. Burtle, Somerset	ST34S	22/08/2005	22/08/2005	present; Count [1]	*	*		*			*			*	*	bird
Ceratophyllum demersum	Rigid Hornwort		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Potamogeton crispus	Curled Pondweed		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ranunculus trichophyllus	Thread-leaved Water-crowfoot		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hottonia palustris	Water-violet		ST34S	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Thalictrum flavum	Common Meadow-rue		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant

Hydrocharis morsus-ranae	Frogbit		ST34S	01/01/1989	31/12/1997	present; Count [+]			*						*	*	flowering plant
Alcedo atthis	Kingfisher	R. Cripps	ST34S	01/01/1989	31/12/1990	in flight; Count [2]	*	*		*			*			*	*	bird
Hydrocotyle vulgaris	Marsh Pennywort		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carex hostiana	Tawny Sedge		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rumex hydrolapathum	Water Dock		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rhinanthus minor	Yellow-rattle		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ranunculus circinatus	Fan-leaved Water-crowfoot		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carex acutiformis	Lesser Pond-sedge		ST34S	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Falco peregrinus	Peregrine	Wells Sewage Treatment Works	ST34M	01/11/1992	31/12/1992	adult; Count [1]	*	*		*						*	*	bird
Tyto alba	Barn Owl	East Huntspill	ST34M	01/06/2002	31/08/2002	proved breeding; Count [1 pair]	*			*						*	*	bird
Ceratophyllum demersum	Rigid Hornwort		ST34M	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ranunculus trichophyllus	Thread-leaved Water-crowfoot		ST34M	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Sagittaria sagittifolia	Arrowhead		ST34M	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit		ST34M	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34M	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Sagina maritima	Sea Pearlwort	North Somerset / East Hutspill / Cote	ST3444	30/05/2014	30/05/2014	Count [+]											*	flowering plant
Anthriscus caucalis	Bur Chervil		ST34M	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Carex disticha	Brown Sedge	North Somerset / East Hutspill / Cote	ST3444	30/05/2014	30/05/2014	Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Bridgwater Bay SSSI / near East Huntspill	ST34M	30/01/1993	30/01/1993	present; Count [2]	*	*		*			*			*	*	bird
Milvus milvus	Red Kite	East Huntspill	ST34M	21/03/2014	21/03/2014	Count [1]	*	*		*						*	*	bird
Athene noctua	Little Owl	East Huntspill	ST34M	07/03/1988	07/03/1988	Count [1]	*									*	*	bird
Brassica nigra	Black Mustard		ST34M	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Phoenicurus ochruros	Black Redstart	Wells Sewage Treatment Works	ST34M	27/12/1992	03/01/1993	female; Count [1]	*			*				*			*	bird
Wolffia arrhiza	Rootless Duckweed		ST34M	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Mergus merganser	Goosander	West Huntspill to Gold Corner	ST34M	01/01/1993	31/03/1993	wintering; Count [21]	*									*	*	bird
Alcedo atthis	Kingfisher	Bridgwater Bay SSSI / Huntspill River	ST34M	04/07/1993	04/07/1993	present; Count [1]	*	*		*			*			*	*	bird
Rumex palustris	Marsh Dock		ST34M	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Wells Sewage Treatment Works	ST34M	01/01/1985	31/10/1993		*	*		*			*			*	*	bird
Mergus merganser	Goosander	Huntspill / Cripps Rivers	ST34M	01/02/2002	28/02/2002	wintering; Count [11]	*									*	*	bird
Sympetrum sanguineum	Ruddy Sympetrum		ST3544	08/07/1936	08/07/1936												*	insect - dragonfly (Odonata)
Alcedo atthis	Kingfisher		ST34M	01/01/1989	31/12/1990		*	*		*			*			*	*	bird
Mergus merganser	Goosander	Huntspill / Cripps Rivers	ST34M	01/12/2002	31/12/2002	wintering; Count [20]	*									*	*	bird
Veronica polita	Grey Field-speedwell		ST34M	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Scutellaria galericulata	Skullcap		ST34M	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Sympetrum striolatum	Common Darter		ST3444	25/08/2012	25/08/2012				*									insect - dragonfly (Odonata)
Sagina apetala subsp. apetala	Annual Pearlwort	North Somerset / East Hutspill / Cote	ST3444	30/05/2014	30/05/2014	Count [+]											*	flowering plant
Falco subbuteo	Hobby	Wells Sewage Treatment Works	ST34M	01/01/1985	31/10/1993	present; Count [rare]	*			*						*	*	bird
Sympetrum striolatum	Common Darter		ST3444	11/08/2012	11/08/2012				*									insect - dragonfly (Odonata)
Sympetrum striolatum	Common Darter		ST3444	18/08/2012	18/08/2012				*									insect - dragonfly (Odonata)
Athene noctua	Little Owl	Chilton Moor	ST34R	28/07/1986	28/07/1986	Count [2]	*									*	*	bird
Thalictrum flavum	Common Meadow-rue		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ceratophyllum demersum	Rigid Hornwort	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]											*	flowering plant
Thalictrum flavum	Common Meadow-rue	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]											*	flowering plant

Carex paniculata	Greater Tussock-sedge	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]											*	flowering plant
Sagittaria sagittifolia	Arrowhead	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit		ST34R	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Lysimachia vulgaris	Yellow Loosestrife	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	Chilton Moor between Gold Corner and Woolavington on rough meadows.	ST34R	03/02/2013	03/02/2013	Adult; Count [1]	*			*						*	*	bird
Alcedo atthis	Kingfisher	Chilton Moor Reserve	ST34R	14/12/1996	14/12/1996	present; Count [1]	*	*		*			*			*	*	bird
Hydrocharis morsus-ranae	Frogbit	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]			*							*	*	flowering plant
Mergus merganser	Goosander	Gold Corner, Huntspill River	ST34R	03/01/2014	03/01/2014	Count [7]	*									*	*	bird
Brassica nigra	Black Mustard	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]										*		flowering plant
Carex pallescens	Pale Sedge		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rhinanthus minor	Yellow-rattle		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Valeriana dioica	Marsh Valerian		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hottonia palustris	Water-violet		ST34R	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Torilis nodosa	Knotted Hedge-parsley		ST34R	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Rumex hydrolapathum	Water Dock	Gold Corner	ST3643	11/07/2003	11/07/2003	Count [+]											*	flowering plant
Lysimachia vulgaris	Yellow Loosestrife		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rumex hydrolapathum	Water Dock		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Mergus merganser	Goosander	Gold Corner, Huntspill River	ST34R	02/02/2014	02/02/2014	Count [1]	*									*	*	bird
Hippuris vulgaris	Mare's-tail		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Falco columbarius	Merlin	Chilton Moor Reserve	ST34R	01/09/1994	30/11/1994	present; Count [1]	*	*		*				*		*	*	bird
Athene noctua	Little Owl		ST34R	25/07/1990	25/07/1990		*									*	*	bird
Falco columbarius	Merlin	Chilton Moor Reserve	ST34R	01/12/1994	28/02/1995	present; Count [1]	*	*		*				*		*	*	bird
Tyto alba	Barn Owl	Chilton Moor Reserve / Chilton Moors Reserve Field	ST34R	02/04/2005	02/04/2005	present; Count [1]	*			*						*	*	bird
Brassica nigra	Black Mustard		ST34R	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Wolffia arrhiza	Rootless Duckweed		ST34R	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Mergus merganser	Goosander	Chilton Moor Reserve	ST34R	11/01/1991	11/01/1991	wintering; Count [9]	*									*	*	bird
Alcedo atthis	Kingfisher	Chilton Moor Reserve	ST34R	26/11/1993	26/11/1993	present; Count [1]	*	*		*			*			*	*	bird
Carex rostrata	Bottle Sedge	Shaking Drove	ST34R	01/01/1985	31/12/1995												*	flowering plant
Mergus merganser	Goosander	Gold Corner, Huntspill River	ST34R	19/02/2014	19/02/2014	Count [3]	*									*	*	bird
Berula erecta	Lesser Water-parsnip		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carex disticha	Brown Sedge		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Baldellia ranunculoides	Lesser Water-plantain	Shaking Drove	ST34R	01/01/1985	31/12/1995				*							*	*	flowering plant
Carex viridula subsp. brachyrrhyncha	Long-stalked Yellow-sedge		ST34R	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Rorippa microphylla	Narrow-fruited Water-cress		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Asio flammeus	Short-eared Owl	Gold Corner Pumping Station	ST34R	23/01/2005	23/01/2005	in flight; Count [1]; hunting; Count [2]	*	*					*			*	*	bird
Triglochin palustre	Marsh Arrowgrass		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Serratula tinctoria	Saw-wort		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Callitriche obtusangula	Blunt-fruited Water-starwort		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Stellaria palustris	Marsh Stitchwort		ST34R	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Dactylorhiza praetermissa	Southern Marsh-orchid		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	Gold Corner	ST34R	01/06/1998	31/08/1998	carrying food; Count [1 pair]	*			*						*	*	bird
Scutellaria galericulata	Skullcap		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carex acutiformis	Lesser Pond-sedge		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant

Hydrocotyle vulgaris	Marsh Pennywort		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Cirsium dissectum	Meadow Thistle		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Chilton Moor Reserve	ST34R	01/01/1996	31/01/1996		*	*		*			*			*	*	bird
Tyto alba	Barn Owl	Chilton Moor, Field	ST34R	23/12/2005	23/12/2005	Adult; Count [1]	*			*						*	*	bird
Malva neglecta	Dwarf Mallow		ST34R	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Mergus merganser	Goosander	Chilton Moor Reserve	ST34R	24/01/1995	24/01/1995	wintering; Count [4]	*									*	*	bird
Asio otus	Long-eared Owl	Chilton Moor Reserve	ST34R	27/03/1990	27/03/1990	present; Count [1]	*									*	*	bird
Falco peregrinus	Peregrine	Chilton Moor Reserve	ST34R	18/03/1996	18/03/1996	male; Count [1]	*	*		*						*	*	bird
Ranunculus circinatus	Fan-leaved Water-crowfoot		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ceratophyllum demersum	Rigid Hornwort		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rumex maritimus	Golden Dock		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Oenanthe fistulosa	Tubular Water-dropwort		ST34R	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Carex hostiana	Tawny Sedge		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Milvus milvus	Red Kite	Ashcott	ST34R	07/06/2014	07/06/2014	present; Count [1]	*	*		*						*	*	bird
Asio flammeus	Short-eared Owl	Gold Corner	ST34R	01/01/2005	31/01/2005	male; Count [2]; female; Count [3]	*	*					*			*	*	bird
Baldellia ranunculoides	Lesser Water-plantain		ST34R	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Rumex palustris	Marsh Dock		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Potamogeton lucens	Shining Pondweed		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Sagittaria sagittifolia	Arrowhead		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34R	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Mergus merganser	Goosander	Gold Corner, Huntspill River	ST34R	22/02/2014	22/02/2014	Count [1]	*									*	*	bird
Mergus merganser	Goosander	Gold Corner, Huntspill River	ST34R	03/01/2015	03/01/2015	Count [3]	*									*	*	bird
Potamogeton pusillus	Lesser Pondweed		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carex rostrata	Bottle Sedge		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Scolopax rusticola	Woodcock	Chilton Moor Reserve	ST34R	13/02/1991	13/02/1991		*							*		*	*	bird
Hyacinthoides non-scripta	Bluebell		ST34R	01/01/1989	31/12/1997	present; Count [+]				*								flowering plant
Galium uliginosum	Fen Bedstraw		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Asio flammeus	Short-eared Owl		ST34R	14/12/1990	14/12/1990		*	*					*			*	*	bird
Athene noctua	Little Owl		ST34R	14/09/1990	14/09/1990		*									*	*	bird
Circus aeruginosus	Marsh Harrier	Chilton Moor Reserve	ST34R	30/06/1993	30/06/1993	present; Count [1]	*	*		*			*			*	*	bird
Scolopax rusticola	Woodcock	Chilton Moor Reserve	ST34R	13/02/1991	13/02/1991	present; Count [1]	*							*		*	*	bird
Falco columbarius	Merlin	Chilton Moor Reserve	ST34R	01/12/1991	29/02/1992	present; Count [1]	*	*		*				*		*	*	bird
Calidris alpina	Dunlin	Chilton Moor Reserve	ST34R	08/02/1992	11/02/1992	wintering; Count [26]	*						*				*	bird
Potamogeton crispus	Curled Pondweed		ST34R	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carex viridula subsp. brachyrrhyncha	Long-stalked Yellow-sedge	Shaking Drove	ST34R	01/01/1985	31/12/1995											*	*	flowering plant
Calidris alpina	Dunlin	Chilton Moor Reserve	ST34R	01/12/1990	28/02/1991	wintering; Count [5]	*						*				*	bird
Tyto alba	Barn Owl	Chilton Moor Reserve	ST34R	02/02/1996	02/02/1996		*			*						*	*	bird
Sagina apetala subsp. apetala	Annual Pearlwort	Gold Corner	ST3643	17/08/2016	17/08/2016	Count [+]											*	flowering plant
Egretta garzetta	Little Egret	Gold Corner, Huntspill River	ST34R	11/01/2014	11/01/2014	Count [1]	*	*								*	*	bird
Asio flammeus	Short-eared Owl	Chilton Moor Reserve	ST34R	26/03/1989	26/03/1989	present; Count [1]	*	*					*			*	*	bird
Mergus merganser	Goosander	Gold Corner, Huntspill River	ST34R	11/01/2014	11/01/2014	Count [5]	*									*	*	bird
Mergus merganser	Goosander	Chilton Moor Reserve	ST34R	24/01/1994	24/01/1994	wintering; Count [4]	*									*	*	bird
Asio flammeus	Short-eared Owl	Chilton Moor Reserve	ST34R	01/01/1985	31/12/1985		*	*					*			*	*	bird
Egretta garzetta	Little Egret	Gold Corner, Huntspill River	ST34R	22/02/2014	22/02/2014	Count [1]	*	*								*	*	bird
Falco peregrinus	Peregrine	Chilton Moor Reserve	ST34R	01/01/1994	31/12/1994	present; Count [1]	*	*		*						*	*	bird
Butomus umbellatus	Flowering-rush	Gold Corner	ST3643	17/08/2016	17/08/2016	Count [+]											*	flowering plant
Porzana porzana	Spotted Crake	Chilton Moor Reserve	ST34R	23/04/1993	30/04/1993	calling/vocalising; Count [1]	*	*		*			*			*	*	bird
Ceratophyllum demersum	Rigid Hornwort	Gold Corner	ST3643	17/08/2016	17/08/2016	Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Whitchey Drove, Cossington	ST3642	23/08/2016	23/08/2016	Count [+]			*							*	*	flowering plant

Hydrocharis morsus-ranae	Frogbit	Gold Corner	ST3643	17/08/2016	17/08/2016	Count [+]			*							*	*	flowering plant
Sagittaria sagittifolia	Arrowhead	Gold Corner	ST3643	17/08/2016	17/08/2016	Count [+]											*	flowering plant
Rumex hydrolapathum	Water Dock	Gold Corner	ST3643	23/08/2016	23/08/2016	Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Gold Corner	ST3643	11/07/2003	11/07/2003	Count [+]			*							*	*	flowering plant
Bufo bufo	Common Toad	Gold Corner	ST3643	13/03/2012	13/03/2012	present; Count [+]					*				*	*		amphibian
Brassica nigra	Black Mustard	Whitchey Drove, Cossington	ST3642	23/08/2016	23/08/2016	Count [+]										*		flowering plant
Brassica nigra	Black Mustard	Gold Corner	ST3643	17/08/2016	17/08/2016	Count [+]										*		flowering plant
Potentilla palustris	Marsh Cinquefoil	Gold Corner	ST3643	01/01/2012	31/12/2012	Count [+]											*	flowering plant
Berula erecta	Lesser Water-parsnip	Whitchey Drove, Cossington	ST3642	22/09/2012	22/09/2012	present; Count [+]											*	flowering plant
Asio otus	Long-eared Owl		ST34R	01/02/1990	28/02/1990		*									*	*	bird
Perdix perdix	Grey Partridge	Woolavington Moor	ST3542	16/07/1977	16/07/1977	Adult; Count [1]					*			*	*	*	*	bird
Podiceps cristatus	Great Crested Grebe	Woolavington Pit	ST3542	08/11/1988	08/11/1988	Adult; Count [1]											*	bird
Meles meles	Eurasian Badger		ST3641	19/03/1990	19/03/1990	badger sett; Count [1]				*							*	terrestrial mammal
Potamogeton crispus	Curled Pondweed	North Somerset / Woolavington / Chilpitts	ST3541	11/05/2014	11/05/2014	Count [+]											*	flowering plant
Lasiommata megera	Wall	The Manor ,Woolavington	ST3441	01/01/1994	31/12/1994	Adult; Count [1]			*		*				*	*		insect - butterfly
Pipistrellus pipistrellus	Pipistrelle		ST3441	15/07/1985	15/07/1985	Count [+]	*			*							*	terrestrial mammal
Aythya ferina	Pochard	Woolavington Pit	ST3542	08/11/1988	08/11/1988	Adult; Count [9]	*							*			*	bird
Helochares lividus	Helochares lividus	Woolavington	ST3441	01/01/1983	31/12/1983	present; Count [1]											*	insect - beetle (Coleoptera)
Spinus spinus	Siskin	Woolavington	ST3441	28/11/1985	28/11/1985	Count [1]	*											bird
Stenus canescens	Stenus canescens	Woolavington	ST3441	01/01/1983	31/12/1983	present; Count [1]											*	insect - beetle (Coleoptera)
Torilis nodosa	Knotted Hedge-parsley	North Somerset / Woolavington	ST3441	10/11/2015	10/11/2015	Count [+]										*		flowering plant
Haliplus heydeni	Haliplus heydeni	Woolavington	ST3441	01/04/1979	30/04/1979	present; Count [1]											*	insect - beetle (Coleoptera)
Vespertilionidae	Bats		ST3441	28/07/1985	28/07/1985	Count [+]	*		*	*	*				*	*	*	terrestrial mammal
Veronica polita	Grey Field-speedwell	North Somerset / Woolavington	ST3441	10/11/2015	10/11/2015	Count [+]										*		flowering plant
Mergus merganser	Goosander	Bridgwater Bay SSSI / Huntspill River	ST34L	01/12/2001	31/12/2001	wintering; Count [20]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	22/02/2015	22/02/2015	Count [4]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	30/12/2014	30/12/2014	Count [15]	*									*	*	bird
Lasiommata megera	Wall	Woolavington area	ST3443	01/01/1994	31/12/1994	Adult; Count [1]			*		*				*	*		insect - butterfly
Circus aeruginosus	Marsh Harrier	Bridgwater Bay SSSI / Huntspill R. mouth	ST34L	21/04/1999	21/04/1999	immature; Count [1]	*	*		*			*			*	*	bird
Brassica nigra	Black Mustard		ST34L	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Mergus merganser	Goosander	Huntspill River	ST34L	25/12/2014	25/12/2014	Count [4]	*									*	*	bird
Carex disticha	Brown Sedge		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Althaea officinalis	Marsh-mallow	Huntspill Moor ?	ST3543	01/01/1800	31/12/1997												*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34L	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Ceratophyllum submersum	Soft Hornwort	Huntspill River ?	ST3543	01/01/1800	31/12/1997												*	flowering plant
Mergus merganser	Goosander	Gold Corner to Woolavington	ST34L	03/01/1994	11/03/1994	wintering; Count [10]	*									*	*	bird
Emberiza schoeniclus	Reed Bunting	s, Woolavington	ST3542	01/02/2006	31/03/2006	male; Count [2]	*				*		*		*	*	*	bird
Falco columbarius	Merlin	Huntspill River	ST34L	31/10/2014	31/10/2014	Count [1]	*	*		*				*		*	*	bird
Anthriscus caucalis	Bur Chervil		ST34L	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Petroselinum segetum	Corn Parsley	North Somerset / Woolavington Bridge	ST3443	12/03/2016	12/03/2016	vegetative; Count [+]										*		flowering plant
Alcedo atthis	Kingfisher	Huntspill River	ST34L	18/12/2014	18/12/2014	Count [1]	*	*		*			*			*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	02/02/2014	02/02/2014	Count [14]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	20/02/2014	20/02/2014	Count [6]	*									*	*	bird
Mergus merganser	Goosander	Bridgwater Bay SSSI / Huntspill River	ST34L	01/12/1997	31/12/1997	wintering; Count [28]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	13/02/2014	13/02/2014	Count [1]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	16/12/2014	16/12/2014	Count [13]	*									*	*	bird
Regulus ignicapilla	Firecrest	Huntspill River	ST34L	26/10/2003	26/10/2003	wintering; Count [1]	*			*						*	*	bird

Alcedo atthis	Kingfisher	Huntspill River	ST34L	01/06/2004	31/08/2004		*	*		*			*			*	*	bird
Brassica nigra	Black Mustard	North Somerset / Woolavington Bridge	ST3443	12/03/2016	12/03/2016	Count [+]										*		flowering plant
Mergus merganser	Goosander	Huntspill River	ST34L	03/01/2014	03/01/2014	Count [14]	*									*	*	bird
Veronica anagallis-aquatica	Blue Water-Speedwell		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Veronica polita	Grey Field-speedwell		ST34L	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Tadorna tadorna	Shelduck	Huntspill River mouth	ST34L	30/06/2000	30/06/2000	female; Count [1]; juvenile; Count [16]	*						*			*	*	bird
Polystichum setiferum	Soft Shield-fern		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	fern
Chloris chloris	Greenfinch	s, Woolavington	ST3542	01/02/2006	31/03/2006	present; Count [several]	*											bird
Alcedo atthis	Kingfisher	Huntspill River	ST34L	05/01/2015	05/01/2015	Count [2]	*	*		*			*			*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	01/01/2015	20/01/2015	Count [9]	*									*	*	bird
Mergus merganser	Goosander	Bridgwater Bay SSSI / Huntspilll River	ST34L	01/02/1996	29/02/1996	wintering; Count [25]	*									*	*	bird
Petroselinum segetum	Corn Parsley		ST34L	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Erysimum cheiranthoides	Treacle-mustard		ST34L	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Mergus merganser	Goosander	Huntspill River	ST34L	26/12/2015	26/12/2015	Count [4]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	04/02/2014	04/02/2014	Count [11]	*									*	*	bird
Mergus merganser	Goosander	Bridgwater Bay SSSI / Huntspill River	ST34L	01/01/1999	31/01/1999	wintering; Count [17]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	18/12/2014	18/12/2014	Count [20]	*									*	*	bird
Egretta garzetta	Little Egret	Huntspill River	ST34L	23/07/2015	23/07/2015	Count [21]	*	*								*	*	bird
Tringa ochropus	Green Sandpiper	Bridgwater Bay NNR / Huntspill R. near Woolavington	ST3443	26/12/1993	26/12/1993	present; Count [1]	*			*			*				*	bird
Upupa epops	Hoopoe	Borrow Pit, Puriton	ST34L	01/01/1972	31/12/1994		*			*							*	bird
Asio flammeus	Short-eared Owl	Huntspill River	ST34L	25/01/2004	25/01/2004	hunting; Count [1]	*	*					*			*	*	bird
Carduelis carduelis	Goldfinch	s, Woolavington	ST3542	01/02/2006	31/03/2006	present; Count [several]	*										*	bird
Pyrrhula pyrrhula	Bullfinch	s, Woolavington	ST3542	01/02/2006	31/03/2006	present; Count [several]							*			*	*	bird
Ceratophyllum demersum	Rigid Hornwort		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Mergus merganser	Goosander	Borrow Pit, Puriton	ST34L	01/01/1972	31/12/1994		*									*	*	bird
Brassica nigra	Black Mustard	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]										*		flowering plant
Berula erecta	Lesser Water-parsnip	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]											*	flowering plant
Scutellaria galericulata	Skullcap	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Bridgwater Bay SSSI / near Woolavington	ST34L	28/12/1993	28/12/1993	present; Count [1]	*	*		*			*			*	*	bird
Mergus merganser	Goosander	Bridgwater Bay SSSI / Huntspill River	ST34L	01/12/2000	31/12/2000	wintering; Count [17]	*									*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	28/12/1995	31/12/1995	wintering; Count [9]	*									*	*	bird
Panurus biarmicus	Bearded Tit	Borrow Pit, Puriton	ST34L	01/01/1972	31/12/1994		*			*						*	*	bird
Rumex hydrolapathum	Water Dock	Woolavington Bridge	ST3443	07/07/2017	07/07/2017	Count [+]											*	flowering plant
Berula erecta	Lesser Water-parsnip	Woolavington Bridge	ST3443	07/07/2017	07/07/2017	Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Huntspill River	ST34L	01/06/2003	31/08/2003	present; Count [1]	*	*		*			*			*	*	bird
Lutra lutra	European Otter		ST3443	03/11/1983	03/11/1983	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Mergus merganser	Goosander	Huntspill River	ST34L	15/02/2014	15/02/2014	Count [5]	*									*	*	bird
Alcedo atthis	Kingfisher	Huntspill River.	ST34L	02/08/1991	02/08/1991		*	*		*			*			*	*	bird
Ranunculus trichophyllus	Thread-leaved Water-crowfoot		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Woolavington Pit	ST34L	24/07/1985	24/07/1985	Count [1]	*	*		*			*			*	*	bird
Hydrocharis morsus-ranae	Frogbit		ST34L	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Saxicola rubetra	Whinchat	Huntspill River	ST34L	05/09/2014	05/09/2014	Count [1]	*							*		*	*	bird
Alcedo atthis	Kingfisher	Borrow Pit, Puriton	ST34L	01/01/1972	31/12/1994		*	*		*			*			*	*	bird
Recurvirostra avosetta	Avocet	Huntspill River mouth	ST34L	06/12/2000	06/12/2000	wintering; Count [2]	*	*		*			*			*	*	bird
Podiceps nigricollis	Black-necked Grebe	Bridgwater Bay SSSI / Huntspill River	ST34L	01/03/1997	02/09/1997	present; Count [1]	*			*			*				*	bird
Falco columbarius	Merlin	Huntspill River	ST34L	01/11/2014	01/11/2014	Count [2]	*	*		*				*		*	*	bird

Scutellaria galericulata	Skullcap		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rumex hydrolapathum	Water Dock	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	North Somerset / Woolavington Bridge	ST3443	12/03/2016	12/03/2016	Count [+]										*		flowering plant
Tadorna tadorna	Shelduck	Borrow Pit, Puriton	ST34L	01/01/1972	31/12/1994		*						*			*	*	bird
Asio flammeus	Short-eared Owl	Huntspill River	ST34L	13/12/2014	13/12/2014	Count [2]	*	*					*			*	*	bird
Anas querquedula	Garganey	Borrow Pit, Puriton	ST34L	01/01/1972	31/12/1994		*			*			*				*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	06/01/1995	06/01/1995	wintering; Count [12]	*									*	*	bird
Mergus merganser	Goosander	Bridgwater Bay SSSI / Huntspill River	ST34L	01/01/1999	31/01/1999	wintering; Count [23]	*									*	*	bird
Mergus merganser	Goosander	Bridgwater Bay SSSI / Huntspill River	ST34L	01/01/1998	31/01/1998	wintering; Count [25]	*									*	*	bird
Milvus milvus	Red Kite	Huntspill River	ST34L	17/04/2015	17/04/2015	Count [1]	*	*		*						*	*	bird
Anas clypeata	Shoveler	Woolavington Pit	ST3542	08/11/1988	08/11/1988	Adult; Count [18]	*						*				*	bird
Anas strepera	Gadwall	Woolavington Pit	ST3542	08/11/1988	08/11/1988	Adult; Count [16]	*						*				*	bird
Lemna trisulca	Ivy-leaved Duckweed	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]										*		flowering plant
Tadorna tadorna	Shelduck	Huntspill River	ST34L	17/07/2014	17/07/2014	Count [18]	*						*			*	*	bird
Ceratophyllum demersum	Rigid Hornwort	Huntspill Moor	ST3543	17/08/2016	17/08/2016	Count [+]											*	flowering plant
Butomus umbellatus	Flowering-rush	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]			*							*	*	flowering plant
Sagittaria sagittifolia	Arrowhead	Huntspill Moor	ST3543	23/08/2016	23/08/2016	Count [+]											*	flowering plant
Mergus merganser	Goosander	Huntspill River	ST34L	07/01/2014	07/01/2014	Count [9]	*									*	*	bird
Potamogeton crispus	Curled Pondweed		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rumex hydrolapathum	Water Dock		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	mile S.of Easr Huntspill	ST34L	24/09/1989	24/09/1989	Count [1]	*			*						*	*	bird
Mergus merganser	Goosander	Huntspill River	ST34L	05/01/2015	05/01/2015	Count [2]	*									*	*	bird
Scutellaria galericulata	Skullcap	Woolavington Bridge	ST3443	07/07/2017	07/07/2017	Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Huntspill River	ST34L	16/03/2015	16/03/2015	Count [1]	*	*		*			*			*	*	bird
Alcedo atthis	Kingfisher		ST34L	14/09/2016	14/09/2016	Count [1]	*	*		*			*			*	*	bird
Butomus umbellatus	Flowering-rush	Woolavington Bridge	ST3443	07/07/2017	07/07/2017	Count [+]											*	flowering plant
Calopteryx splendens	Banded Demoiselle		ST3443	08/06/1984	08/06/1984												*	insect - dragonfly (Odonata)
Ceratophyllum demersum	Rigid Hornwort	Woolavington Bridge	ST3443	07/07/2017	07/07/2017	Count [+]											*	flowering plant
Zannichellia palustris	Horned Pondweed		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	Huntspill River	ST34L	22/12/2003	22/12/2003	hunting; Count [1]; in flight; Count [2]	*			*						*	*	bird
Sagittaria sagittifolia	Arrowhead	Woolavington Bridge	ST3443	07/07/2017	07/07/2017	Count [+]											*	flowering plant
Mergus merganser	Goosander	Huntspill River	ST34L	05/03/2015	05/03/2015	Count [8]	*									*	*	bird
Alcedo atthis	Kingfisher	Woolavington Pit	ST34L	13/10/1985	27/10/1985	Juvenile; Count [1]	*	*		*			*			*	*	bird
Daphne laureola	Spurge-laurel		ST34L	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Woolavington Bridge	ST3443	07/07/2017	07/07/2017	Count [+]			*							*	*	flowering plant
Circus aeruginosus	Marsh Harrier	Bridgwater Bay SSSI / Huntspill R. mouth	ST34L	20/08/1999	20/08/1999	juvenile; Count [1]	*	*		*			*			*	*	bird
Tyto alba	Barn Owl	Huntspill River	ST34L	09/11/2003	09/11/2003	wintering; Count [2]	*			*						*	*	bird
Mergus merganser	Goosander	Chilton Moor Reserve / South Drain	ST34R	08/01/1993	08/01/1993	wintering; Count [6]	*									*	*	bird
Alcedo atthis	Kingfisher	Gold Corner, Huntspill River	ST34R	23/08/2014	23/08/2014	Count [2]	*	*		*			*			*	*	bird
Saxicola rubetra	Whinchat	Chilton Moor Reserve	ST34R	01/05/1988	31/05/1988		*							*		*	*	bird
Tyto alba	Barn Owl	Chilton Moor, Fields & B	ST34R	20/11/2008	20/11/2008	Adult; Count [1]	*			*						*	*	bird
Tyto alba	Barn Owl	Chilton Moor Reserve	ST34R	01/06/1991	31/08/1991	present; Count [1 pair]	*			*						*	*	bird
Alcedo atthis	Kingfisher	Chilton Moor Reserve	ST34R	01/07/1993	31/12/1993		*	*		*			*			*	*	bird
Tyto alba	Barn Owl	River Huntspill (Gold Corner pumping station)	ST34R	25/12/2004	25/12/2004	present; Count [1]	*			*						*	*	bird
Circus aeruginosus	Marsh Harrier	Chilton Moor Reserve	ST34R	24/04/1993	24/04/1993	male; Count [1]	*	*		*			*			*	*	bird
Falco peregrinus	Peregrine	Chilton Moor Reserve	ST34R	17/03/1996	17/03/1996	female; Count [1]	*	*		*						*	*	bird
Asio flammeus	Short-eared Owl	Chilton Moor Reserve	ST34R	01/01/1989	31/12/1989		*	*					*			*	*	bird

Alcedo atthis	Kingfisher	Gold Corner, Huntspill River	ST34R	27/08/2015	27/08/2015	Count [2]	*	*		*			*			*	*	bird
Athene noctua	Little Owl		ST34R	01/04/1990	30/04/1990		*									*	*	bird
Thalictrum flavum	Common Meadow-rue		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Sagittaria sagittifolia	Arrowhead	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996	Count [+]											*	flowering plant
Tyto alba	Barn Owl		ST34Q	01/02/1991	01/02/1991		*			*						*	*	bird
Milvus milvus	Red Kite	Chilton Polden	ST34Q	10/06/2015	10/06/2015	Count [1]	*	*		*						*	*	bird
Potamogeton crispus	Curled Pondweed		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Malva neglecta	Dwarf Mallow		ST34Q	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Rumex hydrolapathum	Water Dock		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Oenanthe fistulosa	Tubular Water-dropwort		ST34Q	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996											*		flowering plant
Hydrocharis morsus-ranae	Frogbit		ST34Q	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Hippuris vulgaris	Mare's-tail		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Athene noctua	Little Owl		ST34Q	14/09/1990	14/09/1990		*									*	*	bird
Brassica nigra	Black Mustard		ST34Q	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Wolffia arrhiza	Rootless Duckweed	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996				*							*	*	flowering plant
Hottonia palustris	Water-violet		ST34Q	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Asio otus	Long-eared Owl		ST34K	05/08/2017	05/08/2017	Count [1]	*									*	*	bird
Blackstonia perfoliata	Yellow-wort		ST34K	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Mergus merganser	Goosander	near Woolavington	ST34K	26/12/1993	26/12/1993	wintering; Count [20]	*									*	*	bird
Torilis nodosa	Knotted Hedge-parsley	North Somerset / Cossington	ST3540	11/05/2014	11/05/2014	Count [+]										*		flowering plant
Sagina maritima	Sea Pearlwort	North Somerset / Cossington	ST3540	11/05/2014	11/05/2014	Count [+]											*	flowering plant
Centaurium erythraea	Common Centaury		ST34K	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Dactylorhiza praetermissa	Southern Marsh-orchid		ST34K	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Dendrocopos minor	Lesser Spotted Woodpecker	Woolavington	ST34K	01/06/1997	31/08/1997		*							*		*	*	bird
Grus grus	Crane	Woolavington	ST34K	06/04/2015	06/04/2015	Count [4]	*	*					*					bird
Meles meles	Eurasian Badger	Bath Road Cossington	ST3440	20/07/2004	20/07/2004	Count [+]				*							*	terrestrial mammal
Papaver dubium subsp. lecoqii	Yellow-juiced Poppy		ST3540	16/08/1999	16/08/1999	Count [+]										*		flowering plant
Doros profuges	Phantom Hoverfly	Cossington	ST3540	15/06/1944	15/06/1944				*		*				*	*	*	insect - true fly (Diptera)
Vespertilionidae	Bats		ST3540	10/08/1990	10/08/1990	Count [+]	*		*	*	*				*	*	*	terrestrial mammal
Thalictrum minus	Lesser Meadow-rue	North Somerset / Cossington	ST3540	11/05/2014	11/05/2014	Count [+]											*	flowering plant
Sphecodes spinulosus	Spined Blood Bee	Cossington	ST3540	25/05/1945	25/05/1945	Count [1]										*	*	insect - hymenopteran
Osmia bicolor	Red-tailed Mason Bee	Cossington, Poldens-	ST3540	01/01/1953	31/12/1953	adult; Count [+]											*	insect - hymenopteran
Ophrys apifera	Bee Orchid		ST34K	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Daphne laureola	Spurge-laurel		ST34K	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ardea cinerea	Grey Heron	Cossington Park Garden	ST3540	01/01/1800	31/12/1918	proved breeding; Count [1]											*	bird
Pipistrellus	Pipistrelle Bat species	The Gables, Mount Road, Cossington	ST3540	13/03/2003	13/03/2003	Adult Male; Count [1]	*		*	*	*				*	*	*	terrestrial mammal
Osmia bicolor	Red-tailed Mason Bee	Cossington, Poldens, Somerset	ST3540	01/01/1953	01/01/1953	Count [1]											*	insect - hymenopteran
Ceratophyllum demersum	Rigid Hornwort		ST34K	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Borrow Pit, Puriton / Woolavington Ordnance Pits	ST34K	23/04/1993	23/04/1993	present; Count [1]	*	*		*			*			*	*	bird
Papaver dubium subsp. lecoqii	Yellow-juiced Poppy		ST34K	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Brassica nigra	Black Mustard		ST34K	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Malva neglecta	Dwarf Mallow		ST34K	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Erinaceus europaeus	West European Hedgehog	A39 Bawdrip	ST3440	07/08/1988	07/08/1988	dead; Count [1]			*		*				*	*		terrestrial mammal
Athene noctua	Little Owl		ST34K	01/08/1990	01/08/1990		*									*	*	bird
Torilis nodosa	Knotted Hedge-parsley		ST34K	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Euphorbia platyphyllos	Broad-leaved Spurge		ST34K	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Asio otus	Long-eared Owl	near Bawdrip	ST34K	07/04/1984	07/04/1984	Adult; Count [1]	*									*	*	bird

Veronica polita	Grey Field-speedwell		ST34K	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Jynx torquilla	Wryneck	Woolavington	ST34K	01/09/2001	01/09/2001	dead; Count [1]	*			*	*				*	*	*	bird
Mergus merganser	Goosander	Woolavington	ST34K	24/01/2015	24/01/2015	Count [1]	*									*	*	bird
Phoenicurus ochruros	Black Redstart	Cossington	ST34K	17/11/1998	17/11/1998	female/immature; Count [1]	*			*				*			*	bird
Euphorbia exigua	Dwarf Spurge		ST34K	01/01/1989	31/12/1997	present; Count [+]			*							*		flowering plant
Athene noctua	Little Owl	Chilton Polden	ST34Q	01/06/2003	31/08/2003	proved breeding; Count [1]	*									*	*	bird
Centaurea scabiosa	Greater Knapweed		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Meles meles	Eurasian Badger		ST3641	01/01/1995	31/12/1995	Evidence of badger sett [main]				*							*	terrestrial mammal
Hippuris vulgaris	Mare's-tail	Chilton Polden	ST34Q	01/01/1985	31/12/1995												*	flowering plant
Potamogeton crispus	Curled Pondweed	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996	Count [+]											*	flowering plant
Tyto alba	Barn Owl	Chilton Polden	ST34Q	01/06/2002	31/08/2002	proved breeding; Count [1]	*			*						*	*	bird
Hydrocharis morsus-ranae	Frogbit	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996	Count [+]			*							*	*	flowering plant
Rumex palustris	Marsh Dock		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Berula erecta	Lesser Water-parsnip		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Artemisia absinthium	Wormwood		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hottonia palustris	Water-violet	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996	Count [+]										*	*	flowering plant
Scutellaria galericulata	Skullcap		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carex acutiformis	Lesser Pond-sedge		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34Q	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Athene noctua	Little Owl		ST34Q	14/09/1990	14/09/1990		*									*	*	bird
Wolffia arrhiza	Rootless Duckweed		ST34Q	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Polystichum setiferum	Soft Shield-fern		ST34Q	01/01/1989	31/12/1997	present; Count [+]											*	fern
Berula erecta	Lesser Water-parsnip	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996	Count [+]											*	flowering plant
Veronica polita	Grey Field-speedwell		ST34Q	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Athene noctua	Little Owl		ST34Q	01/06/1990	30/06/1990		*									*	*	bird
Brassica nigra	Black Mustard	Cossington parish(part)	ST34Q	23/06/1996	23/06/1996	Count [+]										*		flowering plant
Riparia riparia	Sand Martin	Puriton Pit	ST34F	23/03/1988	23/03/1988	Count [3]	*									*	*	bird
Ranunculus parviflorus	Small-flowered Buttercup	Knowle Hill / Chisland Covert	ST3340	27/04/2013	27/04/2013	present; Count [+]										*		flowering plant
Daphne laureola	Spurge-laurel	Knowle Hill / Chisland Covert	ST3340	27/04/2013	27/04/2013	present; Count [+]											*	flowering plant
Polystichum setiferum	Soft Shield-fern	North Somerset / Knowle Hill / Chisland Covert	ST3340	16/03/2014	16/03/2014	Count [+]											*	fern
Lasiommata megera	Wall	Puriton Levels	ST3340	01/01/1994	31/12/1994	Adult; Count [1]			*		*				*	*		insect - butterfly
Vespertilionidae	Bats		ST3241	20/07/1982	20/07/1982	Count [+]	*		*	*	*				*	*	*	terrestrial mammal
Platanthera chlorantha	Greater Butterfly-orchid	Puriton	ST34F	01/01/1985	31/12/1995				*							*	*	flowering plant
Helictotrichon pratense	Meadow Oat-grass		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Pipistrellus pipistrellus	Pipistrelle		ST3241	02/07/1998	02/07/1998	Count [+]	*			*							*	terrestrial mammal
Potamogeton crispus	Curled Pondweed	North Somerset / Puriton	ST3241	29/04/2015	29/04/2015	Count [+]											*	flowering plant
Anas penelope	Wigeon	Puriton Pit	ST3241	22/09/1986	22/09/1986	Count [2]	*						*				*	bird
Anas strepera	Gadwall	Puriton Pit	ST3241	03/01/1988	03/01/1988	Adult; Count [2]	*						*				*	bird
Podiceps cristatus	Great Crested Grebe	Puriton Pit	ST3241	01/06/1985	24/07/1985	Count [1]											*	bird
Torilis nodosa	Knotted Hedge-parsley	North Somerset / Puriton	ST3241	29/04/2015	29/04/2015	Count [+]										*		flowering plant
Falco peregrinus	Peregrine	Puriton Hill	ST34F	07/10/1996	07/10/1996	present; Count [1]	*	*		*						*	*	bird
Ardea alba	Great White Egret	Stile, Kings Sedgemoor Drain, River Parrett	ST34F	27/11/2019	27/11/2019	Adult; Count [1]	*											bird
Buteo buteo	Buzzard	M5, .	ST3241	26/08/1983	27/08/1983	Count [1]	*											bird
Hygrocybe virginea	Hygrocybe virginea	Puriton	ST3241	03/12/1997	03/12/1997											*		fungus
Veronica polita	Grey Field-speedwell	North Somerset / Puriton	ST3241	29/04/2015	29/04/2015	Count [+]										*		flowering plant
Vespertilionidae	Bats		ST3241	05/06/1991	05/06/1991	Count [+]	*		*	*	*				*	*	*	terrestrial mammal
Petroselinum segetum	Corn Parsley		ST34F	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant

Ceratophyllum demersum	Rigid Hornwort		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Brassica nigra	Black Mustard		ST34F	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Beta vulgaris subsp. maritima	Sea Beet		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Torilis nodosa	Knotted Hedge-parsley		ST34F	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Daphne laureola	Spurge-laurel		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Malva neglecta	Dwarf Mallow		ST34F	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Centaurium erythraea	Common Centaury		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Cerastium semidecandrum	Little Mouse-ear		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Coenonympha pamphilus	Small Heath	Puriton Levels	ST3342	01/01/1993	31/12/1993	Adult; Count [1]			*		*				*	*		insect - butterfly
Mergus merganser	Goosander	ROF Puriton	ST34G	01/01/1800	31/12/1986		*									*	*	bird
Erynnis tages	Dingy Skipper	Puriton Levels	ST3342	01/01/1993	31/12/1993	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Torilis nodosa	Knotted Hedge-parsley		ST34G	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Polystichum setiferum	Soft Shield-fern		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	fern
Platanthera chlorantha	Greater Butterfly-orchid		ST34G	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Lepidium campestre	Field Pepperwort		ST34G	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Brassica nigra	Black Mustard		ST34G	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Ophrys apifera	Bee Orchid		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit		ST34G	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Scutellaria galericulata	Skullcap		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Coccothraustes coccothraustes	Hawfinch	ROF Puriton	ST34G	10/04/1987	10/04/1987		*				*			*	*	*	*	bird
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass	Motorway	ST3243	23/07/2005	23/07/2005	Fruiting; Count [+Flowering /]											*	flowering plant
Lasiommata megera	Wall	Puriton Levels	ST3243	01/01/1993	31/12/1993	Adult; Count [1]			*		*				*	*		insect - butterfly
Circus aeruginosus	Marsh Harrier	ROF Puriton	ST34G	01/01/1992	31/12/1992		*	*		*			*			*	*	bird
Lasiommata megera	Wall	Puriton Levels	ST3341	01/01/1994	31/12/1994	Adult; Count [1]			*		*				*	*		insect - butterfly
Apium graveolens	Wild Celery		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit		ST34F	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Ranunculus parviflorus	Small-flowered Buttercup		ST34F	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Oenanthe lachenalii	Parsley Water-dropwort		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Veronica polita	Grey Field-speedwell		ST34F	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Inula conyzae	Ploughman's-spikenard		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Polystichum setiferum	Soft Shield-fern		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	fern
Scutellaria galericulata	Skullcap		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Potamogeton crispus	Curled Pondweed		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Platanthera chlorantha	Greater Butterfly-orchid		ST34F	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Medicago polymorpha	Toothed Medick		ST34F	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Coccothraustes coccothraustes	Hawfinch	ROF Puriton	ST34G	10/04/1987	10/04/1987		*				*			*	*	*	*	bird
Trifolium arvense	Hare's-foot Clover		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Filago minima	Small Cudweed		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Callitriche obtusangula	Blunt-fruited Water-starwort		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Inula conyzae	Ploughman's-spikenard		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Cettia cetti	Cetti's Warbler	East Huntspill to Woolavington	ST3343	01/03/2004	31/05/2004	singing/mating calls; Count [1]				*							*	bird
Lasiommata megera	Wall	Puriton Levels	ST3342	01/01/1993	31/12/1993	Adult; Count [1]			*		*				*	*		insect - butterfly
Pyrgus malvae	Grizzled Skipper	Puriton Levels	ST3342	01/01/1993	31/12/1993	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Aricia agestis	Brown Argus	Puriton Levels	ST3342	01/01/1993	31/12/1993	Adult; Count [1]											*	insect - butterfly
Circus aeruginosus	Marsh Harrier	ROF Puriton	ST34G	01/01/1988	31/12/1988		*	*		*			*			*	*	bird
Phoenicurus ochruros	Black Redstart	ROF Puriton	ST34G	01/01/1800	31/12/1987		*			*				*			*	bird
Veronica polita	Grey Field-speedwell		ST34G	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Reseda lutea	Wild Mignonette		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Petroselinum segetum	Corn Parsley		ST34G	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Tyto alba	Barn Owl	ROF Puriton	ST34G	01/01/1987	31/12/1987		*			*						*	*	bird
Brassica nigra	Black Mustard	North Somerset / Puriton	ST3242	29/04/2015	29/04/2015	Count [+]										*		flowering plant
Potamogeton crispus	Curled Pondweed	North Somerset / Puriton	ST3242	29/04/2015	29/04/2015	Count [+]											*	flowering plant

Eriophorum angustifolium	Common Cottongrass		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34G	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Potamogeton crispus	Curled Pondweed		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Sium latifolium	Greater Water-parsnip		ST34G	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Rhinanthus minor	Yellow-rattle		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Beta vulgaris subsp. maritima	Sea Beet		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Mergus merganser	Goosander	ROF Puriton	ST34G	01/01/1986	31/12/1986		*									*	*	bird
Ophioglossum vulgatum	Adder's-tongue		ST34G	01/01/1989	31/12/1997	present; Count [+]										*	*	fern
Phoenicurus ochruros	Black Redstart	ROF Puriton	ST34G	01/01/1800	31/12/1988		*			*				*			*	bird
Aythya fuligula	Tufted Duck	Puriton Pit	ST3243	27/12/1985	27/12/1985	Adult; Count [9]	*											bird
Falco columbarius	Merlin	ROF Puriton	ST34G	01/01/1800	31/12/1988		*	*		*				*		*	*	bird
Bucephala clangula	Goldeneye	Puriton Pit	ST3243	03/12/1985	27/12/1985	Adult; Count [1]	*			*			*				*	bird
Hordeum marinum	Sea Barley	Motorway	ST3243	17/08/2013	17/08/2013	Fruiting; Count [+]			*		*				*	*	*	flowering plant
Geranium columbinum	Long-stalked Crane's-bill		ST34G	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Anacamptis pyramidalis	Pyramidal Orchid		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Petroselinum segetum	Corn Parsley	Puriton	ST3242	04/08/2005	04/08/2005	Count [+]										*		flowering plant
Zannichellia palustris	Horned Pondweed		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Meles meles	Eurasian Badger	Puriton	ST3343	10/07/2008	10/07/2008	Sett; Count [1]				*							*	terrestrial mammal
Lasiommata megera	Wall	Black Ditch	ST3343	01/01/1995	31/12/1995	Adult; Count [1]			*		*				*	*		insect - butterfly
Coenonympha pamphilus	Small Heath	Black Ditch	ST3343	01/01/1995	31/12/1995	Adult; Count [1]			*		*				*	*		insect - butterfly
Berula erecta	Lesser Water-parsnip	Huntspill River	ST3343	29/08/2016	29/08/2016	Count [+]											*	flowering plant
Butomus umbellatus	Flowering-rush	Huntspill River	ST3343	29/08/2016	29/08/2016	Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit	Huntspill River	ST3343	29/08/2016	29/08/2016	Count [+]			*							*	*	flowering plant
Meles meles	Eurasian Badger	Puriton	ST3343	10/07/2008	10/07/2008	Sett; Count [1]				*							*	terrestrial mammal
Rumex hydrolapathum	Water Dock	Huntspill River	ST3343	29/08/2016	29/08/2016	Count [+]											*	flowering plant
Falco peregrinus	Peregrine	ROF Puriton	ST34G	01/01/1800	31/12/1988		*	*		*						*	*	bird
Coenonympha pamphilus	Small Heath	Puriton Levels	ST3243	01/01/1993	31/12/1993	Adult; Count [1]			*		*				*	*		insect - butterfly
Phoenicurus ochruros	Black Redstart	ROF Puriton	ST34G	01/01/1988	31/12/1988		*			*				*			*	bird
Podiceps cristatus	Great Crested Grebe	Puriton Pit	ST3243	23/03/1988	23/03/1988	Adult; Count [1]											*	bird
Carex disticha	Brown Sedge		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Myosotis ramosissima	Early Forget-me-not		ST34G	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Aythya fuligula	Tufted Duck	Puriton Pit	ST3243	03/12/1985	03/12/1985	Adult; Count [5]	*											bird
Circus aeruginosus	Marsh Harrier	ROF Puriton	ST34G	01/11/1988	30/11/1988		*	*		*			*			*	*	bird
Beta vulgaris subsp. maritima	Sea Beet	South Hills / The Doles / Home Covert	ST3240	17/05/2013	17/05/2013	vegetative; Count [+]											*	flowering plant
Platanthera chlorantha	Greater Butterfly-orchid	Knowle Hill / Chisland Covert	ST3340	27/04/2013	27/04/2013	present; Count [+]			*							*	*	flowering plant
Didymodon nicholsonii	Nicholson's Beard-moss	Bawdrip	ST3340	21/09/2014	21/09/2014	Count [+]											*	moss
Torilis nodosa	Knotted Hedge-parsley	Knowle Hill / Chisland Covert	ST3340	27/04/2013	27/04/2013	present; Count [+]										*		flowering plant
Plantago coronopus	Buck's-horn Plantain	South Hills / The Doles / Home Covert	ST3240	12/07/2013	12/07/2013	Fruiting; Count [+Flowering /]											*	flowering plant
Satyrium w-album	White-letter Hairstreak	Dunball access land	ST3140	14/07/2006	14/07/2006	Adult; Count [2]			*		*				*	*	*	insect - butterfly
Daphne laureola	Spurge-laurel	South Hills / The Doles / Home Covert	ST3240	19/01/2010	19/01/2010	Count [+]											*	flowering plant
Satyrium w-album	White-letter Hairstreak	Crandon Bridge	ST3140	12/07/2006	12/07/2006	Adult; Count [3]			*		*				*	*	*	insect - butterfly
Scotopteryx chenopodiata	Shaded Broad-bar	Walpole	ST3141	23/07/2001	23/07/2001	Adult; Count [1]					*				*	*		insect - moth
Lasiommata megera	Wall	M5 Junction	ST3141	01/04/2006	01/09/2006	Adult; Count [1]			*		*				*	*		insect - butterfly
Lasiommata megera	Wall	M5 Junction	ST3141	06/06/2006	06/06/2006	Adult Female; Count [1]			*		*				*	*		insect - butterfly
Cirsium eriophorum	Woolly Thistle	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Torilis nodosa	Knotted Hedge-parsley	North Somerset / Down End, nr Puriton	ST3141	18/04/2014	18/04/2014	Count [+]										*		flowering plant
Ardea cinerea	Grey Heron	near Dunball	ST3141	01/01/1920	31/12/1940												*	bird
Anacamptis pyramidalis	Pyramidal Orchid	Puriton	ST3141	12/07/2013	12/07/2013	Flowering; Count [+]											*	flowering plant
Satyrium w-album	White-letter Hairstreak	Dunball	ST3141	05/07/2004	05/07/2004	Adult; Count [7]			*		*				*	*	*	insect - butterfly
Anacamptis pyramidalis	Pyramidal Orchid	North Somerset / Motorway	ST3141	30/06/2014	30/06/2014	Flowering; Count [+]											*	flowering plant

Meles meles	Eurasian Badger	M5, Puriton	ST3141	30/05/2005	30/05/2005	Count [+]				*						*	terrestrial mammal
Lasiommata megera	Wall	M5 Junction	ST3141	30/05/2006	30/05/2006	Adult; Count [1]			*		*				*	*		insect - butterfly
Anacamptis pyramidalis	Pyramidal Orchid	Motorway	ST3141	21/06/2005	21/06/2005	Count [+]											*	flowering plant
Erynnis tages	Dingy Skipper	Down End	ST3141	01/01/1993	31/12/1993	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Sagina maritima	Sea Pearlwort	North Somerset / Down End, nr Puriton	ST3141	18/04/2014	18/04/2014	Count [+]											*	flowering plant
Hordeum marinum	Sea Barley	M5, Puriton	ST3141	12/07/2013	12/07/2013	Fruiting; Count [+]			*		*				*	*	*	flowering plant
Lasiommata megera	Wall	M5 Junction	ST3141	01/08/2005	01/08/2005	Adult; Count [1]			*		*				*	*		insect - butterfly
Inula conyzae	Ploughman's-spikenard	North Somerset / Puriton	ST3141	11/02/2016	11/02/2016	Count [+]											*	flowering plant
Aricia agestis	Brown Argus	Dunball	ST3141	20/05/2004	20/05/2004	Adult; Count [1]											*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	Crandon Bridge	ST3140	14/07/2006	14/07/2006	Adult; Count [2]			*		*				*	*	*	insect - butterfly
Brassica nigra	Black Mustard	North Somerset / Dunball	ST3140	11/02/2016	11/02/2016	Count [+]										*		flowering plant
Egretta garzetta	Little Egret	Dunball	ST34A	10/05/2014	10/05/2014	Count [1]	*	*								*	*	bird
Alcedo atthis	Kingfisher	King Sedgemoor Drain, Railway Bridge off Station Road, Dunball	ST34A	25/06/1995	25/06/1995	probable breeding; Count [1]	*	*		*			*			*	*	bird
Puccinellia maritima	Common Saltmarsh-grass	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Petroselinum segetum	Corn Parsley	South Somerset / Starsland Clyce	ST3040	25/06/2014	25/06/2014	Count [+]										*		flowering plant
Raphanus raphanistrum subsp. maritimus	Sea Radish	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Tyto alba	Barn Owl	Dunball roundabout, Bridgwater	ST34A	09/03/2013	09/03/2013	Adult; Count [1]	*			*						*	*	bird
Puccinellia maritima	Common Saltmarsh-grass	Dunball Wharf	ST3040	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Spergularia marina	Lesser Sea-spurrey	North Somerset / Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Plantago maritima	Sea Plantain	Dunball Wharf	ST3040	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Plantago coronopus	Buck's-horn Plantain	Dunball Wharf	ST3040	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Aster tripolium	Sea Aster	Dunball Wharf	ST3040	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Spergularia media	Greater Sea-spurrey	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Spartina anglica	Common Cord-grass	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Oenanthe lachenalii	Parsley Water-dropwort	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Torilis nodosa	Knotted Hedge-parsley	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]										*		flowering plant
Spergularia media	Greater Sea-spurrey	Dunball Wharf	ST3040	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Glaux maritima	Sea-milkwort		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Torilis nodosa	Knotted Hedge-parsley	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]										*		flowering plant
Cochlearia officinalis	Common Scurvygrass		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Raphanus raphanistrum subsp. maritimus	Sea Radish	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Elytrigia atherica	Sea Couch	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Geranium pusillum	Small-flowered Crane's-bill	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]										*	*	flowering plant
Glaux maritima	Sea-milkwort	Dunball Wharf	ST3040	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Falco peregrinus	Peregrine	Huntspill Sluice	ST34A	01/11/2014	01/11/2014	present; Count [2]	*	*		*						*	*	bird
Parapholis strigosa	Hard-grass	Dunball Wharf	ST3040	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Milvus milvus	Red Kite	Dunball	ST34A	16/02/2014	16/02/2014	Count [1]	*	*		*						*	*	bird
Seriphidium maritimum	Sea Wormwood		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ceratophyllum demersum	Rigid Hornwort		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	Bibby's Factory, Dunball	ST34A	16/10/2002	16/10/2002	in flight; Count [1]	*			*						*	*	bird
Spergularia marina	Lesser Sea-spurrey		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant

Spartina anglica	Common Cord-grass	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Spergularia media	Greater Sea-spurrey	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Puccinellia maritima	Common Saltmarsh-grass	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Raphanus raphanistrum subsp. maritimus	Sea Radish	North Somerset / Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Alcedo atthis	Kingfisher		ST34A	01/05/2015	01/05/2015	Count [1]	*	*		*			*			*	*	bird
Milvus milvus	Red Kite	North Pertherton	ST34A	16/05/2014	16/05/2014	present; Count [1]	*	*		*						*	*	bird
Centaurium erythraea	Common Centaury		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Elytrigia atherica	Sea Couch	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Ceratophyllum submersum	Soft Hornwort		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ranunculus trichophyllus	Thread-leaved Water-crowfoot	Pawlett Hams	ST3043	14/03/1991	14/03/1991												*	flowering plant
Reseda lutea	Wild Mignonette		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Potamogeton crispus	Curled Pondweed	Pawlett Hams	ST3043	14/03/1991	14/03/1991	Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed	Pawlett Hams	ST3043	14/03/1991	14/03/1991	Count [+]										*		flowering plant
Sagina apetala subsp. apetala	Annual Pearlwort	Pawlett	ST3042	25/06/2017	25/06/2017	Count [+]											*	flowering plant
Petroselinum segetum	Corn Parsley		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Helianthemum nummularium	Common Rock-rose		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Meles meles	Eurasian Badger	Pawlett Mead Drove Fields	ST3143	01/05/2000	31/05/2000	Tracks; Count [1]; badger sett; Count [1]				*							*	terrestrial mammal
Anthonomus pedicularius	Anthonomus pedicularius	Pawlett Levels	ST3143	15/05/2000	15/05/2000	present; Count [1]											*	insect - beetle (Coleoptera)
Papaver dubium subsp. lecoqii	Yellow-juiced Poppy	Pawlett	ST3042	25/06/2017	25/06/2017	Count [+]										*		flowering plant
Berula erecta	Lesser Water-parsnip		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hottonia palustris	Water-violet		ST34B	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Veronica polita	Grey Field-speedwell		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Oenanthe lachenalii	Parsley Water-dropwort		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hordeum marinum	Sea Barley	Pawlett	ST3143	17/08/2013	17/08/2013	Fruiting; Count [+]			*		*				*	*	*	flowering plant
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass	M5, Puriton	ST3142	09/10/2004	09/10/2004	Count [1000]											*	flowering plant
Tyto alba	Barn Owl	Old Clay Pit, Puriton	ST34B	01/01/1975	31/12/1975		*			*						*	*	bird
Geranium columbinum	Long-stalked Crane's-bill		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Aira caryophyllea	Silver Hair-grass		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Zannichellia palustris	Horned Pondweed		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Elytrigia atherica	Sea Couch	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Egretta garzetta	Little Egret	Rail Bridge, Kings Sedgemoor Drain, River Parrett	ST34A	12/11/2019	12/11/2019	Adult; Count [1]	*	*								*	*	bird
Aster tripolium	Sea Aster	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Populus nigra 'Italica'	Female Lombardy Poplar	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]										*		flowering plant
Glaux maritima	Sea-milkwort	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Beta vulgaris subsp. maritima	Sea Beet	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Suaeda maritima	Annual Sea-blite	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Plantago maritima	Sea Plantain	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Plantago coronopus	Buck's-horn Plantain	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Aster tripolium	Sea Aster	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Cochlearia anglica	English Scurvygrass	North Somerset / Walpole	ST3041	06/08/2014	06/08/2014	Count [+]											*	flowering plant
Petroselinum segetum	Corn Parsley		ST34A	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Trifolium arvense	Hare's-foot Clover		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant

Lutra lutra	European Otter	South Drain	ST3042	02/02/1987	02/02/1987	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal
Anas clypeata	Shoveler	Pawlett	ST3043	03/12/1986	23/12/1986	Count [6]	*						*				*	bird
Ranunculus trichophyllus	Thread-leaved Water-crowfoot		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Actitis hypoleucos	Common Sandpiper	near Pawlett	ST3043	28/10/1988	28/10/1988	Adult; Count [1]	*						*					bird
Vespertilionidae	Bats		ST3043	21/06/2000	21/06/2000	Count [+]	*		*	*	*				*	*	*	terrestrial mammal
Phylloscopus collybita	Chiffchaff	Pawlett	ST3043	28/10/1988	28/10/1988	Adult; Count [1]										*		bird
Muscicapa striata	Spotted Flycatcher	Near Pawlett	ST3043	18/09/1981	18/09/1981	Adult; Count [1]	*				*			*	*	*	*	bird
Thymus polytrichus	Wild Thyme		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Malva neglecta	Dwarf Mallow		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Stellaria pallida	Lesser Chickweed		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ophrys apifera	Bee Orchid		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Oenanthe lachenalii	Parsley Water-dropwort		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Anacamptis pyramidalis	Pyramidal Orchid		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Spergularia marina	Lesser Sea-spurrey	North Somerset / Motorway	ST3141	27/05/2014	27/05/2014	Flowering; Count [+]											*	flowering plant
Pastinaca sativa	Wild Parsnip	North Somerset / Dunball	ST3140	11/02/2016	11/02/2016	Count [+]											*	flowering plant
Parapholis strigosa	Hard-grass		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Veronica polita	Grey Field-speedwell	North Somerset / Puriton	ST3141	11/02/2016	11/02/2016	Flowering; Count [+]										*		flowering plant
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass	M5, Puriton	ST3141	23/07/2005	23/07/2005												*	flowering plant
Puccinellia maritima	Common Saltmarsh-grass		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rhinanthus minor	Yellow-rattle		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Centaurium erythraea	Common Centaury	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Aricia agestis	Brown Argus	Downend M5 J23	ST3141	08/08/2006	08/08/2006	Adult; Count [1]											*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	M5 Junction	ST3141	03/07/2006	03/07/2006	Adult; Count [6]			*		*				*	*	*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	M5 Junction	ST3141	01/04/2006	01/09/2006	Adult; Count [1]			*		*				*	*	*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	Dunball access land	ST3140	12/07/2006	12/07/2006	Adult; Count [2]			*		*				*	*	*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	Dunball access land	ST3140	12/07/2006	12/07/2006	Adult; Count [2]			*		*				*	*	*	insect - butterfly
Plantago coronopus	Buck's-horn Plantain	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Beta vulgaris subsp. maritima	Sea Beet	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Circus aeruginosus	Marsh Harrier	Near Junction , M4	ST34A	12/08/1989	12/08/1989	Female; Count [1]	*	*		*			*			*	*	bird
Plantago maritima	Sea Plantain	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Suaeda maritima	Annual Sea-blite	Walpole	ST3041	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass	M5, Puriton	ST3141	09/10/2004	09/10/2004	Count [1000]											*	flowering plant
Pastinaca sativa	Wild Parsnip	North Somerset / Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Cynoglossum officinale	Hound's-tongue	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]			*							*	*	flowering plant
Satyrium w-album	White-letter Hairstreak	M5 Junction	ST3141	14/07/2006	14/07/2006	Adult; Count [2]			*		*				*	*	*	insect - butterfly
Ceratophyllum demersum	Rigid Hornwort	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Anacamptis pyramidalis	Pyramidal Orchid	Motorway	ST3141	16/06/2011	16/06/2011	present; Count [+]											*	flowering plant
Falco tinnunculus	Kestrel	Dunball	ST3141	27/03/1989	27/03/1989	Count [1]	*						*				*	bird
Satyrium w-album	White-letter Hairstreak	M5 Junction	ST3141	27/06/2006	27/06/2006	Adult; Count [2]			*		*				*	*	*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	M5 Junction	ST3141	28/06/2006	28/06/2006	Adult; Count [10]			*		*				*	*	*	insect - butterfly
Plantago coronopus	Buck's-horn Plantain	North Somerset / Motorway	ST3141	27/05/2014	27/05/2014	Flowering; Count [+]											*	flowering plant
Satyrium w-album	White-letter Hairstreak	Dunball	ST3141	25/06/2004	25/06/2004	Adult; Count [3]			*		*				*	*	*	insect - butterfly
Falco tinnunculus	Kestrel	Dunball	ST3141	10/03/1985	10/03/1985	Adult; Count [1]	*						*				*	bird
Hydrocharis morsus-ranae	Frogbit	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]			*							*	*	flowering plant
Inula conyzae	Ploughman's-spikenard	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Perdix perdix	Grey Partridge	West Huntspill	ST3141	01/01/1987	01/01/1987	Count [2]					*			*	*	*	*	bird
Euplagia quadripunctaria	Jersey Tiger	Walpole	ST3141	23/07/2010	23/07/2010	Adult; Count [1]											*	insect - moth
Anacamptis pyramidalis	Pyramidal Orchid	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Meles meles	Eurasian Badger	Puriton Hill, Puriton	ST3141	26/07/2018	26/07/2018	present; Count [1]; Evidence of badger sett [disused]				*							*	terrestrial mammal

Cerastium semidecandrum	Little Mouse-ear		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Spergularia media	Greater Sea-spurrey		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Brassica nigra	Black Mustard	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]										*		flowering plant
Hordeum marinum	Sea Barley		ST34A	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Apium graveolens	Wild Celery		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Rumex hydrolapathum	Water Dock		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Aricia agestis	Brown Argus	M5 Junction	ST3141	01/04/2006	01/09/2006	Adult; Count [1]											*	insect - butterfly
Brassica nigra	Black Mustard		ST34A	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Lepidium campestre	Field Pepperwort		ST34A	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Koeleria macrantha	Crested Hair-grass		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Berula erecta	Lesser Water-parsnip		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Centaurium erythraea	Common Centaury	North Somerset / Puriton	ST3141	11/02/2016	11/02/2016	Count [+]											*	flowering plant
Torilis nodosa	Knotted Hedge-parsley		ST34A	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Sagina apetala subsp. apetala	Annual Pearlwort	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Aster tripolium	Sea Aster		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lathyrus aphaca	Yellow Vetchling		ST34A	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Atriplex glabriuscula	Babington's Orache	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Suaeda maritima	Annual Sea-blite	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Beta vulgaris subsp. maritima	Sea Beet		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Beta vulgaris subsp. maritima	Sea Beet	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Spergularia marina	Lesser Sea-spurrey	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Spartina anglica	Common Cord-grass	Dunball Wharf	ST3040	18/10/2009	18/10/2009	Count [+]											*	flowering plant
Honckenya peploides	Sea Sandwort		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Suaeda maritima	Annual Sea-blite		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Carlina vulgaris	Carline Thistle		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Plantago maritima	Sea Plantain		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Veronica polita	Grey Field-speedwell		ST34A	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Atriplex glabriuscula	Babington's Orache		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Scutellaria galericulata	Skullcap		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ranunculus parviflorus	Small-flowered Buttercup		ST34A	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Inula conyzae	Ploughman's-spikenard		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alopecurus bulbosus	Bulbous Foxtail		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Elytrigia atherica	Sea Couch		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lathyrus nissolia	Grass Vetchling		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Plantago coronopus	Buck's-horn Plantain	North Somerset / Puriton	ST3141	11/02/2016	11/02/2016	Count [+]											*	flowering plant
Geranium pusillum	Small-flowered Crane's-bill		ST34A	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Sagina apetala subsp. apetala	Annual Pearlwort	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Satyrium w-album	White-letter Hairstreak	Dunball	ST3141	12/07/2006	12/07/2006	Adult; Count [3]			*		*				*	*	*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	M5 Junction	ST3141	08/07/2005	08/07/2005	Adult; Count [3]			*		*				*	*	*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	Dunball	ST3141	06/07/2004	06/07/2004	Adult; Count [8]			*		*				*	*	*	insect - butterfly
Satyrium w-album	White-letter Hairstreak	M5 Junction	ST3141	27/06/2005	27/06/2005	Adult; Count [2]			*		*				*	*	*	insect - butterfly
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass	Down End, nr Puriton	ST3141	25/09/2009	25/09/2009	Count [+]											*	flowering plant
Trifolium squamosum	Sea Clover		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Eriogaster lanestris	Small Eggar	Walpole	ST3141	04/04/2006	04/04/2006	adult; Count [1]											*	insect - moth
Ranunculus trichophyllus	Thread-leaved Water-crowfoot		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34A	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Plantago coronopus	Buck's-horn Plantain		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ceratophyllum submersum	Soft Hornwort		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Cirsium eriophorum	Woolly Thistle		ST34A	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Buteo buteo	Buzzard	Black Ditch & adjacent fields	ST3143	24/09/2002	24/09/2002	adult; Count [1]	*											bird
Lasiommata megera	Wall	Pawlett Levels	ST3143	13/09/1999	13/09/1999	Adult; Count [1]			*		*				*	*		insect - butterfly

Bombus sylvarum	Shrill Carder Bee	Street, .mile north.	ST3143	01/01/1973	01/01/1973	Count [1]					*				*	*	*	insect - hymenopteran
Upupa epops	Hoopoe	Pawlett	ST34B	10/06/1999	10/06/1999	in flight; Count [1]	*			*							*	bird
Arvicola amphibius	European Water Vole	Black Ditch & adjacent fields	ST3143	24/09/2002	24/09/2002	latrine; Count [2]; Burrow; Count [7]			*	*	*				*	*	*	terrestrial mammal
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass	M5, Puriton	ST3142	23/07/2005	23/07/2005	Fruiting; Count [+Flowering /]											*	flowering plant
Coenonympha pamphilus	Small Heath	Pawlett Levels	ST3143	01/01/1994	31/12/1994	Adult; Count [1]			*		*				*	*		insect - butterfly
Torilis nodosa	Knotted Hedge-parsley		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Falco peregrinus	Peregrine	Pawlett Mead Drove Fields	ST34B	01/11/1999	29/02/2000	present; Count [1]	*	*		*						*	*	bird
Cochlearia officinalis	Common Scurvygrass		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Tyto alba	Barn Owl	A38 at Pawlett	ST34B	16/02/1989	16/02/1989	Count [1]	*			*						*	*	bird
Alcedo atthis	Kingfisher		ST34B	01/01/1989	31/12/1990		*	*		*			*			*	*	bird
Vicia tetrasperma	Smooth Tare		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Oenanthe lachenalii	Parsley Water-dropwort	Pawlett Hams	ST3043	14/03/1991	14/03/1991	Count [+]											*	flowering plant
Veronica polita	Grey Field-speedwell	North Somerset / Pawlett (E)	ST3042	23/08/2014	23/08/2014	Count [+]										*		flowering plant
Wolffia arrhiza	Rootless Duckweed		ST34B	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Callitriche obtusangula	Blunt-fruited Water-starwort		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Phylloscopus collybita	Chiffchaff	Brue Estuary	ST3043	27/12/1988	27/12/1988	Adult; Count [1]										*		bird
Ononis spinosa	Spiny Restharrow		ST34B	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Berosus affinis	Berosus affinis	Pawlett	ST3042	01/12/1992	31/12/1992	present; Count [1]											*	insect - beetle (Coleoptera)
Brassica nigra	Black Mustard		ST34B	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Veronica anagallis-aquatica	Blue Water-Speedwell	Pawlett Hams	ST3043	14/03/1991	14/03/1991	Count [+]											*	flowering plant
Veronica anagallis-aquatica	Blue Water-Speedwell	Pawlett Hams	ST3043	16/03/1991	16/03/1991	Count [+]											*	flowering plant
Anacaena bipustulata	Anacaena bipustulata	Pawlett	ST3042	01/08/1992	31/08/1992	present; Count [1]											*	insect - beetle (Coleoptera)
Falco tinnunculus	Kestrel	Pawlett	ST3043	23/12/1979	23/12/1979	Adult; Count [1]	*						*				*	bird
Falco tinnunculus	Kestrel	Pawlett	ST3043	27/03/1989	27/03/1989	Count [1]	*						*				*	bird
Ceratophyllum demersum	Rigid Hornwort		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lathyrus sylvestris	Narrow-leaved Everlasting-pea		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Torilis nodosa	Knotted Hedge-parsley		ST34H	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Armeria maritima subsp. maritima	Thrift		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Phylloscopus sibilatrix	Wood Warbler	West Huntspill / Huntspill River	ST3244	01/05/2004	01/05/2004	migrating; Count [1]					*			*	*	*	*	bird
Lathyrus nissolia	Grass Vetchling		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ceratophyllum demersum	Rigid Hornwort	East Huntspill / Huntspill River	ST3344	29/08/2016	29/08/2016	Count [+]											*	flowering plant
Oenanthe lachenalii	Parsley Water-dropwort		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ranunculus circinatus	Fan-leaved Water-crowfoot		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Puccinellia distans subsp. distans	Reflexed Saltmarsh-grass	M5	ST34H	23/07/2005	23/07/2005	Fruiting; Count [+Flowering /]											*	flowering plant
Brassica nigra	Black Mustard		ST34H	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Carduus tenuiflorus	Slender Thistle		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Artemisia absinthium	Wormwood		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Zannichellia palustris	Horned Pondweed		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Centaurium erythraea	Common Centaury		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ranunculus trichophyllus	Thread-leaved Water-crowfoot		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	Withy Grove, Huntspill R.	ST34H	01/01/1989	31/12/1990	in flight; Count [1]; perching; Count [2]	*	*		*			*			*	*	bird
Cochlearia officinalis	Common Scurvygrass		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lemna trisulca	Ivy-leaved Duckweed		ST34H	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Lutra lutra	European Otter	Huntspill	ST3244	01/01/1985	31/12/1985	droppings; Count [1]	*			*	*				*	*	*	terrestrial mammal

Athene noctua	Little Owl	Barton St. David	ST34H	16/10/2003	16/10/2003	in flight; Count [1]; carrying food; Count [1]; calling/vocalising; Count [1]; perching; Count [2]	*									*	*	bird
Potamogeton crispus	Curled Pondweed		ST34H	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ceratophyllum demersum	Rigid Hornwort	East Huntspill / Huntspill River	ST3244	29/08/2016	29/08/2016	Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit	East Huntspill / Huntspill River	ST3244	29/08/2016	29/08/2016	Count [+]			*							*	*	flowering plant
Tyto alba	Barn Owl	M5 / Huntspill River	ST34H	02/03/1980	02/03/1980	Dead Adult; Count [1]	*			*						*	*	bird
Petroselinum segetum	Corn Parsley		ST34H	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Potamogeton crispus	Curled Pondweed	East Huntspill / Huntspill River	ST3344	29/08/2016	29/08/2016	Count [+]											*	flowering plant
Hydrocharis morsus-ranae	Frogbit		ST34H	01/01/1989	31/12/1997	present; Count [+]			*							*	*	flowering plant
Hydrocharis morsus-ranae	Frogbit	East Huntspill / Huntspill River	ST3344	29/08/2016	29/08/2016	Count [+]			*							*	*	flowering plant
Anchusa arvensis	Bugloss		ST34H	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Arvicola amphibius	European Water Vole		ST3144	24/09/2002	24/09/2002	Burrow; Count [13]			*	*	*				*	*	*	terrestrial mammal
Saxicola rubetra	Whinchat	Huntspill	ST34C	05/09/2014	05/09/2014	present; Count [4]	*							*		*	*	bird
Coturnix coturnix	Quail	West Huntspill	ST34C	13/05/1992	14/05/1992	calling/vocalising; Count [1]				*			*				*	bird
Ardea cinerea	Grey Heron		ST3144	24/09/2002	24/09/2002	adult; Count [1]											*	bird
Ceratophyllum demersum	Rigid Hornwort		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Potamogeton crispus	Curled Pondweed		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Butomus umbellatus	Flowering-rush		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	07/06/1985	16/06/1985	Adult; Count [1]	*											bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	13/10/1984	23/10/1984	Adult; Count [1]	*											bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	23/01/1985	24/01/1985	Adult; Count [2]	*											bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	02/12/1981	02/12/1981	female; Count [1]	*											bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	03/10/1984	03/10/1984	Adult; Count [2]	*											bird
Alcedo atthis	Kingfisher	Sloway Bridge, Huntspill River	ST34C	22/04/2015	22/04/2015	Count [1]	*	*		*			*			*	*	bird
Egretta garzetta	Little Egret	West Huntspill	ST34C	01/04/2014	01/04/2014	Count [2]	*	*								*	*	bird
Sagittaria sagittifolia	Arrowhead	West Huntspill	ST3044	19/07/2006	19/07/2006	Count [+]											*	flowering plant
Stratiotes aloides	Water-soldier		ST34C	01/01/1989	31/12/1997	present; Count [+]			*									flowering plant
Cakile maritima	Sea Rocket		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Phleum arenarium	Sand Cat's-tail		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Saxicola rubetra	Whinchat	Sloway Bridge, Huntspill River	ST34C	22/04/2015	22/04/2015	Count [1]	*							*		*	*	bird
Columba oenas	Stock Dove	West Huntspill	ST3044	29/04/2005	29/04/2005	present; Count [2]							*				*	bird
Wolffia arrhiza	Rootless Duckweed	Gold Corner	ST34C	24/09/2000	24/09/2000	Count [+]			*							*	*	flowering plant
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	02/07/1988	02/07/1988	Adult; Count [1]	*											bird
Falco peregrinus	Peregrine	near Huntspill River	ST34C	12/12/1983	12/12/1983	Adult; Count [1]	*	*		*						*	*	bird
Falco tinnunculus	Kestrel	A38 near Stretcholt	ST3044	26/02/1988	26/02/1988	Count [1]	*						*				*	bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	07/06/1985	07/06/1985	Adult; Count [1]	*											bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	18/08/1985	18/08/1985	Adult; Count [1]	*											bird
Delichon urbicum	House Martin	West Huntspill	ST3044	23/09/1981	23/09/1981	Adult; Count [28]	*						*					bird
Delichon urbicum	House Martin	West Huntspill	ST3044	20/10/1985	20/10/1985	Adult; Count [3]	*						*					bird
Salsola kali subsp. kali	Prickly Saltwort		ST34C	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Vicia tetrasperma	Smooth Tare		ST34C	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Hydrocharis morsus-ranae	Frogbit	Gold Corner	ST34C	24/09/2000	24/09/2000	Count [+]			*							*	*	flowering plant
Arvicola amphibius	European Water Vole		ST3144	24/09/2002	24/09/2002	Burrow; Count [6]; latrine; Count [7]			*	*	*				*	*	*	terrestrial mammal
Potamogeton crispus	Curled Pondweed	Pawlett	ST3144	17/03/1991	17/03/1991	Count [+]											*	flowering plant
Linum bienne	Pale Flax		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Torilis nodosa	Knotted Hedge-parsley		ST34C	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant

Ceratophyllum demersum	Rigid Hornwort	Gold Corner	ST34C	24/09/2000	24/09/2000												*	flowering plant
Torilis nodosa	Knotted Hedge-parsley	Gold Corner	ST34C	14/06/1998	14/06/1998	Count [+]										*		flowering plant
Tyto alba	Barn Owl	West Huntspill	ST34C	13/03/2015	13/03/2015	Count [1]	*			*						*	*	bird
Carex acutiformis	Lesser Pond-sedge	Gold Corner	ST34C	24/09/2000	24/09/2000												*	flowering plant
Arvicola amphibius	European Water Vole		ST3144	17/06/2002	17/06/2002	Burrow; Count [1]; latrine; Count [3]			*	*	*				*	*	*	terrestrial mammal
Arvicola amphibius	European Water Vole	Ditches of Brents Rhyne	ST3144	24/09/2002	24/09/2002	latrine; Count [5]			*	*	*				*	*	*	terrestrial mammal
Sagina apetala subsp. apetala	Annual Pearlwort		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Egretta garzetta	Little Egret	Puriton Rhynes	ST34C	28/07/2015	28/07/2015		*	*								*	*	bird
Carex arenaria	Sand Sedge		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Oenanthe lachenalii	Parsley Water-dropwort		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Brassica nigra	Black Mustard	Gold Corner	ST34C	24/09/2000	24/09/2000	Count [+]										*		flowering plant
Asio flammeus	Short-eared Owl	Huntspill	ST34C	28/12/2014	28/12/2014	present; Count [1]	*	*					*			*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	13/06/1984	13/06/1984	Adult; Count [2]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	16/07/1985	16/07/1985	present; Count [4]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	19/11/1984	19/11/1984	Adult; Count [4]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	13/02/1985	13/02/1985	Adult; Count [2]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	29/07/1985	29/07/1985	Adult; Count [1]					*			*	*	*	*	bird
Falco tinnunculus	Kestrel	West Huntspill	ST3044	16/10/1984	16/10/1984	Adult; Count [1]	*						*				*	bird
Falco tinnunculus	Kestrel	West Huntspill	ST3044	04/11/1984	28/11/1984	Adult; Count [2]	*						*				*	bird
Spinus spinus	Siskin	West Huntsill	ST3044	01/10/1984	01/10/1984	Adult; Count [2]	*											bird
Alcedo atthis	Kingfisher	Bridgwater Bay SSSI / near West Huntspill	ST34C	03/05/1993	03/05/1993	present; Count [1]	*	*		*			*			*	*	bird
Tyto alba	Barn Owl	West Huntspill	ST34C	25/03/2015	25/03/2015	Count [1]	*			*						*	*	bird
Picus viridis	Green Woodpecker	West Huntspill	ST3044	24/07/1985	24/07/1985	juvenile; Count [1]	*										*	bird
Tyto alba	Barn Owl	West Huntspill	ST34C	13/06/2014	13/06/2014	Juvenile; Count [1]	*			*						*	*	bird
Athene noctua	Little Owl	West Huntspill	ST34C	24/05/1985	27/05/1985	Adult; Count [1]	*									*	*	bird
Emberiza schoeniclus	Reed Bunting	West Huntspill	ST3044	01/05/1984	31/05/1984	present; Count [1]	*				*		*		*	*	*	bird
Phoenicurus phoenicurus	Redstart	West Huntspill	ST3044	04/05/1985	04/05/1985	male; Count [1]	*						*				*	bird
Athene noctua	Little Owl	Cadwells Lane, West Huntspill	ST34C	08/06/1983	08/06/1983	Count [1]	*									*	*	bird
Buteo buteo	Buzzard	West Huntspill	ST3044	22/10/1984	22/10/1984	Adult; Count [1]	*											bird
Phylloscopus trochilus	Willow Warbler	West Huntspill	ST3044	05/04/1985	28/04/1985	Adult; Count [4]							*			*		bird
Emberiza citrinella	Yellowhammer	West Huntspill	ST3044	18/11/1985	18/11/1985	Adult; Count [1]	*				*			*	*	*		bird
Sterna hirundo	Common Tern	Huntspill	ST34C	15/08/1976	15/08/1976	Adult; Count [1]	*	*					*			*		bird
Sterna hirundo	Common Tern	West Huntspill	ST34C	02/09/1973	02/09/1973	Adult; Count [1]	*	*					*			*		bird
Pluvialis apricaria	Golden Plover	West Huntspill	ST3044	25/01/1984	25/01/1984	Count [2]	*	*								*	*	bird
Calidris pugnax	Ruff	West Huntspill	ST3044	22/11/1985	05/12/1985	Adult; Count [3]	*	*		*				*		*	*	bird
Numenius arquata	Curlew	West Huntspill, fields	ST3044	05/01/1985	05/01/1985	Adult; Count [300]	*				*			*	*	*	*	bird
Gallinago gallinago	Snipe	West Huntspill, field pond	ST3044	20/07/1984	30/07/1984	Adult; Count [2]	*						*				*	bird
Tringa totanus	Redshank	West Huntspill	ST34C	28/06/1981	28/06/1981	Adult; Count [6]	*						*			*	*	bird
Numenius arquata	Curlew	West Huntspill, fields	ST3044	26/01/1985	26/01/1985	Adult; Count [300]	*				*			*	*	*	*	bird
Gallinago gallinago	Snipe	West Huntspill	ST3044	05/01/1980	05/01/1980	Adult; Count [50]	*						*				*	bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	10/10/1985	27/10/1985	Adult; Count [2]	*											bird
Emberiza calandra	Corn Bunting	West Huntspill side	ST34C	15/01/1987	18/01/1987	Adult; Count [1]								*			*	bird
Motacilla alba subsp. yarrellii	Pied Wagtail	West Huntspill	ST3044	28/08/1979	28/08/1979	Adult; Count [9]	*											bird
Sterna sandvicensis	Sandwich Tern	West Huntspill	ST34C	10/08/1984	10/08/1984	Adult; Count [3]	*	*					*			*		bird
Pluvialis squatarola	Grey Plover	West Huntspill	ST3044	24/02/1985	24/02/1985	Adult; Count [35]	*						*				*	bird
Anser albifrons	White-fronted Goose	West Huntspill	ST3044	22/02/1984	22/02/1984	Adult; Count [1]	*							*			*	bird
Egretta garzetta	Little Egret	burnham on sea	ST34C	24/08/2014	24/08/2014	present; Count [3]	*	*								*	*	bird
Hottonia palustris	Water-violet		ST34C	01/01/1989	31/12/1997	present; Count [+]										*	*	flowering plant
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	31/01/1984	01/03/1984	Adult; Count [1]	*											bird
Linaria cannabina	Linnet	West Huntspill	ST3044	27/09/1980	27/09/1980	Adult; Count [65]	*							*		*	*	bird
Linaria cannabina	Linnet	West Huntspill	ST3044	29/09/1979	29/09/1979	Adult; Count [132]	*							*		*	*	bird
Cettia cetti	Cetti's Warbler	near West Huntspill	ST3044	15/05/1985	20/05/1985	male; Count [1]				*							*	bird

Alauda arvensis	Skylark	West Huntspill	ST3044	01/07/1986	31/07/1986	juvenile; Count [1]					*			*		*	*	bird
Spinus spinus	Siskin	West Huntspill	ST3044	10/12/1984	10/12/1984	Adult; Count [1]	*											bird
Carduelis carduelis	Goldfinch	West Huntspill	ST3044	07/09/1984	22/09/1984	Count [20]	*										*	bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	08/09/1971	08/09/1971	Adult; Count [1]	*											bird
Saxicola rubicola	Stonechat	West Huntspill	ST3044	19/07/1984	19/07/1984	juvenile; Count [1]	*										*	bird
Saxicola rubetra	Whinchat	Cadwells Lane, West Huntspill	ST34C	24/05/1984	24/05/1984	Adult; Count [1]	*							*		*	*	bird
Muscicapa striata	Spotted Flycatcher	West Huntspill	ST3044	08/07/1985	08/07/1985	juvenile; Count [1]	*				*			*	*	*	*	bird
Muscicapa striata	Spotted Flycatcher	West Huntspill	ST3044	20/05/1985	26/05/1985	Adult; Count [1]	*				*			*	*	*	*	bird
Motacilla flava	Yellow Wagtail	West Huntspill	ST3044	27/04/1984	27/04/1984	Adult; Count [10]	*							*		*	*	bird
Oenanthe oenanthe	Wheatear	West Huntspill	ST3044	04/08/1984	04/08/1984	Count [5]	*											bird
Oenanthe oenanthe	Wheatear	West Huntspill	ST3044	16/05/1981	16/05/1981	Adult; Count [9]	*											bird
Oenanthe oenanthe	Wheatear	West Huntspill	ST3044	09/08/1984	24/08/1984	Adult; Count [4]	*											bird
Oenanthe oenanthe	Wheatear	West Huntspill	ST3044	08/06/1985	10/06/1985	male; Count [1]	*											bird
Motacilla flava	Yellow Wagtail	Pawlett to Huntspill River	ST3044	18/08/1981	18/08/1981	Adult; Count [15]	*							*		*	*	bird
Saxicola rubetra	Whinchat	Huntspill	ST34C	05/09/1971	05/09/1971	Adult; Count [2]	*							*		*	*	bird
Hirundo rustica	Swallow	West Huntspill	ST3044	22/04/1985	22/04/1985	Adult; Count [12]	*										*	bird
Thalictrum flavum	Common Meadow-rue	Gold Corner	ST34C	24/09/2000	24/09/2000												*	flowering plant
Falco peregrinus	Peregrine	Parrett, East Bank	ST34C	27/01/1973	27/01/1973	Adult; Count [1]	*	*		*						*	*	bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	04/06/1984	12/06/1984	Count [1]	*											bird
Cuculus canorus	Cuckoo	West Huntspill	ST3044	21/04/1984	30/04/1984	Adult; Count [1]					*			*	*	*		bird
Tringa glareola	Wood Sandpiper	West Huntspill	ST34C	29/08/1991	29/08/1991	present; Count [1]	*	*		*			*			*	*	bird
Columba oenas	Stock Dove	West Huntspill	ST3044	13/05/1988	13/05/1988	Adult; Count [1]							*				*	bird
Columba oenas	Stock Dove	West Huntspill	ST3044	25/08/1980	25/08/1980	Adult; Count [4]							*				*	bird
Falco tinnunculus	Kestrel	West Huntspill	ST3044	06/05/1985	24/05/1985	male; Count [1]	*						*				*	bird
Sagittaria sagittifolia	Arrowhead	Gold Corner	ST34C	24/09/2000	24/09/2000	Count [+]											*	flowering plant
Berula erecta	Lesser Water-parsnip	Gold Corner	ST34C	24/09/2000	24/09/2000	Count [+]											*	flowering plant
Falco tinnunculus	Kestrel	West Huntspill	ST3044	03/06/1981	03/06/1981	female; Count [1]	*						*				*	bird
Leptodon smithii	Prince-of-Wales Feather-moss	Huntspill	ST34C	01/01/1900	31/12/1990												*	moss
Berula erecta	Lesser Water-parsnip		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Ononis spinosa	Spiny Restharrow		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Brassica nigra	Black Mustard		ST34C	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Tringa ochropus	Green Sandpiper	West Huntspill	ST34C	30/01/1993	30/01/1993	present; Count [1]	*			*			*				*	bird
Lemna trisulca	Ivy-leaved Duckweed	Gold Corner	ST34C	24/09/2000	24/09/2000	Count [+]										*		flowering plant
Euphorbia exigua	Dwarf Spurge		ST34C	01/01/1989	31/12/1997	present; Count [+]			*							*		flowering plant
Phoenicurus ochruros	Black Redstart	West Huntspill	ST34C	16/04/1999	16/04/1999	female; Count [1]	*			*				*			*	bird
Veronica polita	Grey Field-speedwell		ST34C	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Cerastium semidecandrum	Little Mouse-ear		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Stellaria pallida	Lesser Chickweed		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lutra lutra	European Otter	West Huntspill	ST3044	21/03/1939	21/03/1939	female; Count [1]	*			*	*				*	*	*	terrestrial mammal
Tyto alba	Barn Owl	West Huntspill	ST34C	01/06/2004	31/08/2004	proved breeding; Count [1]	*			*						*	*	bird
Lemna trisulca	Ivy-leaved Duckweed		ST34C	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Brassica nigra	Black Mustard	Gold Corner	ST34C	14/06/1998	14/06/1998	Count [+]										*		flowering plant
Tyto alba	Barn Owl	River Huntspill	ST34C	13/06/2014	13/06/2014	Juvenile; Count [2]	*			*						*	*	bird
Elytrigia juncea	Sand Couch		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Hordeum marinum	Sea Barley		ST34C	01/01/1989	31/12/1997	present; Count [+]			*		*				*	*	*	flowering plant
Egretta garzetta	Little Egret	West Huntspill	ST34C	28/04/2015	28/04/2015	Count [29]	*	*								*	*	bird
Arvicola amphibius	European Water Vole	Huntspill River	ST3144	24/09/2002	24/09/2002	Burrow; Count [2]			*	*	*				*	*	*	terrestrial mammal
Falco columbarius	Merlin	S. of Huntspill R.	ST34C	17/11/1984	17/11/1984	female; Count [1]	*	*		*				*		*	*	bird
Motacilla alba subsp. yarrellii	Pied Wagtail	West Huntspill	ST3044	27/09/1980	27/09/1980	Adult; Count [8]	*											bird
Falco columbarius	Merlin	West Huntspill	ST34C	31/12/1984	31/12/1984	female; Count [1]	*	*		*				*		*	*	bird
Anas platyrhynchos	Mallard	West Huntspill	ST3044	29/09/1979	29/09/1979	Adult; Count [32]	*						*					bird
Anas platyrhynchos	Mallard	West Huntspill	ST3044	08/07/1984	08/07/1984	Count [3]	*						*					bird
Anas platyrhynchos	Mallard	West Huntspill	ST3044	20/08/1980	20/08/1980	Adult; Count [29]	*						*					bird
Anas platyrhynchos	Mallard	West Huntspill	ST3044	01/05/1988	31/05/1988		*						*					bird
Vanellus vanellus	Lapwing	West Huntspill	ST3044	31/12/1984	31/12/1984	Adult; Count [700]	*				*			*	*	*	*	bird

Gallinula chloropus	Moorhen	West Huntspill	ST3044	10/07/1985	10/07/1985	present; Count [5]	*											bird
Gallinula chloropus	Moorhen	West Huntspill	ST3044	01/04/1984	30/04/1984	Nest; Count [1]	*											bird
Tringa erythropus	Spotted Redshank	West Huntspill	ST3044	12/08/1979	12/08/1979	Adult; Count [5]	*						*					bird
Turdus iliacus	Redwing	West Huntspill	ST3044	20/02/1985	20/02/1985	Adult; Count [75]				*				*			*	bird
Phylloscopus collybita	Chiffchaff	West Huntspill	ST3044	19/04/1984	19/04/1984	Adult; Count [3]										*		bird
Turdus pilaris	Fieldfare	West Huntspill	ST3044	01/11/1981	01/11/1981	Adult; Count [550]				*				*			*	bird
Turdus torquatus	Ring Ouzel	West Huntspill	ST3044	22/04/1985	22/04/1985	female; Count [1]	*				*			*	*	*	*	bird
Pyrrhula pyrrhula	Bullfinch	West Huntspill	ST3044	03/12/1985	19/12/1985	Adult; Count [2]							*			*	*	bird
Charadrius hiaticula	Ringed Plover	West Huntspill	ST34C	10/03/1985	10/03/1985	Adult; Count [6]	*							*		*	*	bird
Pluvialis apricaria	Golden Plover	West Huntspill	ST3044	10/02/1984	22/02/1984	Count [1]	*	*								*	*	bird
Pluvialis apricaria	Golden Plover	West Huntspill	ST3044	31/12/1984	31/12/1984	Adult; Count [12]	*	*								*	*	bird
Turdus pilaris	Fieldfare	West Huntspill	ST3044	17/11/1984	17/11/1984	Adult; Count [65]				*				*			*	bird
Falco columbarius	Merlin	West Huntspill	ST34C	14/10/1984	23/10/1984	Count [1]	*	*		*				*		*	*	bird
Phoenicurus phoenicurus	Redstart	West Huntspill	ST3044	02/05/1985	19/05/1985	female; Count [2]	*						*				*	bird
Aythya marila	Scaup	Huntspill	ST3144	03/04/1977	03/04/1977	male; Count [1]	*			*	*			*	*	*	*	bird
Tringa totanus	Redshank	West Huntspill	ST34C	03/06/1981	03/06/1981	Adult; Count [4]	*						*			*	*	bird
Saxicola rubicola	Stonechat	West Huntspill	ST3044	16/02/1980	16/02/1980	male; Count [1]	*										*	bird
Tadorna tadorna	Shelduck	West Huntspill	ST34C	11/07/1988	11/07/1988	Adult; Count [34]	*						*			*	*	bird
Chloris chloris	Greenfinch	West Huntspill	ST3044	23/09/1980	23/09/1980	Adult; Count [14]	*											bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	08/08/1984	17/09/1984	Count [1]	*											bird
Asio flammeus	Short-eared Owl	Huntspill	ST34C	19/12/2014	19/12/2014	present; Count [2]	*	*					*			*	*	bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	04/01/1985	19/01/1985	male; Count [1]	*											bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	15/07/1984	15/07/1984	Count [1]	*											bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	01/05/1984	31/05/1984	Count [1]	*											bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	09/07/1984	09/07/1984	Count [1]	*											bird
Hirundo rustica	Swallow	West Huntspill	ST3044	26/10/1985	26/10/1985	Adult; Count [2]	*										*	bird
Lysimachia vulgaris	Yellow Loosestrife		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Alcedo atthis	Kingfisher	River Huntspill	ST34C	07/09/1980	07/09/1980	Adult; Count [1]	*	*		*			*			*	*	bird
Alcedo atthis	Kingfisher	West Huntspill	ST34C	01/10/1984	01/10/1984	Count [1]	*	*		*			*			*	*	bird
Columba oenas	Stock Dove	West Huntspill	ST3044	22/12/1984	22/12/1984	Adult; Count [84]							*				*	bird
Vanellus vanellus	Lapwing	West Huntspill	ST3044	07/07/1985	07/07/1985	Adult; Count [175]	*				*			*	*	*	*	bird
Numenius phaeopus	Whimbrel	West Huntspill	ST3044	01/08/1984	08/08/1984	Adult; Count [12]	*			*				*			*	bird
Vanellus vanellus	Lapwing	West Huntspill	ST3044	13/10/1984	13/10/1984	Adult; Count [1]	*				*			*	*	*	*	bird
Tringa erythropus	Spotted Redshank	West Huntspill	ST3044	04/05/1979	04/05/1979	Adult; Count [1]	*						*					bird
Ardea cinerea	Grey Heron	West Huntspill	ST3044	01/03/1984	31/03/1984	Nest; Count [2]											*	bird
Ardea cinerea	Grey Heron	West Huntspill	ST3044	15/07/1984	15/07/1984	Adult; Count [5]											*	bird
Saxicola rubicola	Stonechat	West Huntspill	ST3044	02/11/1985	05/12/1985	Adult; Count [2]	*										*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	24/03/1985	24/03/1985	Adult; Count [2]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	02/03/1984	06/03/1984	Adult; Count [2]					*			*	*	*	*	bird
Sympetrum striolatum	Common Darter		ST3144	08/07/1936	08/07/1936				*									insect - dragonfly (Odonata)
Lutra lutra	European Otter	Huntspill	ST3144	01/01/1985	31/12/1985	droppings; Count [2]	*			*	*				*	*	*	terrestrial mammal
Tyto alba	Barn Owl	West Huntspill	ST34C	23/12/1980	23/12/1980	Count [1]	*			*						*	*	bird
Emberiza cirlus	Cirl Bunting	Huntspill	ST34C	29/07/1962	29/07/1962	male; Count [1]	*			*	*			*	*	*	*	bird
Emberiza citrinella	Yellowhammer	West Huntspill	ST3044	02/10/1984	21/10/1984	Adult; Count [5]	*				*			*	*	*		bird
Athene noctua	Little Owl	Sloway Lane, West Huntspill	ST34C	01/11/1981	01/11/1981	Adult; Count [1]	*									*	*	bird
Tringa nebularia	Greenshank	West Huntspill, field ponds	ST3044	20/07/1984	21/07/1984	Adult; Count [1]	*			*			*				*	bird
Chlidonias niger	Black Tern	West Huntspill	ST3044	04/05/1980	04/05/1980	Adult; Count [3]	*	*		*						*	*	bird
Motacilla alba subsp. alba	White Wagtail	West Huntspill	ST3044	23/09/1984	23/09/1984	Adult; Count [50]	*											bird
Phoenicurus phoenicurus	Redstart	West Huntspill	ST3044	04/08/1984	09/08/1984	juvenile; Count [1]	*						*				*	bird
Athene noctua	Little Owl	West Huntspill	ST34C	09/10/1985	24/10/1985	Adult; Count [1]	*									*	*	bird
Turdus iliacus	Redwing	West Huntspill	ST3044	12/12/1985	12/12/1985	Adult; Count [150]				*				*			*	bird
Turdus pilaris	Fieldfare	West Huntspill	ST3044	15/11/1985	15/11/1985	Adult; Count [60]				*				*			*	bird
Turdus pilaris	Fieldfare	West Huntspill	ST3044	29/04/1984	29/04/1984	Adult; Count [1]				*				*			*	bird
Turdus pilaris	Fieldfare	West Huntspill	ST3044	25/10/1985	25/10/1985	Adult; Count [3]				*				*			*	bird
Phoenicurus phoenicurus	Redstart	West Huntspill	ST3044	22/08/1985	30/08/1985	Adult; Count [3]	*						*				*	bird
Athene noctua	Little Owl	West Huntspill	ST34C	04/10/1984	28/10/1984	Adult; Count [1]	*									*	*	bird
Picus viridis	Green Woodpecker	West Huntspill	ST3044	03/01/1985	23/01/1985	Adult; Count [1]	*										*	bird

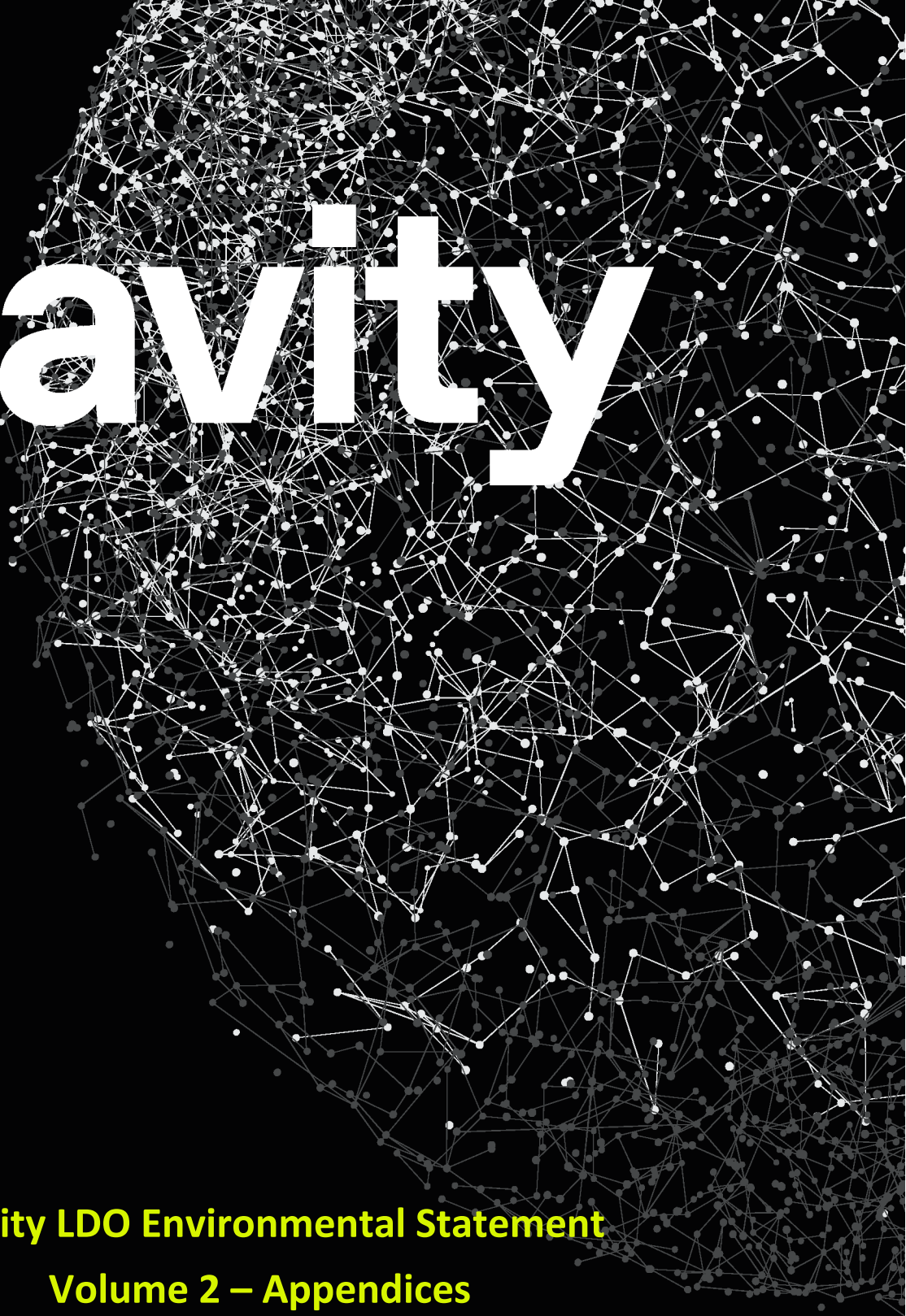
Picus viridis	Green Woodpecker	West Huntspill	ST3044	13/10/1984	13/10/1984	Adult; Count [1]	*									*	bird
Tyto alba	Barn Owl	West Huntspill	ST34C	11/06/2014	11/06/2014	Juvenile; Count [1]	*			*						*	*	bird
Athene noctua	Little Owl	West Huntspill	ST34C	03/01/1985	05/01/1985	Adult; Count [1]	*									*	*	bird
Numenius arquata	Curlew	West Huntspill, fields	ST3044	12/07/1984	12/07/1984	Adult; Count [86]	*				*			*	*	*	*	bird
Scolopax rusticola	Woodcock	Cadwells Lane, West Huntspill	ST34C	20/01/1985	20/01/1985	Adult; Count [1]	*							*		*	*	bird
Numenius arquata	Curlew	West Huntspill	ST3044	31/12/1984	31/12/1984	Adult; Count [300]	*				*			*	*	*	*	bird
Aythya ferina	Pochard	West Huntspill	ST3044	24/02/1985	24/02/1985	Adult; Count [10]	*							*			*	bird
Aythya ferina	Pochard	West Huntspill	ST3044	02/03/1988	02/03/1988	Adult; Count [2]	*							*			*	bird
Gallinago gallinago	Snipe	West Huntspill	ST3044	06/08/1984	06/08/1984	Adult; Count [3]	*						*				*	bird
Numenius arquata	Curlew	West Huntspill, fields	ST3044	08/11/1984	08/11/1984	Adult; Count [175]	*				*			*	*	*	*	bird
Pluvialis apricaria	Golden Plover	West Huntspill	ST3044	26/11/1985	26/11/1985	Adult; Count [30]	*	*								*	*	bird
Bucephala clangula	Goldeneye	West Huntspill	ST3044	26/01/1985	26/01/1985	Adult; Count [2]	*			*			*				*	bird
Scolopax rusticola	Woodcock	Cadwells Lane, West Huntspill	ST34C	20/02/1985	20/02/1985	Adult; Count [1]	*							*		*	*	bird
Limosa limosa	Black-tailed Godwit	West Huntspill	ST3044	24/02/1985	24/02/1985	Adult; Count [9]	*			*				*		*	*	bird
Limosa limosa	Black-tailed Godwit	West Huntspill	ST3044	15/12/1984	15/12/1984	Adult; Count [1]	*			*				*		*	*	bird
Calidris pugnax	Ruff	West Huntspill	ST3044	25/01/1984	25/01/1984	Count [3]	*	*		*				*		*	*	bird
Aythya fuligula	Tufted Duck	West Huntspill	ST3044	27/03/1988	31/03/1988	Adult; Count [1]	*											bird
Calidris pugnax	Ruff	West Huntspill	ST3044	28/06/1981	28/06/1981	female; Count [1]	*	*		*				*		*	*	bird
Mergus merganser	Goosander	Huntspill River, near Sloway Lane	ST34C	12/12/1985	12/12/1985	female; Count [8]	*									*	*	bird
Numenius arquata	Curlew	West Huntspill	ST3044	19/05/1981	19/05/1981	Adult; Count [6]	*				*			*	*	*	*	bird
Falco peregrinus	Peregrine	West Huntspill	ST34C	24/02/1985	24/02/1985	male; Count [1]	*	*		*						*	*	bird
Limosa limosa	Black-tailed Godwit	West Huntspill	ST3044	28/06/1981	28/06/1981	Adult; Count [3]	*			*				*		*	*	bird
Tadorna tadorna	Shelduck	Huntspill	ST34C	03/10/1971	03/10/1971	Adult; Count [10]	*						*			*	*	bird
Ardea cinerea	Grey Heron	West Huntspill	ST3044	01/05/1984	31/05/1984	juvenile; Count [7]											*	bird
Tringa nebularia	Greenshank	West Huntspill	ST3044	04/08/1975	04/08/1975	Adult; Count [1]	*			*			*				*	bird
Ardea cinerea	Grey Heron	West Huntspill	ST3044	23/04/1976	23/04/1976	Adult; Count [1]											*	bird
Calidris pugnax	Ruff	West Huntspill	ST3044	15/12/1985	15/12/1985	Adult; Count [2]	*	*		*				*		*	*	bird
Calidris pugnax	Ruff	West Huntspill	ST3044	30/06/1985	30/06/1985	Adult; Count [1]	*	*		*				*		*	*	bird
Calidris pugnax	Ruff	West Huntspill	ST3044	15/12/1985	15/12/1985	Adult; Count [2]	*	*		*				*		*	*	bird
Calidris pugnax	Ruff	West Huntspill	ST3044	30/06/1985	30/06/1985	Adult; Count [1]	*	*		*				*		*	*	bird
Calidris pugnax	Ruff	West Huntspill & fields	ST3044	23/10/1985	06/11/1985	Adult; Count [3]	*	*		*				*		*	*	bird
Lymnocryptes minimus	Jack Snipe	West Huntspill, field pond	ST3044	01/10/1984	01/10/1984	Adult; Count [1]	*										*	bird
Charadrius hiaticula	Ringed Plover	West Huntspill	ST34C	10/08/1983	10/08/1983	Adult; Count [65]	*							*		*	*	bird
Alcedo atthis	Kingfisher	West Huntspill	ST34C	31/12/1989	31/12/1989	Count [1]	*	*		*			*			*	*	bird
Picus viridis	Green Woodpecker	West Huntspill	ST3044	03/05/1985	03/05/1985	Adult; Count [1]	*										*	bird
Apium graveolens	Wild Celery		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Lathyrus nissolia	Grass Vetchling		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Falco subbuteo	Hobby	West Huntspill	ST34C	29/04/1984	30/04/1984	Count [1]	*			*						*	*	bird
Egretta garzetta	Little Egret	Sloway,Brue	ST34C	28/04/2018	28/04/2018	Droppings; Count [1]	*	*								*	*	bird
Lullula arborea	Woodlark	West Huntspill	ST34C	24/11/1985	24/11/1985	Adult; Count [1]		*		*	*				*	*	*	bird
Acanthis flammea	Common (Mealy) Redpoll	West Huntspill	ST3044	29/04/1984	29/04/1984	Adult; Count [1]	*						*					bird
Linaria cannabina	Linnet	West Huntspill	ST3044	17/08/1980	20/08/1980	Adult; Count [80]	*							*		*	*	bird
Linaria cannabina	Linnet	West Huntspill	ST3044	01/01/1987	01/01/1987	Adult; Count [45]	*							*		*	*	bird
Linaria cannabina	Linnet	West Huntspill	ST3044	16/02/1980	16/02/1980	Adult; Count [16]	*							*		*	*	bird
Linaria cannabina	Linnet	West Huntspill	ST3044	21/02/1987	21/02/1987	Adult; Count [35]	*							*		*	*	bird
Linaria cannabina	Linnet	West Huntspill	ST3044	17/09/1979	17/09/1979	Adult; Count [23]	*							*		*	*	bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	03/05/1985	31/05/1985	Adult; Count [1]	*											bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	03/06/1985	14/06/1985	Adult; Count [2]					*			*	*	*	*	bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	01/04/1984	28/04/1984	Count [1]	*											bird
Alcedo atthis	Kingfisher	West Huntspill	ST34C	23/09/1980	27/09/1980	Adult; Count [1]	*	*		*			*			*	*	bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	15/07/1984	31/08/1984	Adult; Count [1]	*											bird
Acanthis flammea	Common (Mealy) Redpoll	West Huntspill	ST3044	04/11/1984	04/11/1984	Adult; Count [1]	*						*					bird
Alcedo atthis	Kingfisher	Cadwells Lane, West Huntspill	ST34C	19/01/1985	07/02/1985	Count [1]	*	*		*			*			*	*	bird
Falco tinnunculus	Kestrel	West Huntspill	ST3044	09/07/1984	26/07/1984	Adult; Count [2]	*						*				*	bird
Athene noctua	Little Owl	West Huntspill	ST34C	03/06/1984	28/07/1984	Adult; Count [1]	*									*	*	bird
Periparus ater	Coal Tit	West Huntspill	ST3044	04/11/1985	24/12/1985	Adult; Count [1]	*											bird

Chloris chloris	Greenfinch	West Huntspill	ST3044	01/11/1981	01/11/1981	Adult; Count [44]	*											bird
Chloris chloris	Greenfinch	West Huntspill	ST3044	20/08/1980	20/08/1980	Adult; Count [11]	*											bird
Tringa ochropus	Green Sandpiper	West Huntspill, Field Ponds	ST3044	02/08/1984	30/08/1984	Adult; Count [5]	*			*			*				*	bird
Beta vulgaris subsp. maritima	Sea Beet		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Podiceps cristatus	Great Crested Grebe	near West Huntspill	ST3044	01/05/1985	31/05/1985	Count [2]											*	bird
Rumex hydrolapathum	Water Dock	Gold Corner	ST34C	24/09/2000	24/09/2000	Count [+]											*	flowering plant
Falco tinnunculus	Kestrel	West Huntspill	ST3044	22/05/1985	22/05/1985	Adult; Count [1]	*						*				*	bird
Petroselinum segetum	Corn Parsley		ST34C	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	07/07/1985	07/07/1985	juvenile; Count [1]	*											bird
Calidris minuta	Little Stint	West Huntspill	ST3044	06/10/1984	26/10/1984	Adult; Count [1]	*											bird
Phylloscopus collybita	Chiffchaff	West Huntspill	ST3044	15/10/1984	25/10/1984	Adult; Count [2]										*		bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	23/01/1985	23/01/1985	Adult; Count [4]					*			*	*	*	*	bird
Malva neglecta	Dwarf Mallow		ST34C	01/01/1989	31/12/1997	present; Count [+]										*		flowering plant
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	08/07/1985	28/08/1985	Adult; Count [1]	*											bird
Spinus spinus	Siskin	West Huntsill	ST3044	22/10/1984	17/11/1984	Adult; Count [8]	*											bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	01/03/1985	26/03/1985	Adult; Count [2]	*											bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	04/11/1984	27/11/1984	Adult; Count [1]	*											bird
Muscicapa striata	Spotted Flycatcher	West Huntspill	ST3044	01/07/1981	31/08/1981	Adult; Count [4]	*				*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	15/08/1985	19/08/1985	Adult; Count [4]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	28/12/1985	28/12/1985	Adult; Count [10]					*			*	*	*	*	bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	01/11/1981	01/11/1981	Adult; Count [2]	*											bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	01/09/1984	24/09/1984	Adult; Count [1]	*											bird
Dendrocopos minor	Lesser Spotted Woodpecker	Main Road, West Huntspill	ST34C	05/10/1981	05/10/1981	male; Count [1]	*							*		*	*	bird
Recurvirostra avosetta	Avocet	Huntspill	ST34C	22/01/2014	22/01/2014	present; Count [130]	*	*		*			*			*	*	bird
Glebionis segetum	Corn Marigold	Gold Corner	ST34C	14/06/1998	14/06/1998	Count [+]			*							*	*	flowering plant
Trifolium arvense	Hare's-foot Clover		ST34C	01/01/1989	31/12/1997	present; Count [+]											*	flowering plant
Asio flammeus	Short-eared Owl	Huntspill	ST34C	07/12/2014	07/12/2014	present; Count [1]	*	*					*			*	*	bird
Regulus ignicapilla	Firecrest	Sloway Lane, West Huntspill	ST34C	30/10/1981	30/10/1981	Adult; Count [1]	*			*						*	*	bird
Tringa totanus	Redshank	burnham on sea	ST34C	24/08/2014	24/08/2014	present; Count [150]	*						*			*	*	bird
Egretta garzetta	Little Egret	Bleak Bridge, River Huntspill	ST34C	01/08/1999	01/08/1999	present; Count [5]	*	*								*	*	bird
Columba oenas	Stock Dove	West Huntspill	ST3044	25/04/1984	25/04/1984	Pair; Count [1]							*				*	bird
Asio flammeus	Short-eared Owl	West Huntspill	ST34C	31/12/1984	31/12/1984	Adult; Count [1]	*	*					*			*	*	bird
Regulus regulus	Goldcrest	West Huntspill	ST3044	06/11/1985	26/11/1985	Adult; Count [4]	*											bird
Regulus regulus	Goldcrest	West Huntspill	ST3044	19/01/1985	04/02/1985	Adult; Count [1]	*											bird
Motacilla cinerea	Grey Wagtail	West Huntspill	ST3044	01/03/1984	31/03/1984	Adult; Count [2]	*							*				bird
Falco tinnunculus	Kestrel	West Huntspill	ST3044	03/03/1984	31/03/1984	Adult; Count [2]	*						*				*	bird
Motacilla cinerea	Grey Wagtail	West Huntspill	ST3044	05/02/1985	14/02/1985	Adult; Count [1]	*							*				bird
Motacilla cinerea	Grey Wagtail	West Huntspill	ST3044	13/09/1984	21/10/1984	Adult; Count [4]	*							*				bird
Falco peregrinus	Peregrine	near Huntspill River	ST34C	01/10/1982	01/10/1982	Adult; Count [1]	*	*		*						*	*	bird
Dendrocopos major	Great Spotted Woodpecker	West Huntspill	ST3044	20/11/1985	25/12/1985	Adult; Count [1]	*											bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	07/07/1985	18/07/1985	Adult; Count [2]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	30/09/1985	30/09/1985	Adult; Count [5]					*			*	*	*	*	bird
Regulus regulus	Goldcrest	West Huntspill	ST3044	12/10/1985	29/10/1985	Adult; Count [5]	*											bird
Regulus ignicapilla	Firecrest	West Huntspill Churchyard	ST34C	10/10/1984	10/10/1984	Count [1]	*			*						*	*	bird
Saxicola rubicola	Stonechat	West Huntspill	ST3044	07/07/1985	07/07/1985	juvenile; Count [2]	*										*	bird
Passer domesticus	House Sparrow	West Huntspill	ST3044	25/08/1984	25/08/1984	Adult; Count [525]					*			*	*	*		bird
Motacilla flava	Yellow Wagtail	West Huntspill	ST3044	18/08/1981	18/08/1981	Adult; Count [1]	*							*		*	*	bird
Oenanthe oenanthe	Wheatear	West Huntspill	ST3044	23/09/1981	23/09/1981	Adult; Count [2]	*											bird
Oenanthe oenanthe	Wheatear	West Huntspill	ST3044	23/09/1980	27/09/1980	Adult; Count [4]	*											bird
Falco subbuteo	Hobby	West Huntspill	ST34C	25/05/1985	25/05/1985	Adult; Count [1]	*			*						*	*	bird
Regulus regulus	Goldcrest	West Huntspill	ST3044	04/12/1985	29/12/1985	Adult; Count [3]	*											bird
Regulus regulus	Goldcrest	West Huntspill	ST3044	01/03/1985	26/03/1985	Adult; Count [1]	*											bird

Alcedo atthis	Kingfisher	Brue/Rhyne, Railway Bridge	ST34C	26/04/2014	26/04/2014	Individual; Count [1]	*	*		*			*			*	*	bird
Alauda arvensis	Skylark	West Huntspill	ST3044	16/02/1980	16/02/1980	Adult; Count [11]					*			*		*	*	bird
Accipiter nisus	Sparrowhawk	West Huntspill	ST3044	02/06/1984	02/06/1984	Adult; Count [1]	*											bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	21/07/1984	21/07/1984	Adult; Count [4]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	10/05/1985	12/05/1985	Pair; Count [2]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	13/08/1984	13/08/1984	Adult; Count [4]					*			*	*	*	*	bird
Perdix perdix	Grey Partridge	West Huntspill	ST3044	30/11/1985	04/12/1985	Adult; Count [5]					*			*	*	*	*	bird
Passer montanus	Tree Sparrow	West Huntspill	ST3044	12/10/1984	12/10/1984	Adult; Count [3]					*			*	*	*	*	bird
Saxicola rubetra	Whinchat	West Huntspill	ST34C	19/08/1985	19/08/1985	Adult; Count [1]	*							*		*	*	bird
Certhia familiaris	Treecreeper	West Huntspill	ST3044	13/02/1984	13/02/1984	Adult; Count [1]	*											bird
Calidris fuscicollis	White-rumped Sandpiper	West Huntspill, Field Ponds	ST3044	14/08/1984	16/08/1984	Adult; Count [1]	*											bird
Anthus trivialis	Tree Pipit	West Huntspill	ST3044	29/09/1979	29/09/1979	Adult; Count [1]	*				*			*	*	*		bird
Acrocephalus schoenobaenus	Sedge Warbler	West Huntspill	ST3044	18/04/1984	30/04/1984	male; Count [4]										*		bird
Anthus richardi	Richard's Pipit	West Huntspill	ST3044	03/11/1985	03/11/1985	Adult; Count [1]	*											bird
Anthus pratensis	Meadow Pipit	West Huntspill	ST3044	27/09/1980	27/09/1980	Adult; Count [3]	*						*					bird
Acrocephalus schoenobaenus	Sedge Warbler	West Huntspill	ST3044	24/05/1984	24/05/1984	Adult; Count [9]										*		bird
Anthus pratensis	Meadow Pipit	West Huntspill	ST3044	29/09/1979	29/09/1979	Adult; Count [11]	*						*					bird
Alcedo atthis	Kingfisher		ST34C	27/04/2014	27/04/2014	adult; Count [1]	*	*		*			*			*	*	bird
Linaria cannabina	Linnet	West Huntspill	ST3044	07/09/1980	07/09/1980	Adult; Count [50]	*							*		*	*	bird
Circus cyaneus	Hen Harrier	West Huntspill	ST3044	22/11/1985	24/11/1985	immature; Count [1]	*	*		*	*			*		*	*	bird
Falco columbarius	Merlin	Huntspill	ST34C	27/01/1973	27/01/1973	Adult; Count [1]	*	*		*				*		*	*	bird
Turdus iliacus	Redwing	West Huntspill	ST3044	20/10/1985	24/10/1985	Adult; Count [60]				*				*			*	bird
Turdus iliacus	Redwing	West Huntspill	ST3044	17/11/1984	17/11/1984	Adult; Count [100]				*				*			*	bird
Phylloscopus collybita	Chiffchaff	West Huntspill	ST3044	27/03/1984	27/03/1984	male; Count [2]										*		bird
Phylloscopus collybita	Chiffchaff	West Huntspill	ST3044	16/08/1984	17/08/1984	Adult; Count [3]										*		bird
Phylloscopus collybita	Chiffchaff	West Huntspill	ST3044	03/04/1985	03/04/1985	Adult; Count [4]										*		bird
Phylloscopus collybita	Chiffchaff	West Huntspill	ST3044	01/01/1985	13/01/1985	Adult; Count [2]										*		bird
Strix aluco	Tawny Owl	West Huntspill	ST3044	07/09/1980	07/09/1980	Adult; Count [1]	*						*					bird
Turdus pilaris	Fieldfare	West Huntspill	ST3044	17/12/1985	17/12/1985	Adult; Count [800]				*				*			*	bird
Turdus iliacus	Redwing	West Huntspill	ST3044	16/10/1985	16/10/1985	Adult; Count [6]				*				*			*	bird
Anthus pratensis	Meadow Pipit	West Huntspill	ST3044	05/10/1985	05/10/1985	Adult; Count [200]	*						*					bird
Tringa ochropus	Green Sandpiper	West Huntspill	ST3044	01/10/1984	18/10/1984	Adult; Count [3]	*			*			*				*	bird
Anas platyrhynchos	Mallard	West Huntspill	ST3044	01/06/1985	30/06/1985	present frequent; Count [1]; juvenile; Count [10]	*						*					bird

Gravity

Smart Campus



Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.2

Bat Activity Survey Report

CONTENTS

PLANS

APPENDICES

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.3. Bat Activity Survey Report

1.3.1. This document describes the results of bat activity survey work undertaken and provides a broad assessment of the current ecological interest of the Site as a whole, based upon field and desk-based studies.

1.3.2. Potential roosting habitat is also present in the form of Trees and Buildings is discussed with the Bat Roost Survey Report submitted as a separate appendix to the ES Chapter.

1.3.3. The importance of the habitats within the site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1 The methodology utilised for the bat survey work can be split into two areas, a desk study and specific faunal survey work. These are discussed in more detail below.

2.2 Desk Study

2.2.1 In order to compile background information on the use of the Site and its immediate surroundings by bats, Ecology Solutions contacted Somerset Ecological Records Centre (SERC). The records received are collated data from a number of sources and provide information on an array of bat species (covering a 3km search radius from the application site).

2.2.2 Information provided by SERC is referred to where relevant.

2.3 Bat Activity Surveys

2.3.1 Evening activity surveys were undertaken to ascertain whether the Site and surrounding area supports any features of potential importance for foraging and commuting bats. A total of seven surveys were undertaken monthly between April 2020 and October 2020.

2.3.2 The evening activity surveys were conducted from sunset to approximately 2 hours after sunset. Surveyors utilised EchoMeter Touch 2 Pro (EMT) bat detectors to aid identification of bats and record data. Surveyors walked transects in order to encompass relevant features of potential value to foraging and commuting bats.

2.3.3 In addition to the activity transects, automated detectors (Wildlife Acoustic Song Meter 4) were also deployed for several consecutive nights following the activity surveys at a strategic location to collect longer term data regarding the use of the Site by foraging and commuting bats. All bat data recorded was subsequently analysed using Kaleidoscope bat sound analysis software.

2.3.4 It should be noted that detectors may experience errors when deployed. Such an occurrence can be caused by a multitude of technical factors including issues with batteries, the internal clock, or the corruption of data. As such, on occasions, it is possible that deployed detectors either fail to record (or only partially record) data, or the data is corrupted and cannot be processed. In order to ensure that such incidents do not significantly impact the robustness of the survey, care has been taken to ensure that should any one detector fail, the survey area will remain adequately covered. In this instance, where detectors have failed for any given survey period, it is considered that the robustness of the wider survey has not been effected.

3. SURVEY RESULTS

3.4 The Site is noted to contain habitats suitable for bats foraging and commuting and is considered to be of moderate suitability for this species group. Potential roosting habitat is also present in the form of Trees and Buildings is discussed with the Bat Roost Survey Report submitted as a separate appendix to the ES Chapter.

3.5 **Previous surveys.** A suite of surveys was undertaken by EPI in 2009, including activity surveys. Furthermore, Ecology Solutions undertook additional update survey work in 2011 and 2017. The findings are summarised below.

3.6 Activity surveys undertaken in 2009 and 2011 recorded 5 species of bat including; Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pymaeus*, Brown Long-eared, Noctule *Nyctalus noctula* and a *Myotis* species. The majority of this activity was associated with Pipistrelle species.

3.7 Bat activity surveys undertaken in 2017 recorded a broadly comparable number of species. The majority of registrations are again attributed to Soprano Pipistrelle and Common Pipistrelle with Brown Long-eared Bat, Noctule and Serotine *Eptesicus serotinus* also recorded in lesser numbers. In addition, several registrations for rarer species including; Greater Horseshoe Bat *Rhinolophus ferrumequinum*, Lesser Horseshoe *Rhinolophus hipposideros* and Barbastelle *Barbastella barbastellus* were recorded. Registrations for these species were levels indicative use of the Site by single / small numbers bats on an occasional basis

3.8 The majority of the bat activity was associated with the eastern boundary, with higher levels of activity in the south east close to woodland and also with woodland edge / scrub habitat in the west and north west. In addition, localised activity was recorded along the southern boundary and in the centre of the Site.

3.9 Barbastelle and Lesser Horseshoe registrations (both in low numbers) were recorded in the south east and along the southern boundary. Greater Horseshoe registrations were recorded in the west and north west.

3.10 **Update surveys.** Bat surveys (both activity and automated surveys) have been conducted across the active season in 2020. The results of the surveys are presented below in chronological order.

3.11 Five bat activity transect surveys were undertaken at the Site during 2020, in line with methodology outlined in section 2 above. Table 1 below outlines the weather conditions during each survey visit.

Date	Weather Conditions
28.05.2020	20ºC, 10% Cloud Cover, Dry, Moderate Winds
25.06.2020	22ºC, 10% Cloud Cover, Dry, Light Breeze
27.07.2020	17ºC, 80% Cloud Cover, Dry, Light Breeze
03.09.2020	16ºC, 10% Cloud Cover, Dry, Moderate Breeze
30.09.2020	14ºC, 70% Cloud Cover, Dry, Light Breeze

Table 1: Weather conditions during each bat activity survey.

Automated Detector Survey 27th April - 12th May

3.12 Automated detectors were deployed throughout the Site at locations **D1**, **D2**, **D3** and **D4** (see Plan ECO1) and set to record for 16 consecutive nights from April 27th to May 12th. The results from each night are detailed below in Tables 1 to 3 (Appendix 12.2A) for each of the detector locations. The detector placed at location **D4** experienced technical difficulties resulting in no recordings being made for this survey period. However, given the coverage provided by the other detectors deployed, this is not considered have significantly impacted the robustness of the survey (see paragraph 2.3.12 for further details).

3.13 The automated detector survey undertaken between 27th April and 12th May showed mostly consistent bat activity within the Site, although some nights recorded relatively higher registrations than others. Bat activity was noted to be reduced towards the end of the survey period in all three locations.

3.14 The detector placed at **D3** recorded the highest amount of bat registrations during this survey period with relatively high numbers of *Nyctalus* and Common Pipistrelle registrations.

3.15 The detector placed at **D1** recorded the lowest amount of bat registrations during the survey period with the highest proportion of registrations associated with *Nyctalus* species although the majority of these registrations were recorded on just two nights (27th April and 3rd May)

3.16 The detector placed at **D3** also recorded the highest total registrations of notable species, namely Barbastelle, Greater Horseshoe and Lesser Horseshoe (54 total registrations) as well as the highest total counts of Barbastelle (2 registrations), Greater Horseshoe (45 registrations) and Lesser Horseshoe (7 registrations).

28th May Activity Survey

3.17 The activity survey undertaken on May 28th recorded at total of 557 registrations, most of which were related to Common Pipistrelle (231 registrations). Other species recorded during this survey were, unidentified *Nyctalus* species (120 registrations), Soprano Pipistrelle (117 registrations), Nathusius' Pipistrelle *Pipistrellus nathusii*, (37 registrations), Serotine (35 registrations), Brown Long-eared Bat (7 registrations), Barbastelle (6

registrations), unidentified *Myotis* species (3 registrations) and Lesser Horseshoe Bat (1 registration).

3.18 The majority of the activity of common and widespread species was associated with southern and south-eastern areas of the Site.

3.19 Nathusius' Pipistrelle is a species not previously recorded during 2017 surveys. The majority of Nathusius' Pipistrelle activity during this survey was associated with the north-eastern and south-eastern areas of the Site.

3.20 The Lesser Horseshoe and Barbastelle registrations were recorded in south and south-eastern areas of the Site.

Automated Detector Survey 28th May - 8th June

3.21 Following the activity survey, automated detectors were deployed throughout the site at locations **D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10** (see Plan ECO1) and set to record for 12 consecutive nights from 28th May to 8th June. The results from each night are detailed below in Tables 4 to 12 (Appendix 12.2A) for each of the detector locations. The detector located at **D8** experienced technical difficulties, resulting in no recordings being made during this survey period. Again, given the coverage provided by the other detectors deployed, this is not considered have significantly impacted the robustness of the survey (see paragraph 2.3.12 for further details).

3.22 The automated detector survey undertaken between 28th May and 8th June showed mostly consistent and frequent bat activity within the Site, although some nights recorded relatively higher registrations than others.

3.23 The detectors placed at **D1** and **D4** recorded the highest amount of bat registrations during this survey period with relatively high numbers of Common Pipistrelle registrations at **D1** and relatively high numbers of Common Pipistrelle, Soprano Pipistrelle and Nathusius' Pipistrelle at **D4**.

3.24 The detectors placed at **D6, D8** and **D10** recorded the lowest amount of bat registrations during the survey period with the highest proportion of registrations associated with Common Pipistrelle in all three locations.

3.25 The detector placed at **D5** recorded the highest total registrations of notable species, namely Barbastelle, Greater Horseshoe and Lesser Horseshoe (41 registrations) as well as the highest counts of Lesser Horseshoe (14 registrations). **D8** returned the highest amount of Greater Horseshoe registrations despite recording a relatively low number of registrations (12 registrations), as noted above. The detector placed at **D6** recorded a high number of registrations associated with notable species (40 registrations) and the highest total registrations of Barbastelle (28 registrations). As with **D8,** the detector placed at **D6** recorded a relatively low number of registrations.

25th June Activity Survey

3.26 The activity survey undertaken on June 25th recorded a total of 378 registrations, most of which were attributed to Common Pipistrelle (172 registrations). Other species recorded during this survey were, Soprano Pipistrelle (113 registrations), unidentified *Nyctalus* species (52 registrations), Serotine (17 registrations), Brown Long-eared Bat (10 registrations), unidentified *Myotis* species (9 registrations), Nathusius' Pipistrelle (5 registrations) and Greater Horseshoe (1 registration).

3.27 The majority of the activity of common and widespread species during this survey was more widespread than in the survey undertaken on the 28th May, although still concentrated along the southern and south-eastern boundaries.

3.28 Nathusius' Pipistrelle was recorded three times throughout the Site in north-western, central and south-eastern areas.

3.29 A single Greater Horseshoe Bat registration was recorded along the south-eastern boundary of the Site.

Automated Detector Survey 25th June - 5th July

3.30 Following the activity survey, automated detectors were deployed throughout the Site at locations **D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10** (see Plan ECO1) and set to record for 11 consecutive nights from June 25th to July 5th. The results from each night are detailed below in Tables 13 to 21 (Appendix 12.2A) for each of the detector locations. The detector located at **D8** experienced technical difficulties, resulting in no recordings being made during this survey period. Again, given the coverage provided by the other detectors deployed, this is not considered have significantly impacted the robustness of the survey (see paragraph 2.3.12 for further details).

3.31 The automated detector survey undertaken between 25th June and 5th July showed mostly consistent and frequent bat activity within the Site, although some nights recorded relatively higher registrations than others.

3.32 The detectors placed at **D2** and **D9** recorded the highest amount of bat registrations during this survey period with relatively high numbers of Common Pipistrelle and Soprano Pipistrelle registrations at both locations.

3.33 The detectors placed at **D1, D4** and **D6** recorded the lowest amount of bat registrations during the survey period, with the highest proportion of registrations associated with Common Pipistrelle and Soprano Pipistrelle at location **D4** and **D6** and *Nyctalus* species at **D1**.

3.34 The detector placed at **D3** recorded the highest total registrations of notable species, namely Barbastelle, Greater Horseshoe and Lesser Horseshoe (55 registrations) as well as the highest counts of Lesser Horseshoe (9 registrations) and Barbastelle (32 registrations). **D9** returned the highest amount of Greater Horseshoe registrations (18 registrations).

3.35 When comparing this survey to previous surveys in April and May, it can be seen that there is an obvious decline in notable species registrations at a number of the detector locations.

27th July Activity Survey

3.36 The activity survey undertaken on July 27th recorded a total of 485 registrations, most of which are once again related to Common Pipistrelle (260 registrations). Other species recorded during this survey were Soprano Pipistrelle (108 registrations), unidentified *Nyctalus* species (51 registrations), Serotine (22 registrations), unidentified *Myotis* species (22 registrations), Brown Long-eared Bat (10 registrations), Barbastelle (4 registrations), Nathusius' Pipistrelle (4 registrations) and Greater Horseshoe (4 registrations).

3.37 The majority of the activity of common and widespread species during this survey was concentrated along the southern and eastern boundaries of the site.

3.38 A small number of registrations of the previously unrecorded Nathusius' Pipistrelle were recorded in the south of the Site.

3.39 The small numbers of Greater Horseshoe Bat were recorded along the southern and northern boundaries of the Site and the Barbastelle registrations were recorded throughout the Site.

Automated Detector Survey 27th July - 9th August

3.40 Following the activity survey, automated detectors were deployed throughout the Site at locations **D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10** (see Plan ECO1) and set to record for 14 consecutive nights from July 27th to August 9th. The results from each night are detailed below in Tables 22 to 30 (Appendix 12.2A) for each of the detector locations. The detector located at **D6** experienced technical difficulties, resulting in no recordings being made during this survey period. Again, given the coverage provided by the other detectors deployed, this is not considered have significantly impacted the robustness of the survey (see paragraph 2.3.12 for further details).

3.41 The automated detector survey undertaken between 27th July and 9th August returned a mixed set of results with some detector locations recording consistent and frequent bat activity within the Site, although some nights recorded relatively higher registrations than others. And other detector locations only recording bat registrations during a small number of nights within the survey period.

3.42 The detector placed at **D2** recorded the highest amount of bat registrations during this survey period with the vast majority of registrations associated with Common Pipistrelle and Soprano Pipistrelle.

3.43 The detectors placed at **D1** and **D5** recorded the lowest amount of bat registrations during the survey period with the highest proportion of registrations associated with Common Pipistrelle, Soprano Pipistrelle and *Nyctalus* species at both locations. It should be noted that the detector placed at **D5** recorded registrations on only two of the fourteen nights of the survey period.

3.44 The detector placed at **D9** recorded the highest total registrations of notable species, namely Barbastelle, Greater Horseshoe and Lesser Horseshoe (90 registrations) as well as the highest counts of Lesser Horseshoe (44 registrations) and Barbastelle (38 registrations) registrations. **D4** returned the highest amount of Greater Horseshoe (28 registrations) registrations.

3.45 This survey period continued the trend of low amounts of activity recorded by the detector placed at **D1** seen in the 25th June to 5th July survey period**.** The detector placed at this location recorded just 583 registrations across the 14 night survey period.

3.46 3rd September Activity Survey

3.47 The activity survey undertaken on September 3rd recorded a total of 377 registrations, Common Pipistrelle was recorded the most (168 registrations). Other species recorded during this survey were Soprano Pipistrelle (108 registrations) unidentified *Nyctalus* species (65 registrations), unidentified *Myotis* species (17 registrations), Brown Long-eared Bat (8 registrations), Serotine (6 registrations), Barbastelle (3 registrations), Nathusius' Pipistrelle (1 registration) and Greater Horseshoe (1 registration).

3.48 The majority of activity of common and widespread species during this survey was concentrated along the southern and south-eastern areas with northern and central areas of the site seeing minimal activity.

3.49 The low number of registrations of Barbastelle were recorded in the south-east of the Site. The registration of Greater Horseshoe was recorded in the south of the Site.

Automated Detector Survey 3rd September - 7th September

3.50 Following the activity survey, automated detectors were deployed throughout the Site at locations **D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10** (see Plan ECO1) and set to record for 5 consecutive nights from September 3rd to September 7th. The results from each night are detailed below in Tables 31 to 39 (Appendix 12.2A) for each of the detector locations. The detector located at **D4** experienced technical difficulties, resulting in no recordings being made during this survey period. Again, given the coverage provided by the other detectors deployed, this is not considered have significantly impacted the robustness of the survey (see paragraph 2.3.12 for further details).

3.51 The automated detector survey undertaken between 3rd September and 7th September again returned a mixed set of results with some detector locations recording consistent and frequent bat activity within the Site, although some nights recorded relatively higher registrations than others. And other detector locations only recording bat registrations during a small number of the nights within the survey period.

3.52 The detector placed at **D7** recorded the highest amount of bat registrations during this survey period with the vast majority of registrations associated with Common Pipistrelle and Soprano Pipistrelle. However, there was also a relatively high number of *Plecotus* species registrations recorded at **D7** compared to in other locations.

3.53 The detectors placed at **D1, D2, D6** and **D10** recorded the lowest amount of bat registrations during the survey period with the highest proportion of registrations associated with Common Pipistrelle and *Nyctalus* species at **D1**, Common Pipistrelle at **D2** and Common Pipistrelle and Soprano Pipistrelle at both **D6** and **D10**.

3.54 The detectors placed at **D2**, **D6** and **D10** all recorded bat registrations on only some of the five nights of the survey period. With **D6** and **D10** recording registrations on only two nights and **D2** recording registrations on just three nights.

3.55 The detector placed at **D8** recorded the highest total registrations of notable species, namely Barbastelle, Greater Horseshoe and Lesser Horseshoe (27 registrations) as well as the highest counts of Greater Horseshoe registrations (15 registrations). **D1** returned the highest amount of Lesser Horseshoe registrations although it should be noted that this was a relatively low total of 4 registrations. **D3** and **D9** recorded the highest amount of Barbastelle registrations (14 registrations) during this survey period.

3.56 The detector placed at **D1** recorded just 214 registrations during this survey period, continuing the trend of low amounts of activity recorded by the detector placed at **D1** seen in both the 25th June to 5th July and 27th July to 9th August survey periods**.**

<u>30th September Activity Survey</u>

3.57 The activity survey undertaken on September 30th recorded a total of 212 registrations, most of which were related to Soprano and Common Pipistrelle (73 and 61 registrations respectively). Other species recorded were unidentified *Nyctalus* species (43 registrations), Brown Long-eared Bat (12 registrations), Serotine (11 registrations), unidentified *Myotis* species (11 registrations) and Greater Horseshoe (1 registration).

3.58 The majority of the activity of common and widespread species was once again concentrated in the south and south-eastern areas of the Site. With central and northern areas of the Site seeing little activity.

3.59 The Greater Horseshoe registration was recorded in the south of the Site.

Automated Detector Survey 30th September - 12th October

3.60 Following the activity survey, automated detectors were deployed throughout the Site at locations **D1, D2, D3, D4, D5, D6, D7, D8, D9** and **D10** (see Plan ECO1) and set to record for 13 consecutive nights from September 30th to October 12th. The results from each night are detailed below in Tables 40 to 49 (Appendix 12.2A) for each of the detector locations.

3.61 The automated detector survey undertaken between 30th September and 12th October again returned a mixed set of results with some detector locations recording consistent and frequent bat activity within the Site, although some nights recorded relatively higher registrations than others. Whilst other detector locations only recording limited bat registrations during a small number of the nights within the survey period.

3.62 The detector placed at **D8** recorded the highest amount of bat registrations during this survey period with the vast majority of registrations associated with Common Pipistrelle and Soprano Pipistrelle.

3.63 The detectors placed at **D1, D2** and **D5** recorded the lowest amount of bat registrations during the survey period with the highest proportion of registrations associated with *Nyctalus* species at **D1**, *Myotis* species at **D2**, and Common Pipistrelle at **D5**.

3.64 The detectors placed at **D1**, **D2** and **D5** all recorded bat registrations on only a small number of the thirteen nights of the survey period, with **D1** and **D2** recording registrations on only four and three nights respectively and **D5** recording registrations on six nights.

3.65 The detector placed at **D6** recorded the highest total registrations of notable species, namely Barbastelle, Greater Horseshoe and Lesser Horseshoe (142 registrations) as well as the highest count of Greater Horseshoe registrations (54 registrations). **D9** returned the highest amount of Lesser Horseshoe registrations (19 registrations) and **D10** recorded the highest amounts of Barbastelle (118 registrations) during this survey period, despite recording just 849 and 638 total bat registrations respectively.

3.66 The 142 registrations of notable species recorded at **D6** during this survey period is the highest total number of registrations recorded at any one location during surveys undertaken in 2020.

3.67 This survey period once again continued the trend of low amounts of activity recorded by the detector placed at **D1** seen in the three previous survey periods.

21st October Activity Survey

3.68 The activity survey undertaken on October 21st recorded a total of 461 registrations, most of which were related to Common Pipistrelle (262 registrations). Other species recorded were Soprano Pipistrelle (82 registrations), unidentified *Nyctalus* species (56 registrations), Serotine (46 registrations), unidentified *Myotis* species (7 registrations), Barbastelle (4 registrations), Nathusius' Pipistrelle (2 registrations) and Greater Horseshoe (2 registration).

3.69 The majority of the activity of common and widespread species was once again concentrated in the south and south-eastern areas of the Site. With central and northern areas of the Site seeing little activity.

3.70 The Greater Horseshoe and Barbastelle registrations were all recorded in the south and south-east of the Site.

Automated Detector Survey 21st October - 4th November

3.71 Following the activity survey, automated detectors were deployed throughout the Site at locations **D1, D2, D3, D4, D5, D6, D7, D8, D9** and **D10** (see Plan ECO1) and set to record for 15 consecutive nights from October 21st to November 4th. The results from each night are detailed below in Tables 50 to 59 (Appendix 12.2A) for each of the detector locations.

3.72 The automated detector survey undertaken between 21st October and 4th November once again returned a mixed set of results with some detector locations recording consistent and frequent bat activity within the Site, although some nights recorded relatively higher registrations than others. Whilst other detector locations only recorded limited numbers of bat registrations.

3.73 The detector placed at **D5** and **D10** recorded the highest amount of bat registrations during this survey period with the vast majority of registrations associated with Common Pipistrelle and Soprano Pipistrelle at both locations.

3.74 The detectors placed at **D1, D2, D6 and D7** recorded the lowest amount of bat registrations during the survey period with the highest proportion of registrations associated with *Myotis* species at **D1**, Soprano Pipistrelle at **D2**, Common Pipistrelle and *Nyctalus* species at **D6** and Brown Long-eared Bat at **D7**.

3.75 The detectors placed at **D2** and **D9** both recorded bat registrations on only a fraction of the fifteen nights of the survey period, with **D2** recording registrations on only seven nights and **D9** recording registrations on eleven nights.

3.76 The detector placed at **D5** recorded the highest total registrations of notable species, namely Barbastelle, Greater Horseshoe and Lesser Horseshoe (121 registrations) as well as the highest count of Barbastelle registrations (118 registrations). **D8** returned the highest amount of Greater Horseshoe

registrations (45 registrations) and **D9** recorded the highest amounts of Lesser Horseshoe (46 registrations) during this survey period.

Summary of Activity Surveys

3.77 Bat activity surveys undertaken throughout the active period of 2020 show that the vast majority of bat activity within the Site can be attributed to either Common Pipistrelle, Soprano Pipistrelle or *Nyctalus* species. Other species recorded were Serotine, *Myotis* species, Brown Long-eared Bat, Nathusius' Pipistrelle, Barbastelle, Greater Horseshoe Bat and Lesser Horseshoe Bat.

3.78 The activity of both common and widespread species and rarer species such as Barbastelle, Lesser Horseshoe and Greater Horseshoe is seen to be focused in the southern and south-eastern areas of the Site.

3.79 Given the small numbers of Barbastelle, Greater Horseshoe Bat and Lesser Horseshoe Bat registrations it is deemed that the Site is of use by single / small numbers of individual bats on an occasional basis.

Summary of Automated Surveys

3.80 Automated surveys undertaken throughout the active period of 2020 show similar patterns to the activity surveys. The vast majority of registrations recorded can be attributed to either Common Pipistrelle, Soprano Pipistrelle or *Nyctalus* species. No additional bat species were recording during automated surveys that were not recorded during the activity surveys.

3.81 The activity of common and widespread species is well distributed across the Site with no one location showing significantly higher registrations than the others. However, it should be noted that location **D6** consistently recorded lower amounts of registrations compared to other detector locations throughout the survey period and as mentioned above location **D1** also recorded low numbers of registrations in the majority of the survey periods.

3.82 When analysing the activity of notable species during the active period of 2020, it can be seen that on average locations **D1, D2** and **D4** returned the fewest numbers of notable bat registrations, whilst locations **D3**, **D6**, **D9** and **D10** returned the highest numbers.

3.83 Given location **D6's** high number of notable species registrations and low number of total bat registrations across the survey period. It is no surprise that **D6** recorded the highest proportion of notable bat species registrations with nearly 6.5% of the bat registrations recorded at this location associated with a notable species.

3.84 **Background records.** The desk study undertaken with SERC returned several records of bat species from within or immediately adjacent to the Site.

3.85 The records returned include Brown Long-eared Bat (2017) Lesser Horseshoe Bat (2017), Common Pipistrelle (2016), Greater Horseshoe Bat (2017), Barbastelle (2017), Noctule bat (2016) and Soprano Pipistrelle (2016). The nearest recorded roost site is located approximately 0.7km south east of the Site at its closest point recorded in 2018. This record does not identify the species of bat.

4. SUMMARY

3.86 Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in April 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

3.87 The Site was surveyed were undertaken with regard to best practice guidelines issued by Natural England (2004), the Joint Nature Conservation Committee (2004) and the Bat Conservation Trust (2016).

3.88 The results of the survey work undertaken are present within this report and it is considered that an extensive ecological baseline for bats has been established that can fully inform any future assessment / evaluation of the Site in ecological terms.

3.89 The survey work will inform the LDO process and the related Environmental assessment process.

PLANS

PLAN ECO1

Bat Survey Plan

KEY:

- SITE BOUNDARY
- ACTIVITY TRANSECT 1
- ACTIVITY TRANSECT 2
- ACTIVITY TRANSECT 3
- ACTIVITY TRANSECT 4
- STATIC DETECTOR LOCATION (D#)
- BAT MITIGATION ROOST

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7761: GRAVITY

PLAN ECO1: BAT SURVEY PLAN

Rev: C

Sept 2021

APPENDICES

APPENDIX 12.2A

Bat Survey Results Tables

Location D1																	
Species	**27/04**	**28/04**	**29/04**	**30/04**	**01/05**	**02/05**	**03/05**	**04/05**	**05/05**	**06/05**	**07/05**	**08/05**	**09/05**	**10/05**	**11/05**	**12/05**	**Total**
Barbastelle	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Serotine	7	0	0	2	1	1	1	0	0	1	2	2	3	0	0	0	20
Myotis sp	4	4	2	6	1	0	0	2	2	1	1	1	1	0	1	0	26
Nyctalus sp	253	7	3	3	1	58	124	16	12	15	16	24	38	1	2	0	573
Nathusius' Pipistrelle	9	1	0	12	1	1	0	4	0	1	0	0	1	0	0	0	30
Common Pipistrelle	30	4	19	107	26	36	21	18	8	5	11	2	10	1	1	0	299
Soprano Pipistrelle	17	1	2	17	3	8	8	29	6	3	10	5	6	3	0	0	118
Brown Long-eared Bat	1	0	0	0	0	0	1	2	0	0	1	0	0	0	0	0	5
Greater Horseshoe	1	0	1	2	1	1	0	0	0	0	0	1	1	0	0	0	8
Lesser Horseshoe	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	322	17	27	149	34	105	155	71	28	26	41	35	61	5	4	0	1081

Table 1: Survey results from Location D1, 27th April to 12th May

Location D2																	
Species	**27/04**	**28/04**	**29/04**	**30/04**	**01/05**	**02/05**	**03/05**	**04/05**	**05/05**	**06/05**	**07/05**	**08/05**	**09/05**	**10/05**	**11/05**	**12/05**	**Total**
Serotine	76	0	0	0	1	17	11	1	1	16	4	13	41	0	0	0	181
Myotis sp	1	0	0	0	6	0	1	0	1	0	0	1	2	0	0	0	12
Nyctalus sp	12	3	0	0	1	9	21	1	3	10	5	7	2	0	0	0	74
Nathusius' Pipistrelle	0	1	0	0	0	1	4	0	4	3	0	2	0	0	0	0	15
Common Pipistrelle	212	20	0	1	3	98	91	59	71	69	33	63	93	0	0	0	813
Soprano Pipistrelle	8	0	0	1	0	6	13	95	10	24	5	12	16	1	1	0	192
Greater Horseshoe	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	5
Total	309	24	0	2	11	131	141	156	90	122	49	98	157	1	1	0	1292

Table 2: Survey results from Location D2, 27th April to 12th May

Location D3																	
Species	**27/04**	**28/04**	**29/04**	**30/04**	**01/05**	**02/05**	**03/05**	**04/05**	**05/05**	**06/05**	**07/05**	**08/05**	**09/05**	**10/05**	**11/05**	**12/05**	**Total**
Barbastelle	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Serotine	14	0	0	3	6	5	3	20	5	5	0	0	0	0	0	0	61
Myotis sp	15	25	18	15	37	24	25	25	18	27	3	0	0	0	0	0	232
Nyctalus sp	247	33	2	2	18	355	186	36	34	75	80	0	0	0	0	0	1068
Nathusius' Pipistrelle	1	1	6	1	0	1	1	6	1	2	0	0	0	0	0	0	20
Common Pipistrelle	24	57	244	275	153	174	69	524	35	49	45	0	0	0	0	0	1649
Soprano Pipistrelle	14	5	7	34	13	40	53	52	12	33	13	0	0	0	0	0	276
Brown Long-eared Bat	5	4	0	3	7	6	3	19	22	7	2	0	0	0	0	0	78
Greater Horseshoe	1	1	0	2	0	2	0	1	0	0	0	0	0	0	0	0	7
Lesser Horseshoe	5	2	12	15	4	2	2	1	1	1	0	0	0	0	0	0	45
Total	326	128	289	350	238	609	342	686	128	199	143	0	0	0	0	0	3438

Table 3: Survey results from Location D3, 27th April to 12th May

Location D1													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	1	0	0	0	0	3	1	1	4	0	1	0	11
Serotine	15	5	7	10	107	108	2	14	2	1	49	44	364
Myotis sp	6	20	2	2	3	2	4	2	0	3	10	5	59
Nyctalus sp	20	16	15	17	27	91	5	11	0	3	5	67	277
Nathusius' Pipistrelle	19	7	8	5	6	32	5	15	2	4	5	3	111
Common Pipistrelle	82	42	24	19	44	521	31	536	94	646	188	647	2874
Soprano Pipistrelle	5	4	7	14	12	126	0	27	10	36	13	54	308
Brown Long-eared Bat	2	2	5	2	1	10	1	10	0	2	1	2	38
Greater Horseshoe	3	1	0	2	2	1	0	0	0	0	0	0	9
Lesser Horseshoe	0	0	0	0	0	0	1	0	0	0	1	0	2
Total	153	97	68	71	202	894	50	616	112	695	273	822	4053

Table 4: Survey results from Location D1, 28th May to 8th June

Location D3													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	5	5	2	1	0	2	1	3	0	3	1	1	24
Serotine	14	10	5	4	23	6	0	2	0	1	2	15	82
Myotis sp	14	11	10	5	12	12	0	6	1	3	9	9	92
Nyctalus sp	47	60	29	42	20	21	6	21	2	7	24	13	292
Nathusius' Pipistrelle	18	29	9	17	3	2	0	8	0	0	9	1	96
Common Pipistrelle	39	41	15	36	59	50	41	73	13	16	68	56	507
Soprano Pipistrelle	15	15	15	17	16	13	2	17	1	10	16	9	146
Brown Long-eared Bat	13	9	10	8	5	13	0	2	0	1	9	5	75
Greater Horseshoe	1	0	2	0	3	0	1	0	0	0	2	0	9
Lesser Horseshoe	0	0	1	0	0	1	0	2	1	1	1	0	7
Total	166	180	98	130	141	120	51	134	18	42	141	109	1330

Table 5: Survey results from Location D3, 28th May to 8th June

Location D4													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	0	1	0	1	1	0	1	0	0	0	1	0	5
Serotine	2	6	3	3	3	3	0	0	0	0	2	0	22
Myotis sp	3	27	118	26	69	1	0	1	0	1	10	3	259
Nyctalus sp	4	1	2	7	1	8	0	2	1	0	1	4	31
Nathusius' Pipistrelle	248	159	184	44	22	10	1	6	0	0	18	8	700
Common Pipistrelle	905	292	120	87	217	308	7	272	2	28	920	563	3721
Soprano Pipistrelle	103	79	120	94	133	158	5	24	0	4	46	82	848
Greater Horseshoe	0	0	0	1	0	0	0	0	0	0	0	0	1
Total	1265	565	547	263	446	488	14	305	3	33	998	660	5587

Table 6: Survey results from Location D4, 28th May to 8th June

Location D5													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	6	3	12	2	0	0	2	0	0	0	2	0	27
Serotine	53	21	29	53	7	3	0	0	0	0	2	2	170
Myotis sp	13	9	3	11	5	2	0	1	0	0	8	3	55
Nyctalus sp	4	10	9	8	10	12	2	2	2	5	4	4	72
Nathusius' Pipistrelle	14	10	208	20	11	10	1	0	0	0	4	0	278
Common Pipistrelle	370	274	238	195	88	59	43	34	7	13	59	27	1407
Soprano Pipistrelle	274	135	159	150	60	48	42	22	3	16	135	32	1076
Brown Long-eared Bat	10	4	3	0	4	1	0	1	0	0	2	1	26
Greater Horseshoe	3	3	1	4	0	0	0	1	0	0	1	1	14
Lesser Horseshoe	0	0	0	1	0	0	0	0	0	0	0	0	1
Total	747	469	662	444	185	135	90	61	12	34	217	70	3126

Table 7: Survey results from Location D5, 28th May to 8th June

Location D6													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	1	0	3	0	0	0	3	4	9	7	0	1	28
Serotine	17	9	10	28	7	6	4	2	3	2	4	5	97
Myotis sp	9	5	2	2	2	1	1	0	0	0	5	0	27
Nyctalus sp	35	22	25	14	13	13	8	13	1	2	17	50	213
Nathusius' Pipistrelle	3	5	6	3	2	7	3	0	0	0	5	1	35
Common Pipistrelle	36	64	38	54	40	49	40	31	13	14	47	20	446
Soprano Pipistrelle	36	45	38	53	38	42	12	21	8	6	40	12	351
Brown Long-eared Bat	5	1	1	1	2	3	7	2	1	5	3	4	35
Greater Horseshoe	0	0	0	0	3	0	0	0	0	1	1	0	5
Lesser Horseshoe	1	0	0	1	0	0	3	0	1	0	0	1	7
Total	143	151	123	156	107	121	81	73	36	37	122	94	1244

Table 8: Survey results from Location D6, 28th May to 8th June

Location D7													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	3	3	0	1	0	1	3	1	1	1	1	0	15
Serotine	14	21	13	16	13	6	23	17	2	9	13	20	167
Myotis sp	42	36	29	32	28	29	37	19	3	11	17	8	291
Nyctalus sp	20	25	16	56	27	13	7	10	2	0	14	28	218
Nathusius' Pipistrelle	20	10	23	18	14	8	8	11	8	11	32	23	186
Common Pipistrelle	71	85	65	80	74	102	89	125	40	60	111	160	1062
Soprano Pipistrelle	133	95	95	54	59	197	18	137	27	17	128	142	1102
Brown Long-eared Bat	25	20	16	21	15	18	21	29	15	15	19	14	228
Greater Horseshoe	0	1	2	1	0	0	0	1	0	0	1	1	7
Lesser Horseshoe	0	1	0	0	2	0	0	0	0	0	0	0	3
Total	328	297	259	279	232	374	206	350	98	124	336	396	3279

Table 9: Survey results from Location D7, 28th May to 8th June

Location D8													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	2	5	1	3	1	0	0	1	0	0	1	0	14
Serotine	29	26	16	19	0	4	2	0	0	0	1	1	98
Myotis sp	8	5	6	6	2	2	0	1	0	0	0	1	31
Nyctalus sp	86	16	11	16	14	13	0	4	1	0	7	6	174
Nathusius' Pipistrelle	20	32	22	14	8	6	1	0	0	0	2	0	105
Common Pipistrelle	111	132	112	142	85	22	3	2	0	0	8	0	617
Soprano Pipistrelle	11	19	12	12	6	2	0	0	0	0	1	1	64
Brown Long-eared Bat	3	3	5	2	1	1	0	1	0	0	0	0	16
Greater Horseshoe	2	5	1	3	0	0	0	0	0	0	0	1	12
Lesser Horseshoe	0	0	0	5	1	0	0	0	0	0	0	2	8
Total	272	243	186	222	118	50	6	9	1	0	20	12	1139

Table 10: Survey results from Location D8, 28th May to 8th June

Location D9													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Barbastelle	2	1	6	0	0	0	1	1	0	0	2	0	13
Serotine	24	11	15	11	6	13	4	0	1	0	5	7	97
Myotis sp	16	15	14	9	8	17	8	3	1	7	18	18	134
Nyctalus sp	64	43	25	37	70	29	14	20	1	1	9	17	330
Nathusius' Pipistrelle	10	10	13	6	2	12	8	0	2	2	9	6	80
Common Pipistrelle	104	127	80	58	49	98	134	42	11	29	96	59	887
Soprano Pipistrelle	36	23	27	18	26	28	27	11	15	6	41	34	292
Brown Long-eared Bat	10	4	6	3	1	2	1	1	0	1	3	3	35
Greater Horseshoe	2	0	0	0	0	0	0	0	0	0	0	0	2
Lesser Horseshoe	0	0	0	0	1	0	0	1	0	0	2	0	4
Total	268	234	186	142	163	199	197	79	31	46	185	144	1874

Table 11: Survey results from Location D9, 28th May to 8th June

Location D10													
Species	**28/05**	**29/05**	**30/05**	**31/05**	**01/06**	**02/06**	**03/06**	**04/06**	**05/06**	**06/06**	**07/06**	**08/06**	**Total**
Serotine	4	6	2	4	3	3	0	1	1	0	5	1	30
Myotis sp	1	1	0	0	0	0	0	0	0	0	0	0	2
Nyctalus sp	16	12	10	2	8	11	5	5	1	2	3	7	82
Nathusius' Pipistrelle	3	16	6	5	5	18	0	4	0	8	5	12	82
Common Pipistrelle	37	48	12	52	53	268	6	34	9	12	16	28	575
Soprano Pipistrelle	23	9	16	12	26	77	7	7	2	16	22	25	242
Brown Long-eared Bat	1	1	0	2	0	4	1	0	0	0	0	0	9
Greater Horseshoe	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	85	93	46	77	95	381	19	51	14	38	51	73	1023

Table 12: Survey results from Location D10, 28th May to 8th June

Location D1												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Serotine	2	1	3	1	1	1	0	0	2	1	3	15
Myotis sp	0	4	0	0	0	0	1	0	1	0	2	8
Nyctalus sp	18	31	28	28	24	16	6	11	1	1	7	171
Nathusius' Pipistrelle	9	1	0	0	1	0	1	0	1	0	0	13
Common Pipistrelle	13	8	3	2	7	6	6	3	11	6	0	65
Soprano Pipistrelle	5	10	2	1	0	0	0	2	0	0	1	21
Brown Long-eared Bat	1	0	0	1	1	2	0	2	0	0	0	7
Greater Horseshoe	0	1	2	0	0	0	0	1	0	0	0	4
Total	48	56	38	33	34	25	14	19	16	8	13	304

Table 13: Survey results from Location D1, 25th June to 5th July

Location D2												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Barbastelle	0	0	0	2	0	0	0	0	0	0	0	2
Serotine	49	0	0	1	0	1	0	3	1	1	0	56
Myotis sp	9	7	3	2	7	3	3	2	3	0	1	40
Nyctalus sp	30	0	0	0	0	1	1	0	1	1	0	34
Nathusius' Pipistrelle	2	0	0	0	0	1	0	1	0	2	1	7
Common Pipistrelle	91	597	279	80	715	341	444	102	318	1021	10	3998
Soprano Pipistrelle	14	8	7	5	38	13	16	5	175	4	1	286
Brown Long-eared Bat	15	2	10	14	7	7	2	3	2	5	5	72
Total	210	614	299	104	767	367	466	116	500	1034	18	4495

Table 14: Survey results from Location D2, 25th June to 5th July

Location D3												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Barbastelle	0	0	4	4	2	5	4	0	0	3	10	32
Serotine	13	13	16	14	15	5	4	3	10	26	7	126
Myotis sp	5	11	18	12	2	7	5	8	3	5	7	83
Nyctalus sp	38	17	15	29	20	57	47	17	20	31	4	295
Nathusius' Pipistrelle	5	0	0	1	2	2	1	0	6	3	0	20
Common Pipistrelle	120	215	139	78	120	93	76	67	264	158	47	1377
Soprano Pipistrelle	9	7	10	13	11	7	10	8	11	16	9	111
Brown Long-eared Bat	7	11	6	7	3	13	4	5	10	8	6	80
Greater Horseshoe	0	0	0	3	0	0	4	2	2	1	1	13
Lesser Horseshoe	0	0	3	2	1	0	0	0	0	0	3	9
Total	197	274	211	163	176	189	155	110	326	251	94	2146

Table 15: Survey results from Location D3, 25th June to 5th July

Location D4												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Serotine	2	2	0	0	0	3	0	1	1	1	1	11
Myotis sp	4	4	0	0	2	5	4	2	1	0	0	22
Nyctalus sp	9	6	1	1	2	0	0	3	5	1	1	29
Nathusius' Pipistrelle	9	4	0	0	0	4	0	15	1	1	1	35
Common Pipistrelle	126	29	2	4	15	49	29	7	7	15	2	285
Soprano Pipistrelle	83	11	3	7	2	14	58	19	8	0	0	205
Brown Long-eared Bat	2	0	0	0	0	0	0	0	0	0	0	2
Greater Horseshoe	1	0	0	0	0	0	0	0	0	1	0	2
Total	236	56	6	12	21	75	91	47	23	19	5	591

Table 16: Survey results from Location D4, 25th June to 5th July

Location D5												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Barbastelle	0	1	0	0	0	0	1	0	1	0	0	3
Serotine	31	22	1	2	3	11	14	3	9	7	1	104
Myotis sp	5	5	0	1	1	0	1	1	0	0	0	14
Nyctalus sp	51	11	1	1	0	10	12	8	3	4	4	105
Nathusius' Pipistrelle	1	6	0	0	0	1	0	0	0	0	0	8
Common Pipistrelle	47	159	6	2	13	46	54	17	39	8	0	391
Soprano Pipistrelle	46	326	16	12	29	32	33	28	54	12	4	592
Greater Horseshoe	0	0	0	0	1	0	3	0	0	0	0	4
Total	181	530	24	18	47	100	118	57	106	31	9	1221

Table 17: Survey results from Location D5, 25th June to 5th July

Location D6												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Barbastelle	0	0	0	0	1	0	0	0	0	0	0	1
Serotine	6	0	0	1	2	0	2	1	1	2	0	15
Myotis sp	2	2	1	0	2	1	0	0	0	0	0	8
Nyctalus sp	3	1	0	1	1	2	2	0	1	0	1	12
Nathusius' Pipistrelle	0	2	0	0	1	3	3	1	1	0	0	11
Common Pipistrelle	28	13	3	8	10	18	8	4	2	6	7	107
Soprano Pipistrelle	21	10	4	5	4	13	4	4	5	4	5	79
Brown Long-eared Bat	2	2	1	1	1	3	0	0	0	0	1	11
Greater Horseshoe	0	1	1	0	0	1	0	1	0	0	0	4
Total	62	31	10	16	22	41	19	11	10	12	14	248

Table 18: Survey results from Location D6, 25th June to 5th July

Location D7												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Barbastelle	0	0	0	1	1	2	2	1	0	0	0	7
Serotine	26	20	31	46	29	24	24	22	23	45	16	306
Myotis sp	4	0	5	20	8	8	0	1	3	2	3	54
Nyctalus sp	28	4	2	1	1	13	4	7	4	6	1	71
Nathusius' Pipistrelle	3	6	2	2	4	6	4	2	2	3	2	36
Common Pipistrelle	68	78	28	40	46	64	37	27	83	127	23	621
Soprano Pipistrelle	30	6	3	7	3	8	8	3	8	10	9	95
Brown Long-eared Bat	10	6	6	3	9	7	3	9	6	7	4	70
Greater Horseshoe	0	0	0	1	1	1	1	2	0	0	1	7
Total	169	120	77	121	102	133	83	74	129	200	59	1267

Table 19: Survey results from Location D7, 25th June to 5th July

Location D9												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Barbastelle	1	0	0	1	0	14	2	1	2	0	0	21
Serotine	14	2	2	3	4	1	1	4	1	0	7	39
Myotis sp	5	8	2	4	8	4	5	1	6	4	0	47
Nyctalus sp	19	7	3	10	3	16	21	12	19	2	1	113
Nathusius' Pipistrelle	7	1	3	0	2	7	0	0	7	2	0	29
Common Pipistrelle	139	116	695	605	729	522	419	142	844	839	23	5073
Soprano Pipistrelle	114	100	117	12	110	73	145	62	10	25	122	890
Brown Long-eared Bat	5	12	3	3	9	5	11	15	16	3	12	94
Greater Horseshoe	0	0	3	5	3	2	1	2	2	0	0	18
Total	304	246	828	643	868	644	605	239	907	875	165	6324

Table 20: Survey results from Location D9, 25th June to 5th July

Location D10												
Species	**25/06**	**26/06**	**27/06**	**28/06**	**29/06**	**30/06**	**01/07**	**02/07**	**03/07**	**04/07**	**05/07**	**Total**
Barbastelle	0	0	0	3	2	0	0	1	0	0	0	6
Serotine	17	20	5	0	2	3	4	0	3	5	0	59
Myotis sp	8	4	2	0	1	5	2	4	1	1	1	29
Nyctalus sp	49	92	24	4	34	50	42	13	11	12	4	335
Nathusius' Pipistrelle	5	4	0	1	1	8	0	3	2	1	0	25
Common Pipistrelle	298	189	37	32	58	81	64	32	48	51	15	905
Soprano Pipistrelle	44	60	29	34	39	44	36	16	30	32	28	392
Brown Long-eared Bat	6	8	2	3	7	11	5	3	2	9	2	58
Greater Horseshoe	0	0	0	0	0	0	0	1	1	0	0	2
Lesser Horseshoe	0	0	0	1	0	0	0	1	0	0	0	2
Total	427	377	99	78	144	202	153	74	98	111	50	1813

Table 21: Survey results from Location D10, 25th June to 5th July

Location D1															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Serotine	3	0	2	2	3	1	4	1	5	6	6	9	0	3	45
Myotis sp	0	1	1	1	2	14	1	2	1	0	0	1	1	0	25
Nyctalus sp	17	6	33	28	17	9	12	10	7	11	22	4	8	8	192
Common Pipistrelle	16	6	11	5	59	10	8	5	27	16	12	12	8	0	195
Soprano Pipistrelle	7	2	5	12	6	9	2	1	16	6	10	6	12	1	95
Brown Long-eared Bat	0	1	2	0	2	2	3	0	1	0	7	1	3	1	23
Greater Horseshoe	0	0	0	0	0	1	2	2	1	0	1	0	0	0	7
Lesser Horseshoe	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Total	43	16	54	48	90	46	32	21	58	39	58	33	32	13	583

Table 22: Survey results from Location D1, 27th July to 9th August

Location D2															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Barbastelle	0	0	0	0	0	0	0	2	2	1	0	0	0	0	5
Serotine	1	2	11	5	5	2	8	0	2	16	12	3	7	0	74
Myotis sp	1	1	7	4	1	3	3	5	2	5	3	1	4	0	40
Nyctalus sp	2	2	9	21	10	6	8	4	5	12	8	4	6	0	97
Nathusius' Pipistrelle	0	0	0	2	0	0	0	1	0	1	2	0	2	0	8
Common Pipistrelle	536	98	192	250	171	54	572	160	685	478	359	801	164	0	4520
Soprano Pipistrelle	49	52	37	45	86	29	49	34	37	53	35	41	169	0	716
Brown Long-eared Bat	0	0	2	0	3	3	1	1	1	3	3	3	1	0	21
Greater Horseshoe	0	0	0	0	0	0	0	0	2	1	0	0	1	0	4
Total	589	155	258	327	276	97	641	207	736	570	422	853	354	0	5485

Table 23: Survey results from Location D2, 27th July to 9th August

Location D3															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Barbastelle	1	3	0	1	0	2	3	4	2	2	0	0	0	0	18
Serotine	3	2	8	35	10	3	12	0	38	18	36	5	6	0	176
Myotis sp	10	13	9	19	13	7	5	11	10	13	18	11	9	0	148
Nyctalus sp	13	57	30	98	23	16	36	42	166	111	113	36	17	0	758
Nathusius' Pipistrelle	0	1	0	0	2	0	0	0	2	2	0	1	1	0	9
Common Pipistrelle	260	53	61	90	143	83	39	46	232	105	155	374	79	0	1720
Soprano Pipistrelle	42	22	21	55	31	27	24	14	44	48	73	31	22	0	454
Brown Long-eared Bat	3	4	2	3	6	10	7	5	18	2	6	5	2	0	73
Greater Horseshoe	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
Total	332	155	131	302	228	149	126	122	512	301	401	463	136	0	3358

Table 24: Survey results from Location D3, 27th July to 9th August

Location D4															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Barbastelle	1	0	0	0	1	0	3	0	1	0	0	0	0	0	6
Serotine	11	2	12	17	12	6	13	11	4	17	6	0	0	0	111
Myotis sp	5	8	12	11	9	6	7	5	1	14	4	0	0	0	82
Nyctalus sp	5	8	16	32	20	5	4	5	8	17	11	0	0	0	131
Nathusius' Pipistrelle	0	0	1	1	0	0	0	0	0	1	0	0	0	0	3
Common Pipistrelle	18	11	72	60	56	17	24	18	30	127	15	0	0	0	448
Soprano Pipistrelle	24	80	110	116	94	92	21	60	108	125	79	0	0	0	909
Brown Long-eared Bat	0	0	2	2	2	3	2	0	1	2	1	0	0	0	15
Greater Horseshoe	2	2	9	8	1	0	1	1	1	1	2	0	0	0	28
Total	66	111	234	247	195	129	75	100	154	304	118	0	0	0	1733

Table 25: Survey results from Location D4, 27th July to 9th August

Location D5															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Serotine	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
Myotis sp	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
Nyctalus sp	0	0	0	0	0	0	0	0	0	0	0	0	15	19	34
Nathusius' Pipistrelle	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Common Pipistrelle	0	0	0	0	0	0	0	0	0	0	0	0	41	9	50
Soprano Pipistrelle	0	0	0	0	0	0	0	0	0	0	0	0	38	8	46
Brown Long-eared Bat	0	0	0	0	0	0	0	0	0	0	0	0	5	3	8
Greater Horseshoe	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	106	42	148

Table 26: Survey results from Location D5, 27th July to 9th August

Location D7															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Barbastelle	1	0	3	0	0	0	0	1	0	0	0	0	0	0	5
Serotine	15	4	8	12	4	0	5	29	25	15	38	19	11	14	199
Myotis sp	2	1	1	0	0	1	2	2	2	2	0	2	4	0	19
Nyctalus sp	11	11	27	47	59	10	25	10	53	42	18	23	83	36	455
Nathusius' Pipistrelle	4	1	0	1	2	0	3	1	2	1	1	0	0	0	16
Common Pipistrelle	256	40	53	74	60	41	81	23	132	83	98	73	58	58	1130
Soprano Pipistrelle	24	5	9	19	9	9	13	4	24	27	23	22	24	27	239
Brown Long-eared Bat	25	13	29	19	6	7	21	16	16	8	3	30	13	14	220
Greater Horseshoe	0	0	0	0	1	0	1	0	0	0	1	0	0	2	5
Total	338	75	130	172	141	68	151	86	254	178	182	169	193	151	2288

Table 27: Survey results from Location D7, 27th July to 9th August

Location D8															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Barbastelle	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Serotine	2	5	32	85	5	5	0	0	0	0	0	0	0	0	134
Myotis sp	7	4	10	18	9	3	0	0	0	0	0	0	0	0	51
Nyctalus sp	15	43	32	56	13	10	0	0	0	0	0	0	0	0	169
Nathusius' Pipistrelle	1	0	2	2	1	0	0	0	0	0	0	0	0	0	6
Common Pipistrelle	82	96	88	306	67	25	0	0	0	0	0	0	0	0	664
Soprano Pipistrelle	9	27	21	55	35	13	0	0	0	0	0	0	0	0	160
Brown Long-eared Bat	2	0	2	1	1	1	0	0	0	0	0	0	0	0	7
Greater Horseshoe	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3
Total	118	175	190	524	132	57	0	0	0	0	0	0	0	0	1196

Table 28: Survey results from Location D8, 27th July to 9th August

Location D9															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Barbastelle	0	0	0	0	0	7	6	2	4	0	19	0	0	0	38
Serotine	0	0	0	0	0	4	3	1	1	0	9	0	0	0	18
Myotis sp	0	0	0	0	0	2	6	1	6	0	15	0	0	0	30
Nyctalus sp	0	0	0	0	0	3	10	3	4	1	21	0	0	0	42
Common Pipistrelle	0	0	0	0	0	105	38	7	211	4	367	0	0	0	732
Soprano Pipistrelle	0	0	0	0	0	12	18	10	44	1	86	0	0	0	171
Brown Long-eared Bat	0	0	0	0	0	5	6	1	5	0	17	0	0	0	34
Greater Horseshoe	0	0	0	0	0	2	1	0	1	0	4	0	0	0	8
Lesser Horseshoe	0	0	0	0	0	1	1	2	17	1	22	0	0	0	44
Total	0	0	0	0	0	141	89	27	293	7	560	0	0	0	1117

Table 29: Survey results from Location D9, 27th July to 9th August

Location D10															
Species	**27/07**	**28/07**	**29/07**	**30/07**	**31/07**	**01/08**	**02/08**	**03/08**	**04/08**	**05/08**	**06/08**	**07/08**	**08/08**	**09/08**	**Total**
Barbastelle	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3
Serotine	5	11	18	42	54	2	0	0	0	0	0	0	0	0	132
Myotis sp	2	6	16	8	9	4	0	0	0	0	0	0	0	0	45
Nyctalus sp	17	38	52	81	68	17	0	0	0	0	0	0	0	0	273
Common Pipistrelle	42	44	69	88	90	34	0	0	0	0	0	0	0	0	367
Soprano Pipistrelle	61	62	139	121	126	32	0	0	0	0	0	0	0	0	541
Brown Long-eared Bat	2	0	0	1	3	0	0	0	0	0	0	0	0	0	6
Greater Horseshoe	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Lesser Horseshoe	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	131	162	295	341	351	89	0	0	0	0	0	0	0	0	1369

Table 30: Survey results from Location D10, 27th July to 9th August

Location D1						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Serotine	1	4	3	3	4	15
Myotis sp	2	12	6	3	4	27
Nyctalus sp	9	11	9	12	10	51
Common Pipistrelle	10	8	19	7	17	61
Soprano Pipistrelle	6	3	9	10	9	37
Brown Long-eared Bat	6	2	3	4	3	18
Greater Horseshoe	0	0	0	1	0	1
Lesser Horseshoe	1	2	1	0	0	4
Total	35	42	50	40	47	214

Table 31: Survey results from Location D1, 3rd September to 7th September

Location D2						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	0	1	0	0	0	1
Serotine	1	0	1	0	0	2
Nyctalus sp	8	0	1	0	0	9
Common Pipistrelle	34	23	21	0	0	78
Soprano Pipistrelle	4	2	4	0	0	10
Lesser Horseshoe	1	0	0	0	0	1
Total	48	26	27	0	0	101

Table 32: Survey results from Location D2, 3rd September to 7th September

Location D3						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	3	1	2	5	3	14
Serotine	4	8	2	13	8	35
Myotis sp	4	4	9	7	9	33
Nyctalus sp	28	28	30	25	54	165
Common Pipistrelle	12	9	17	15	37	90
Soprano Pipistrelle	143	118	97	114	305	777
Brown Long-eared Bat	5	16	8	18	9	56
Greater Horseshoe	0	2	0	0	0	2
Lesser Horseshoe	2	0	0	0	0	2
Total	201	186	165	197	425	1174

Table 33: Survey results from Location D3, 3rd September to 7th September

Location D5						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	0	0	1	3	6	10
Serotine	21	15	6	8	65	115
Myotis sp	3	3	0	1	1	8
Nyctalus sp	17	17	17	25	21	97
Common Pipistrelle	59	253	42	358	47	759
Soprano Pipistrelle	29	68	16	73	51	237
Brown Long-eared Bat	1	2	1	3	1	8
Greater Horseshoe	1	0	0	1	0	2
Lesser Horseshoe	1	2	0	0	0	3
Total	132	360	83	472	192	1239

Table 34: Survey results from Location D5, 3rd September to 7th September

Location D6						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	0	0	0	4	2	6
Serotine	0	0	0	7	2	9
Myotis sp	0	0	0	14	4	18
Nyctalus sp	0	0	0	11	11	22
Nathusius' Pipistrelle	0	0	0	0	1	1
Common Pipistrelle	0	0	0	22	26	48
Soprano Pipistrelle	0	0	0	44	39	83
Brown Long-eared Bat	0	0	0	9	2	11
Total	0	0	0	111	87	198

Table 35: Survey results from Location D6, 3rd September to 7th September

Location D7						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	2	0	1	2	1	6
Serotine	4	9	6	4	1	24
Myotis sp	13	7	6	16	2	44
Nyctalus sp	5	12	8	8	24	57
Nathusius' Pipistrelle	0	0	0	1	3	4
Common Pipistrelle	395	618	733	681	1338	3765
Soprano Pipistrelle	56	128	249	77	120	630
Brown Long-eared Bat	41	36	26	39	24	166
Greater Horseshoe	2	3	2	1	1	9
Total	518	813	1031	829	1514	4705

Table 36: Survey results from Location D7, 3rd September to 7th September

Location D8						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	6	0	0	0	3	9
Serotine	17	6	3	18	14	58
Myotis sp	7	6	4	10	8	35
Nyctalus sp	12	17	9	9	22	69
Nathusius' Pipistrelle	1	0	0	0	2	3
Common Pipistrelle	65	9	20	10	150	254
Soprano Pipistrelle	16	3	9	4	47	79
Brown Long-eared Bat	3	0	2	0	0	5
Greater Horseshoe	3	2	4	2	4	15
Lesser Horseshoe	1	0	1	0	1	3
Total	131	43	52	53	251	530

Table 37: Survey results from Location D8, 3rd September to 7th September

Location D9						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	3	3	1	7	0	14
Serotine	8	7	6	21	0	42
Myotis sp	11	0	5	16	0	32
Nyctalus sp	20	14	15	49	0	98
Common Pipistrelle	156	112	118	386	0	772
Soprano Pipistrelle	26	64	13	103	0	206
Brown Long-eared Bat	4	3	1	8	0	16
Lesser Horseshoe	1	0	0	1	0	2
Total	229	203	159	591	0	1182

Table 38: Survey results from Location D9, 3rd September to 7th September

Location D10						
Species	**03/09**	**04/09**	**05/09**	**06/09**	**07/09**	**Total**
Barbastelle	4	1	0	0	0	5
Serotine	3	5	0	0	0	8
Myotis sp	13	2	0	0	0	15
Nyctalus sp	35	10	0	0	0	45
Common Pipistrelle	48	32	0	0	0	80
Soprano Pipistrelle	53	17	0	0	0	70
Brown Long-eared Bat	27	9	0	0	0	36
Greater Horseshoe	1	0	0	0	0	1
Lesser Horseshoe	2	0	0	0	0	2
Total	186	76	0	0	0	262

Table 39: Survey results from Location D10, 3rd September to 7th September

Location D1														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Serotine	1	0	0	0	0	2	0	0	0	0	0	0	0	3
Myotis sp	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Nyctalus sp	13	3	0	0	1	6	0	0	0	0	0	0	0	23
Nathusius' Pipistrelle	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Common Pipistrelle	2	0	0	0	7	2	0	0	0	0	0	0	0	11
Soprano Pipistrelle	4	0	0	0	5	1	0	0	0	0	0	0	0	10
Brown Long-eared Bat	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	23	3	0	0	14	12	0	0	0	0	0	0	0	52

Table 40: Survey results from Location D1, 30th September to 12th October

Location D2														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Serotine	9	0	0	0	9	0	0	0	0	0	0	0	0	18
Myotis sp	51	0	0	0	51	0	0	0	0	0	0	0	0	102
Nyctalus sp	7	0	0	0	7	0	0	0	0	0	0	0	0	14
Soprano Pipistrelle	10	0	0	0	10	0	0	0	0	0	0	0	0	20
Brown Long-eared Bat	2	0	2	0	4	0	0	0	0	0	0	0	0	8
Total	79	0	2	0	81	0	0	0	0	0	0	0	0	162

Table 41: Survey results from Location D2, 30th September to 12th October

Location D3														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	3	0	1	1	0	0	5	0	2	5	6	10	0	33
Serotine	55	0	0	0	4	51	2	62	59	19	8	128	2	390
Myotis sp	11	0	0	1	2	12	2	2	10	11	7	9	1	68
Nyctalus sp	256	2	2	2	28	215	15	50	192	19	12	388	17	1198
Nathusius' Pipistrelle	0	0	0	0	1	0	0	0	1	0	0	0	0	2
Common Pipistrelle	16	0	1	1	6	11	6	59	8	0	3	16	1	128
Soprano Pipistrelle	14	0	2	3	2	17	6	9	27	8	29	17	8	142
Brown Long-eared Bat	8	0	0	0	1	10	0	0	7	6	14	10	1	57
Greater Horseshoe	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Lesser Horseshoe	1	0	0	0	0	0	0	0	0	2	0	0	0	3
Total	365	2	6	8	44	316	36	182	306	70	79	578	30	2022

Table 42: Survey results from Location D3, 30th September to 12th October

Location D4														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	0	0	0	0	0	0	0	1	1	0	4	7	1	14
Serotine	2	0	1	0	2	0	1	4	15	0	1	4	0	30
Myotis sp	30	0	0	0	24	7	0	1	26	13	29	51	12	193
Nyctalus sp	7	1	2	0	1	10	2	10	34	4	1	27	3	102
Nathusius' Pipistrelle	21	0	0	0	0	0	0	3	46	0	2	4	0	76
Common Pipistrelle	179	0	0	0	183	39	4	74	227	2	866	82	14	1670
Soprano Pipistrelle	129	0	1	0	97	50	7	13	106	21	127	68	20	639
Brown Long-eared Bat	2	0	0	0	1	2	0	0	2	2	1	1	0	11
Total	370	1	4	0	308	108	14	106	457	42	1031	244	50	2735

Table 43: Survey results from Location D4, 30th September to 12th October

Location D5														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Myotis sp	0	0	0	0	0	0	0	4	4	1	0	9	0	18
Nyctalus sp	0	0	0	0	0	0	0	1	1	1	0	1	0	4
Nathusius' Pipistrelle	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Common Pipistrelle	0	0	0	0	0	0	0	10	20	0	0	7	0	37
Soprano Pipistrelle	0	0	0	0	0	0	0	2	8	1	0	1	1	13
Brown Long-eared Bat	0	0	0	0	0	0	0	1	3	10	0	5	0	19
Total	0	0	0	0	0	0	0	18	37	13	0	24	1	93

Table 44: Survey results from Location D5, 30th September to 12th October

Location D6														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	0	0	2	0	4	0	49	1	0	1	23	1	0	81
Serotine	5	0	0	0	1	1	0	1	6	21	4	13	0	52
Myotis sp	0	0	0	0	0	1	6	0	3	9	16	2	5	42
Nyctalus sp	11	0	1	1	13	10	5	14	22	9	11	38	6	141
Common Pipistrelle	5	0	19	1	22	11	264	28	8	5	2	18	11	394
Soprano Pipistrelle	2	0	94	15	31	29	93	18	11	15	29	39	20	396
Brown Long-eared Bat	6	0	1	0	4	3	2	1	8	13	9	8	1	56
Greater Horseshoe	0	0	0	46	0	0	5	0	2	0	0	1	0	54
Lesser Horseshoe	0	0	0	0	0	0	2	0	3	1	0	1	0	7
Total	29	0	117	63	75	55	426	63	63	74	94	121	43	1223

Table 45: Survey results from Location D6, 30th September to 12th October

Location D7														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	1	0	0	0	0	0	0	0	1	0	1	1	0	4
Serotine	1	0	0	0	0	3	0	1	10	4	1	4	0	24
Myotis sp	2	0	0	0	0	2	3	0	7	8	5	4	0	31
Nyctalus sp	13	0	0	0	4	1	2	9	4	4	5	9	3	54
Nathusius' Pipistrelle	0	0	0	0	0	0	0	1	0	0	0	0	2	3
Common Pipistrelle	22	0	0	0	5	2	1	4	13	5	2	18	5	77
Soprano Pipistrelle	10	0	1	8	6	5	8	1	14	12	24	6	2	97
Brown Long-eared Bat	33	7	0	1	10	13	35	12	29	46	40	25	16	267
Greater Horseshoe	0	0	0	1	0	0	0	1	0	0	4	2	0	8
Lesser Horseshoe	0	0	0	0	0	0	0	0	0	1	0	1	0	2
Total	82	7	1	10	25	26	49	29	78	80	82	70	28	567

Table 46: Survey results from Location D7, 30th September to 12th October

Location D8														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	0	0	0	0	2	4	0	12	1	0	0	11	0	30
Serotine	26	1	0	0	3	13	0	21	18	17	3	29	0	131
Myotis sp	6	0	0	0	36	12	2	43	20	8	3	9	12	151
Nyctalus sp	18	1	0	0	14	13	3	34	47	8	15	31	2	186
Nathusius' Pipistrelle	0	0	0	0	0	2	0	1	0	0	0	1	0	4
Common Pipistrelle	56	1	0	2	118	310	439	468	111	107	449	127	200	2388
Soprano Pipistrelle	10	3	0	1	2	28	12	240	21	8	3	30	17	375
Brown Long-eared Bat	6	1	0	0	6	14	0	36	10	1	3	12	1	90
Greater Horseshoe	1	3	0	0	0	0	0	1	2	0	2	2	0	11
Lesser Horseshoe	0	0	0	0	1	0	0	0	0	0	0	1	0	2
Total	123	10	0	3	182	396	456	856	230	149	478	253	232	3368

Table 47: Survey results from Location D8, 30th September to 12th October

Location D9														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	0	0	0	0	0	0	0	0	0	2	29	3	0	34
Serotine	3	0	0	0	0	13	0	1	0	1	4	2	0	24
Myotis sp	2	0	0	0	6	2	0	11	8	1	1	12	0	43
Nyctalus sp	3	0	0	0	0	34	0	4	20	11	14	17	0	103
Nathusius' Pipistrelle	0	0	0	0	0	0	0	1	0	0	0	1	0	2
Common Pipistrelle	10	0	0	0	42	152	0	55	19	2	14	19	0	313
Soprano Pipistrelle	11	0	0	1	82	54	15	95	11	1	4	11	0	285
Brown Long-eared Bat	1	0	0	0	0	3	0	3	5	3	3	1	0	19
Greater Horseshoe	1	0	0	0	0	0	0	0	3	0	0	3	0	7
Lesser Horseshoe	0	0	0	0	2	0	0	0	1	6	8	2	0	19
Total	31	0	0	1	132	258	15	170	67	27	77	71	0	849

Table 48: Survey results from Location D9, 30th September to 12th October

Location D10														
Species	**30/09**	**01/10**	**02/10**	**03/10**	**04/10**	**05/10**	**06/10**	**07/10**	**08/10**	**09/10**	**10/10**	**11/10**	**12/10**	**Total**
Barbastelle	4	0	0	0	0	6	0	3	2	38	6	0	59	118
Serotine	1	0	0	0	0	1	3	2	2	6	3	3	21	42
Myotis sp	1	0	0	0	0	0	0	1	2	2	7	1	14	28
Nyctalus sp	8	0	1	1	4	1	6	8	1	7	7	2	46	92
Common Pipistrelle	12	1	1	0	2	0	3	21	6	9	20	9	84	168
Soprano Pipistrelle	7	0	2	2	2	1	1	8	0	4	7	5	39	78
Brown Long-eared Bat	8	0	0	1	0	0	2	14	1	8	14	0	48	96
Greater Horseshoe	0	0	0	0	0	0	0	1	1	0	0	0	2	4
Lesser Horseshoe	0	0	1	0	1	0	0	1	0	1	2	0	6	12
Total	41	1	5	4	9	9	15	59	15	75	66	20	319	638

Table 49: Survey results from Location D10, 30th September to 12th October

Location D1																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	4	6	2	0	4	1	0	0	0	0	0	1	0	0	0	18
Serotine	4	1	0	0	0	1	0	0	2	1	0	0	0	0	1	10
Myotis sp	11	4	2	0	3	0	4	0	27	0	10	21	8	0	3	93
Nyctalus sp	9	10	2	0	0	0	0	0	8	9	0	1	0	0	0	39
Common Pipistrelle	15	7	4	0	7	9	0	2	10	1	7	3	8	1	0	74
Soprano Pipistrelle	8	3	2	1	1	7	0	2	1	1	1	5	1	2	1	36
Brown Long-eared Bat	1	2	1	0	1	5	3	0	1	1	1	1	0	0	1	18
Lesser Horseshoe	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2
Total	52	34	13	1	16	23	7	4	49	14	19	32	17	3	6	290

Table 50: Survey results from Location D1, 21st October to 4th November

Location D2																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Serotine	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Myotis sp	1	2	0	3	1	0	0	0	0	0	0	0	0	0	0	7
Nyctalus sp	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Nathusius' Pipistrelle	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Common Pipistrelle	0	3	11	0	1	3	2	0	0	0	0	0	0	0	0	20
Soprano Pipistrelle	10	25	13	6	2	1	0	0	0	0	0	0	0	0	0	57
Brown Long-eared Bat	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Greater Horseshoe	6	2	0	0	0	1	0	0	0	0	0	0	0	0	0	9
Total	22	42	24	9	4	6	2	0	0	0	0	0	0	0	0	109

Table 51: Survey results from Location D2, 21st October to 4th November

Location D3																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	6	1	0	0	0	0	0	0	0	0	1	0	0	0	0	8
Serotine	8	3	8	0	0	0	0	0	2	30	0	1	0	0	0	52
Myotis sp	10	2	2	1	3	3	0	0	4	0	0	0	5	0	0	30
Nyctalus sp	14	8	5	0	0	0	1	1	4	30	1	5	0	0	2	71
Nathusius' Pipistrelle	0	0	0	0	0	1	0	0	0	5	0	1	0	0	0	7
Common Pipistrelle	555	0	3	0	0	0	1	1	105	10	9	54	0	1	2	741
Soprano Pipistrelle	7	36	9	5	3	5	7	7	123	15	10	15	1	0	3	246
Brown Long-eared Bat	6	0	1	0	1	1	0	0	3	2	0	0	0	0	0	14
Greater Horseshoe	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	3
Total	607	50	28	6	7	10	9	10	242	92	21	76	6	1	7	1172

Table 52: Survey results from Location D3, 21st October to 4th November

Location D4																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	4
Serotine	1	0	0	0	0	0	0	0	0	7	0	0	0	0	0	8
Myotis sp	28	17	16	38	6	10	4	1	1	14	5	5	0	0	1	146
Nyctalus sp	7	8	1	0	0	0	0	0	1	6	0	0	0	0	1	24
Nathusius' Pipistrelle	13	0	0	0	0	0	0	0	10	2	0	0	0	0	0	25
Common Pipistrelle	29	61	1	0	0	2	6	1	2	67	0	0	0	17	1	187
Soprano Pipistrelle	21	30	9	7	2	4	3	5	4	75	0	0	0	0	0	160
Brown Long-eared Bat	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Lesser Horseshoe	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	100	116	27	46	10	18	13	7	18	171	5	5	0	17	3	556

Table 53: Survey results from Location D4, 21st October to 4th November

Location D5																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	15	21	5	0	4	4	0	0	0	68	1	0	0	0	0	118
Serotine	12	0	0	0	0	0	0	0	0	19	0	0	0	0	0	31
Myotis sp	29	6	0	0	2	0	0	1	1	7	2	1	0	0	5	54
Nyctalus sp	25	3	3	0	0	0	1	0	10	14	0	1	0	0	0	57
Nathusius' Pipistrelle	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Common Pipistrelle	21	16	7	0	2	49	4	6	132	443	5	3	63	0	35	786
Soprano Pipistrelle	83	51	19	7	10	111	7	4	359	79	51	36	30	4	5	856
Brown Long-eared Bat	1	0	0	0	1	0	1	0	0	3	0	0	0	0	1	7
Greater Horseshoe	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Lesser Horseshoe	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Total	186	98	34	7	19	164	14	11	503	635	59	41	93	4	46	1914

Table 54: Survey results from Location D5, 21st October to 4th November

Location D6																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Serotine	1	0	1	0	0	0	0	0	0	2	0	0	0	0	0	4
Myotis sp	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Nyctalus sp	7	9	4	0	0	0	0	0	4	11	1	1	0	0	1	38
Common Pipistrelle	0	2	0	0	0	2	0	1	1	6	3	1	7	1	14	38
Soprano Pipistrelle	0	1	1	1	0	1	1	0	2	2	0	1	1	1	1	13
Brown Long-eared Bat	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	10	12	6	1	0	3	1	1	7	21	4	3	8	2	17	96

Table 55: Survey results from Location D6, 21st October to 4th November

Location D7																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Serotine	1	1	0	2	0	0	0	0	0	1	0	0	0	0	0	5
Myotis sp	3	0	2	0	0	0	1	0	0	0	1	0	0	0	0	7
Nyctalus sp	8	8	1	0	0	0	0	0	8	11	1	3	0	0	0	40
Nathusius' Pipistrelle	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Common Pipistrelle	5	4	5	0	1	3	19	1	11	4	2	6	1	0	2	64
Soprano Pipistrelle	8	2	1	0	1	1	1	1	15	3	0	2	0	0	3	38
Brown Long-eared Bat	16	8	6	3	12	6	6	0	9	4	5	6	4	1	4	90
Greater Horseshoe	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Lesser Horseshoe	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	41	23	16	5	16	10	27	2	44	23	9	17	5	1	9	248

Table 56: Survey results from Location D7, 21st October to 4th November

Location D8																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	1	0	1	1	0	1	3	4	0	2	0	0	0	0	0	13
Serotine	2	0	2	0	1	0	0	0	2	27	0	0	0	0	0	34
Myotis sp	2	0	4	0	2	3	1	0	2	0	0	0	2	0	1	17
Nyctalus sp	11	4	7	0	0	0	0	0	6	14	1	1	0	0	3	47
Nathusius' Pipistrelle	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
Common Pipistrelle	171	3	6	2	1	9	6	7	117	573	20	48	2	5	3	973
Soprano Pipistrelle	23	25	96	26	11	41	8	17	59	62	14	26	4	1	1	414
Brown Long-eared Bat	3	0	1	0	0	0	2	0	1	1	0	0	0	0	5	13
Greater Horseshoe	1	0	0	2	1	18	16	3	0	3	0	1	0	0	0	45
Lesser Horseshoe	0	0	0	12	0	1	0	5	0	0	0	0	0	0	1	19
Total	214	32	117	43	16	73	36	36	189	683	35	76	8	6	14	1578

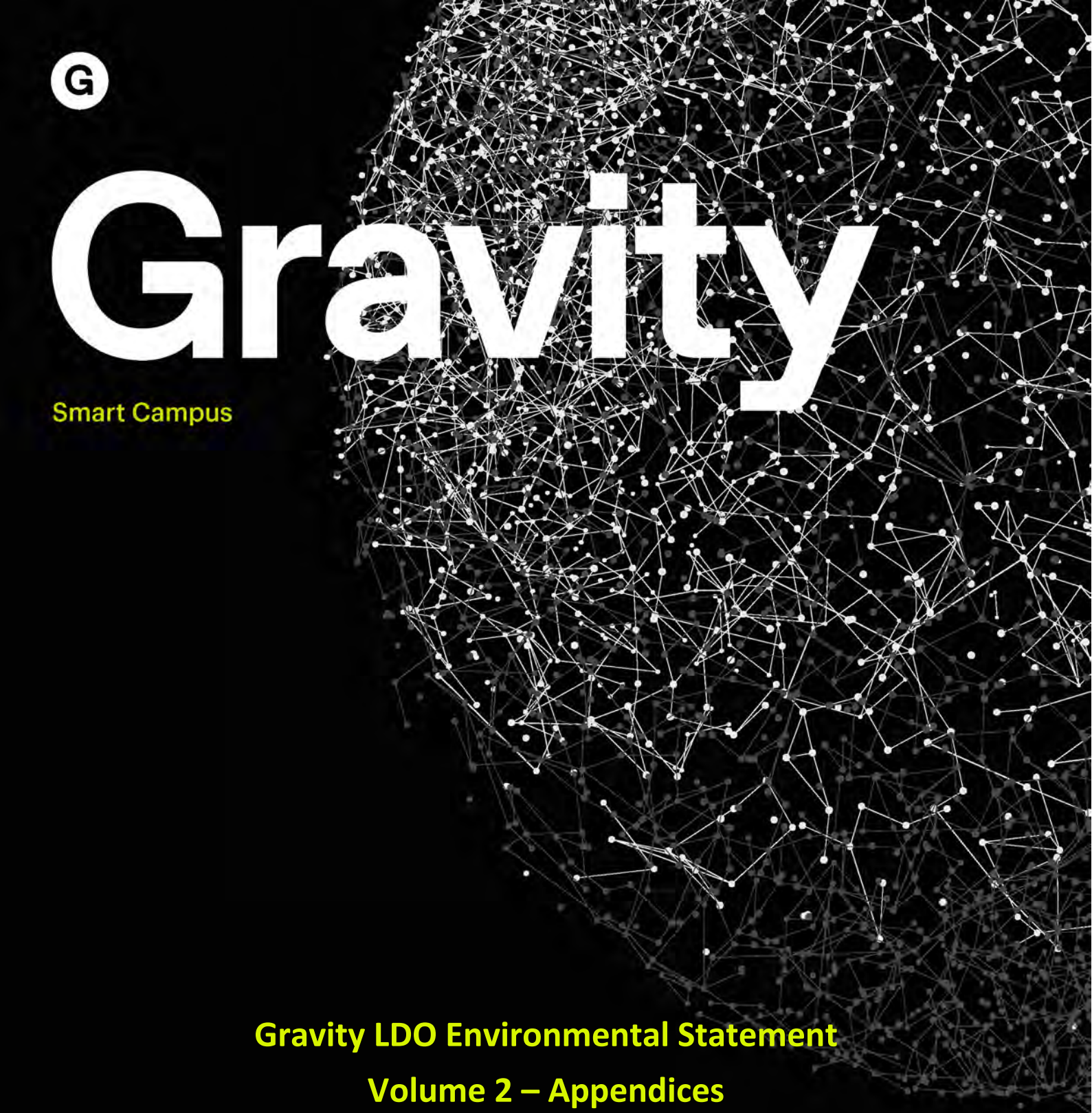
Table 57: Survey results from Location D8, 21st October to 4th November

Location D9																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Serotine	3	0	1	0	0	1	0	0	1	1	0	0	0	0	0	7
Myotis sp	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Nyctalus sp	23	4	56	0	0	3	0	1	10	3	1	0	0	0	0	101
Nathusius' Pipistrelle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Pipistrelle	317	9	4	11	4	141	45	134	166	11	60	0	0	0	0	902
Soprano Pipistrelle	60	6	1	1	0	278	15	14	80	6	48	0	0	0	0	509
Brown Long-eared Bat	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
Greater Horseshoe	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
Lesser Horseshoe	3	3	2	13	2	22	1	0	0	0	0	0	0	0	0	46
Total	408	22	65	25	6	446	61	150	257	22	109	0	0	0	0	1571

Table 58: Survey results from Location D9, 21st October to 4th November

Location D10																
Species	**21/10**	**22/10**	**23/10**	**24/10**	**25/10**	**26/10**	**27/10**	**28/10**	**29/10**	**30/10**	**31/10**	**01/11**	**02/11**	**03/11**	**04/11**	**Total**
Barbastelle	12	9	3	3	1	1	3	0	0	2	3	0	2	0	1	40
Serotine	0	0	1	0	0	0	0	0	2	4	0	0	0	0	0	7
Myotis sp	3	8	7	0	4	0	4	0	2	17	7	3	1	0	1	57
Nyctalus sp	11	11	4	0	0	0	0	0	5	19	1	3	0	1	1	56
Nathusius' Pipistrelle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Pipistrelle	308	48	147	81	20	8	31	24	125	92	22	19	14	5	289	1233
Soprano Pipistrelle	100	149	14	188	130	23	21	16	72	97	13	2	8	1	6	840
Brown Long-eared Bat	5	7	3	1	7	3	2	1	1	5	1	0	2	0	5	43
Greater Horseshoe	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lesser Horseshoe	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2
Total	440	232	179	273	162	35	62	41	207	236	48	27	27	7	303	2279

Table 59: Survey results from Location D10, 21st October to 4th November



Gravity

Smart Campus

Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.3

Bat Roost Survey Report

CONTENTS

PLANS

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.3. **Bat Roost Survey Report**

1.3.1. This document describes the results of bat roost survey work undertaken and provides a broad assessment of the current ecological interest of the Site as a whole, based upon field and desk-based studies.

1.3.2. The importance of the habitats within the site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1 The methodology utilised for the bat survey work can be split into two areas, a desk study and specific faunal survey work. These are discussed in more detail below.

2.2 Desk Study

2.2.1 In order to compile background information on the use of the Site and its immediate surroundings by bats, Ecology Solutions contacted Somerset Ecological Records Centre (SERC). The records received are collated data from a number of sources and provide information on an array of bat species (covering a 3km search radius from the application site).

2.2.2 Information provided by SERC is referred to where relevant.

2.3 Bat Roost Surveys

2.2.1 Trees and buildings present within the Site, were assessed for their potential to support roosting bats in April 2018. The work was led by an experienced bat worker and aimed to establish the likelihood of presence / absence of bats. Update surveys / inspections were undertaken in 2020 and 2021.

2.2.2 Field surveys were undertaken with regard to best practice guidelines issued by Natural England (20042), the Joint Nature Conservation Committee (20043) and the Bat Conservation Trust (20164).

2.2.3 Trees at the Site were assessed for their potential to support roosting bats. For a tree to be classed as having some potential for roosting bats it must usually have one or more of the following characteristics:

- obvious holes, e.g. rot holes and old woodpecker holes;
- dark staining on the tree below a hole;
- tiny scratch marks around a hole from bats' claws;
- cavities, splits and/or loose bark from broken or fallen branches, lightning strikes etc.;
- very dense covering of mature Ivy *Hedera helix* over trunk.

2.2.4 All buildings/structures present within the Site were assessed for potential to support bat roosts. The probability of a building being used by bats as a summer roost site increases if it:

[2] Mitchell-Jones, A. J. (2004). *Bat Mitigation Guidelines*. English Nature, Peterborough.
[3] Mitchell-Jones, A.J. & McLeish, A.P. (Eds.) (2004). *Bat Workers' Manual*. 3rd edition. Joint Nature Conservation Committee, Peterborough.
[4] Collins, J. (Eds.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)*. Bat Conservation Trust, London.

- is largely undisturbed;
- dates from pre 20th Century;
- has a large roof void with unobstructed flying spaces;
- has access points for bats (though not too draughty);
- has wooden cladding or hanging tiles; and
- is in a rural setting and close to woodland or water.

2.2.5 Conversely, the probability decreases if a building is of a modern or pre-fabricated design / construction, is in an urban setting, has small or cluttered roof voids, has few gaps at the eaves or is a heavily disturbed premises.

2.2.6 All accessible internal spaces and external features of the buildings/structures assessed to have bat roost potential were thoroughly searched for any signs of use by bats.

2.2.7 Historically the Site contained a large number of buildings and previous surveys had recorded evidence of bats roosting within 18 of them. As part of the remediation of the ROF site, the majority of the buildings were demolished. All buildings containing bat roosts, expect one in the ROF site, were demolished under Natural England licence in 2011. The building was previously recorded as a bat roost for Brown Long-eared Bat *Plecotus auritus*. In order to ascertain whether the building continued to support roosting bats, inspection and emergence surveys were undertaken in May 2017. No roosting bat activity was identified in relation to the building and it was concluded that the building no longer supported a bat roost. Outside of the ROF site, additional buildings were noted to have previously contained bat roosts and were due to be retained.

2.2.8 Buildings and trees have been reappraised for their potential to support roosting bats during detailed inspection surveys undertaken 2018, 2020 and 2021. Where present, evidence of bats being present was recorded as well as samples taken of any DNA evidence (i.e. droppings) for laboratory analysis to determine the related species.

2.2.9 Following initial assessments, emergence / re-entry surveys were conducted from sunset to approximately 2 hours after sunset. Surveyors utilised EchoMeter Touch 2 Pro (EMT) bat detectors to aid identification of bats and record data. Surveyors were stationed a vantage points in order to view features of potential interest to bats .

3. SURVEY RESULTS

3.4 The Site is noted to contain habitats suitable for bats foraging and commuting and is considered to be of moderate suitability for this species group. Potential roosting habitat is also present in the form of Trees and Buildings is discussed with the Bat Roost Survey Report submitted as a separate appendix (appendix 12.2) to the ES Chapter.

3.5 **Previous surveys.** A suite of surveys was undertaken by EPI in 2009, including roost surveys and activity surveys. Furthermore, Ecology Solutions undertook additional update survey work in 2011 and 2017. The findings are summarised below.

3.6 In 2009 a total of 19 individual trees were assessed to have medium to high potential for roosting bats, with an additional 29 trees and an orchard within the wider Site assessed as having value for roosting bats. Of the 19 trees within the Site with medium to high potential for roosting bats, further survey work was carried out and none were found to support bat roosts.

3.7 A licence was granted by Natural England in relation to the loss of all roost sites within the ROF site and the mitigation strategy was agreed and implemented (construction and monitoring of three purpose built bat barns (see Plan ECO1) and the erection of bat boxes). However, remnant buildings still remain within the ROF site and wider Site.

3.8 Three buildings remain which were previously been identified as roost sites for Brown Long-eared or Common Pipistrelle bats (buildings B1, B4 and B10). Other remaining buildings are considered suboptimal for roosting bats given their design and condition.

3.9 During an update emergence survey of the remaining building (undertaken in May 2017 by Ecology Solutions) previously shown to be a roost site (building B4), no bats were observed to emerge from this building. Furthermore, it is understood that the rain water began to leak into the roof section, making the potential roost site unsuitable. This building is not currently considered to be a roost site.

3.10 **Update surveys.** During update surveys in 202/21 onsite trees were assessed. A total of 6 individual trees were assessed to have moderate potential for roosting bats, a with an additional 15 trees within the wider Site assessed as having low suitability for roosting bats. Of the 6 trees within the Site with moderate potential for roosting bats, further survey work / internal inspections were carried out and none were found to support bat roosts.

3.11 The trees in the orchard were subject to a detail inspection in July 2021. The majority of trees were deemed to be of negligible potential to support roosting bats due to their poor condition. Whilst most contained hollows in the trunk and branches, these were often heavily exposed to the element, and little if any internal space was present within which bats could shelter. The trees are all

generally short, allowing for a full internal inspection to be undertaken. A total of 5 trees (T1 – T5) were identified within the orchards that had moderate potential to support roosting bats and a further 5 trees (T6 – T10) (see plan ECO2). This suitability was typically due to the presence of large cavities within the main stems that were not fully exposed to the water ingress or other adverse weather. These were subject to detailed inspections surveys and no evidence of bats was found. However, on a precautionary basis a re-entry survey was undertaken in July 2021 on those deemed to have moderate suitability. The results are described below.

3.12 A further tree with moderate potential foe roosting bats was identified within the woodland to the north west of the Site (T20). This tree was a dead totem, with a large cavity on its south-eastern side as well as a number of woodpecker holes connecting to the cavity along the trunk. The cavity was sheltered and showed no signs of water ingress or rot. The tree was subject to an internal inspection on 3rd September 2021 and no evidence of roosting bats was recorded, although evidence of nesting birds was noted. Other trees within the woodland were noted to have low bat roost potential due to the presence of small areas of loose bark, dense Ivy growth or woodpecker holes / crevices, although the extent of these features was limited. A single tree (T11) was recorded to have low – moderate suitability on the basis of a larger cavity opening on the truck, however, the section of trunk was relatively narrow and evidence of water ingress was identified, therefore the features was considered to have reduced suitability. The remaining trees were deemed to be of negligible significance due to the lack of any suitable features.

3.13 The bridge structure spanning the M5 motorway corridor was assessed for its potential to support roosting bats. The large concrete structure is in relatively good condition with no enclosed cavity features identified within the bridge abutments or spanning section. No features were identified during the inspection that were considered suitable to support roosting bats. The structure is considered to be of negligible suitability for roosting bats.

3.14 Buildings identified to have suitability as potential bat roost features were subject to update inspections in November 2020. During the course of the inspections evidence of bats was recorded in buildings **B1**, **B10**, **B11** and **B12**. The evidence is described further below for each of these buildings.

3.15 Building **B1** (the 37 Club) has historically been recorded as a roost site for Pipistrelle bats. During update inspections undertaken in 2020 evidence of bat presence within the buildings was confirmed with the observation of a dead juvenile Pipistrelle, located below a dislodged tile within a suspended ceiling above the main function room. Given the construction of the ceiling it is not possible to access the void extensively, although the entry point was considered to be on the eastern elevation of the structure. Further inspections were undertaken in July 2021 that recorded a total of 3 Pipistrelle bats present under the eastern gable end of the pitch roof. Faecal samples were collected for around the access point and confirm the species as Common Pipistrelle.

3.16 Given the presence of juveniles within the roost it is considered that building **B1** is used as a maternity roost for Common Pipistrelle.

3.17 Further emergence and re-entry surveys have also been undertaken to further assist in categorising the type and status of the roost. These are described further below.

3.18 Building **B10** has historically been recorded as a Brown Long-eared bat roost. The update inspection recorded a small scattering of bat droppings within the loft void of the house. These were located below the ridge beam of the roof structure. Samples were collected for DNA analysis, which confirmed the droppings were from Brown Long-eared bats. Access points are present in the form of large holes in the eaves present in the west and east of the roof. Given the small scattering of droppings and lack of any other evidence of bat presence, it is considered that the buildings **B10** is currently used as a summer roost for Brown Long-eared bats.

3.19 Further emergence and re-entry surveys have also been undertaken to further assist in categorising the type and status of the roost. These are described further below.

3.20 Buildings **B11** and **B12** have not historically been recorded as having any evidence of bats roosts being present. However, during update inspections in November 2020, a small collection of droppings were observed below a potential perching location in building **B11**. Subsequent DNA analysis confirmed that the droppings were from Lesser Horseshoe bat. Furthermore, a single Lesser Horseshoe bat was observed within building **B12**, perching from the ceiling. No other potential perching locations were identified within either structure. Regular inspections have taken place over the 2021 active season and no further sightings of bats have been recorded and no new evidence of recent use (e.g. fresh droppings) have been recorded. It is considered that these buildings not used as maternity or hibernations roost, but are used as alternative day/night roosting sites by small numbers or individual of bats.

3.21 The three bat lofts created within the Site were also subject to inspection in July 2021. All three are considered to be in good condition with no signs of damage apparent. All three also have significant amounts of bat droppings present within the loft voids with a range in old and new material evident. Searches were undertaken of the features within the voids and no bat were recorded as being present at the time of the survey. Faecal samples were from all three roosts and all confirmed as being from Brown Long-eared bat. All of the roosts are considered to be currently used as a summer roost for Brown Long-eared bats.

Emergence / Re-entry surveys

3.22 Detailed emergence / re-entry surveys were undertaken on buildings **B1** and **B10** in July and August 2021, in order to further ascertain to their use by roosting bats.

3.23 The dates, times and weather conditions of each survey is shown in Table 1 below, in addition to details of the buildings subjected to further survey effort.

Date	survey	Weather Conditions (temp, cloud cover, precipitation, wind speed)	Buildings surveyed
01.07.2021	Emergence (21:30 sunset)	17˚C, 20%, dry, 11 mph	B1, B10
02.07.2021	Re-entry (05:01 sunrise)	15˚C, 70%, dry, 9 mph	B1, B10
27.07.2021	Emergence (05:29 sunset)	17˚C, 90%, 10mm, 4mph	T1, T2, T3, T4, T5
23/08/2021	Emergence (20:17 sunset)	18˚C, 25%, dry, 7mph	B1, B10
23/08/2021	Re-entry (06:12 sunrise)	13˚C, 25% rising to 90% by sunrise, dry, 6mph	B1, B10

Table 1. Survey times, weather conditions and buildings surveyed

3.24 Full details of the 2021 survey findings are set out below.

Building B1 (37 Club)

3.25 Building **B1** was subject to emergence and re-entry surveys on the nights of the 1st/2nd July and the 23rd/24th August 2021. The dates and findings are summarised in Table 2 below.

Date	Survey Type	Confirmed Bat Re-entry / Emergence?	Species & number
01.07.2021	Emergence	**YES**	C.Pip (x 81)
02.07.2021	Re-entry	**YES**	C.Pip (x 88)
23.08.2021	Emergence	**YES**	C Pip (x 4)
24.08.2021	Re-entry	**NO**	N/A

Table 2. Dates, weather conditions and results for July 2021 emergence and re-entry surveys on B1

3.26 As summarised in Table 2, Common Pipistrelle were recorded utilizing a roost within **B1**. Access to the roost was through the soffits on the eastern end of the building that leads to a pitched roof above a suspended ceiling within the structure. During the emergence survey on the evening of the 1st July, at least 81 were observed emerging from this area. The emergence occurred between 21:38 and 22:05, with the majority of bats emerging between 21:44 and 21:56.

3.27 There was general bat activity recorded by 4 surveyors during the emergence survey in the areas around **B1**. The most common species recorded was Noctule (168 registrations), with Common Pipistrelle (103 registrations) and Leisler's Bat (52 registrations) constituting the majority of the remaining records. Other species recorded were Nathusius' Pipistrelle (4 registration), Serotine (3 registrations) and Soprano Pipistrelle (3 registrations). It should be noted that the figures given relate to the total registration by all surveyors positioned near the building and it is expected that a level of 'double counting' of individual bats took place.

3.28 During the re-entry survey the following morning (2nd July), approximately 88 Common Pipistrelle were observed entering **B1** through the same feature on the eastern end of the building.

3.29 Similarly, to the emergence survey there was general bat activity during the survey period. The most common species was Common Pipistrelle with 309 registrations, most of these being recorded as they circled the car park before re-entering the building. The majority of the remaining records were for Noctule (151 registrations) and Leisler's Bat (104 registrations). Other species recorded were Soprano Pipistrelle (28 registrations), *Myotis* species (17 registrations), Nathusius' Pipistrelle (8 registrations) and Serotine (5 registrations). Again, it should be noted that the figures given relate to the total registration by all surveyors positioned near the building and it is expected that a level of 'double counting' of individual bats took place.

3.30 As summarised in Table 2, a small number of emergences were recorded during the emergence survey conducted on the evening of the 23rd August. These were once again observed from the eastern end of the building. During the survey 4 emergences were observed at 20:36, 20:40, 20:43 and 21:30 all of which were Pipistrelle. No re-entries were recorded during the re-entry survey conducted on the morning of the 24th August.

3.31 It is considered that the surveys results confirm that building B1 as a maternity roost for Common Pipistrelle.

Building B10 (99 Woolavington Road)

3.32 Building **B10** was subject to emergence and re-entry surveys on the night of the 1st/2nd July and the 23rd/24th August 2021. The dates and findings are summarised in Table 2 below.

Date	Survey Type	Confirmed Bat Re-entry / Emergence?	Species & number
01.07.2021	Emergence	**NO**	N/A
02.07.2021	Re-entry	**NO**	N/A
23.08.2021	Emergence	**NO**	N/A
24.08.2021	Re-entry	**YES**	Sop Pip (x 1)

Table 3. Results for July 2021 emergence and re-entry surveys on B1

3.33 As summarised in Table 3, no bats were observed emerging from **B10** during the July survey.

3.34 During the emergence survey on the evening of the 1st July, general activity was recorded by 3 surveyors positioned around the building. The majority of the records were for Common Pipistrelle (213 registrations). There were 6 other species recorded during this survey, including Noctule (37 registrations), Soprano Pipistrelle (14 registrations), Leisler's Bat (9 registrations), Brown Long-eared Bat (9 registrations), Nathusius' Pipistrelle (4 registrations) and Serotine (3 registrations). There was also a single recording of a greater horseshoe bat however there was no evidence of this species using the building or surrounding trees. Again, it should be noted that the figures given relate to the total registration by all surveyors positioned near the building and it is expected that a level of 'double counting' of individual bats took place.

3.35 As summarised in table 3, there were also no observations of bats re-entering **B10**.

3.36 During the re-entry survey there was a lower level of general activity. The majority of the records were for Noctule (49 registrations), Soprano Pipistrelle (48 registrations) and Common Pipistrelle (40 registrations). Alongside this there were also records for *Myotis* species (13 registrations) as well as single registrations of Serotine, Leisler's Bat and Nathusius' Pipistrelle. A single registration of a Greater Horseshoe bat was recorded, but it passed over and there is not evidence of it using the building or roost surrounding area. Again, it should be noted that the figures given relate to the total registration by all surveyors positioned near the building and it is expected that a level of 'double counting' of individual bats took place.

3.37 As summarised in Table 3, no bats were observed emerging from B10 during the August emergence survey. However, there was a single observation of a Soprano Pipistrelle re-entering the southern side of the building past a loose roof tile at 05:56.

3.38 On this basis it is considered that building B10 is used as a summer roost for Brown Long-eared bats and individual Soprano Pipistrelle.

Tree's T1 – T5

3.39 Trees **T1 – T5** were subject to re-entry surveys on the morning of the 27th July. The times, findings and weather conditions are summarised in Table 4 below.

Date	Survey Type	Confirmed Bat Re-entry / Emergence?	Species & number
21.07.2021	Re-entry	**NO**	N/A

Table 4. Results for July 2021 re-entry surveys on T1, T2, T3, T4 & T5

3.40 As summarised in table 4, there were also no observations of bats re-entering any of the trees.

3.41 During the re-entry survey there was a lower level of general activity than was observed at the start of the month around **B1** and **B10**. The majority of the records were for Common Pipistrelle (65 registrations). In addition to this there were also records of Soprano Pipistrelle (29 registrations), Noctule (26 registration), Brown Long-Eared Bat (7 registrations), Leisler's Bat (5 registrations), *Myotis* species (2 registrations), Serotine (1 registrations) and Nathusius' Pipistrelle (1 registration). Again, it should be noted that the figures given relate to the total registration by all surveyors positioned near the building and it is expected that a level of 'double counting' of individual bats took place.

3.42 **Background records.** The desk study undertaken with SERC returned several records of bat species from within or immediately adjacent to the Site.

3.43 The records returned include Brown Long-eared Bat (2017) Lesser Horseshoe Bat (2017), Common Pipistrelle (2016), Greater Horseshoe Bat (2017), Barbastelle (2017), Noctule bat (2016) and Soprano Pipistrelle (2016). The nearest recorded roost site is located approximately 0.7km south east of the Site at its closest point recorded in 2018. This record does not identify the species of bat.

4. SUMMARY

3.44 Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in April 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

3.45 The Site was surveyed were undertaken with regard to best practice guidelines issued by Natural England (2004), the Joint Nature Conservation Committee (2004) and the Bat Conservation Trust (2016).

3.46 The results of the survey work undertaken are present within this report and it is considered that an extensive ecological baseline for roosting bats has been established that can fully inform any future assessment / evaluation of the Site in ecological terms.

3.47 The survey work will inform the LDO process and the related Environmental assessment process.

PLANS

PLAN ECO1

Location of Purpose Built Bat Barns

KEY:

- SITE BOUNDARY
- BAT MITIGATION ROOST

N

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7761: GRAVITY

PLAN ECO1: LOCATION OF PURPOSE BUILT BAT BARNS

Rev: A

Sept 2021

PLAN ECO1

Building and Orchard Tree Survey Plan

BUILDINGS

ORCHARD TREES

B1

B11

B12

B10

T5

T4

T3

T6

T7

T8

T9

T10

T2

T1

Google Earth

KEY:

T# TREE WITH MODERATE ROOST BAT POTENTIAL

B1 BUILDING WITH KNOWN BAT ROOST

T# TREE WITH LOW ROOST BAT POTENTIAL

N

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7761: GRAVITY, PURITON

PLAN ECO2: BUILDING AND ORCHARD TREE SURVEY PLAN

Rev: A

Sept 2021

PLAN ECO1

Woodland Tree Survey Plan

KEY:

- T# TREE WITH MODERATE ROOST BAT POTENTIAL
- T# TREE WITH LOW - MODERATE ROOST BAT POTENTIAL
- T# TREE WITH LOW ROOST BAT POTENTIAL

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7761: THIS IS GRAVITY, PURITON

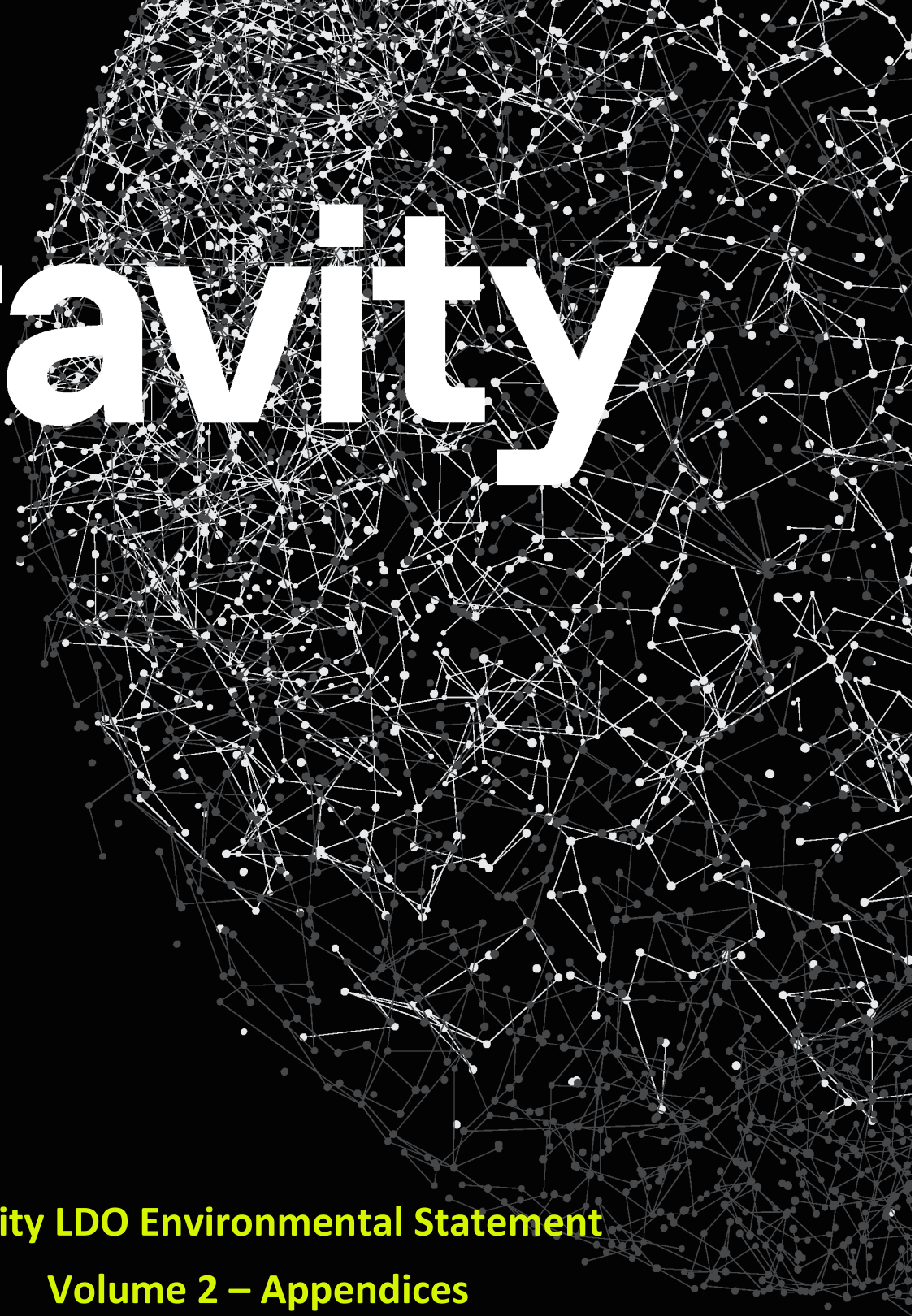
PLAN ECO3: WOODLAND TREE SURVEY

Rev: A

Sept 2021

Gravity

Smart Campus



Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.4

Badger Survey Report

(CONFIDENTIAL)

CONTENTS

PLANS

APPENDICES

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.3. Badger Survey Report

1.3.1. This document describes the results of badger survey work undertaken and provides a broad assessment of the current ecological interest of the Site

as a whole, based upon field and desk-based studies. The importance of the habitats within the site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1 The methodology utilised for the survey work undertaken can be spilt into two areas, a desk study and specific faunal surveys. These are discussed in more detail below.

2.2 The Site has been subject to regular survey and surveillance for Badger throughout 2020 with specific search of the Site undertaken in June 2020 and October 2020. Surveys comprised two main elements. The first of these was a thorough search for evidence of Badger setts. For any setts encountered each sett entrance would be recorded and plotted, even if the entrance appeared disused. The following information was recorded if appropriate:

i). The number and location of well used or very active entrances; these are clear of any debris or vegetation and are obviously in regular use and may, or may not, have been excavated recently.

ii). The number and location of inactive entrances; these are not in regular use and have debris such as leaves and twigs in the entrance or have plants growing in or around the edge of the entrance.

iii). The number of disused entrances; these have not been in use for some time, are partly or completely blocked and cannot be used without considerable clearance. If the entrance has been disused for some time all that may be visible is a depression in the ground where the hole used to be and the remains of the spoil heap.

2.3 Secondly, evidence of Badger activity, such as well-worn paths and run-throughs, snagged hair, footprints, latrines and foraging signs, was also searched for in order to build up a picture of the use of the Site and surrounding area by Badgers.

3. SURVEY RESULTS

3.1 The Site has been subject to regular monitoring for the presence of Badgers. Indeed, Badger field signs have been recorded and historically, several Badger setts have been recorded within the Site.

3.2 **Previous surveys**. A number of Badger setts had been identified within the Site during surveys undertaken by EPI in 2008 and 2009. Ecology Solutions carried out further surveys of the Site in 2011 and 2012 to establish the use of the Site by Badgers.

3.3 Additional update survey work was undertaken by Ecology Solutions to a inform two Badger sett closure licence applications that were granted in 2012 and 2013. Temporary sett closure works were completed in 2012 in the north of the Site in order to support remediation work.

3.4 A main sett located in the west of the Site, under the footprint of the proposed landscape mound was the subject of an aborted sett exclusion undertaken in 2013. The works in relation to the latter licence were undertaken in 2018 to complete the aborted works to exclude Badgers and this process was accompanied by update survey work.

3.5 This update survey work recorded that of the 21 setts previously reported within the Site, 19 no longer display signs of current use and accordingly they are no longer considered to be setts. The details of each sett (including former setts) as recorded during the survey in June 2018 are given below and shown graphically at Appendix 12.4A.

3.6 S1 was formerly recorded as a two entrance outlier sett located in dense scrub to the west of the Site. The sett was last recorded as being active in 2008, but has consistently been recorded as inactive since that time, including in June 2018. The two entrances have now collapsed.

3.7 S2, located to the west of S1, was previously recorded throughout the surveys in 2008, 2009, 2011 and 2012 as a disused three entrance sett occupied by rabbits. Evidence in July 2013 indicated Badgers had recolonised this sett. Evidence of use was also recorded in June 2018. It was considered to be an annex sett. A single active entrance was present and a large spoil pile was recorded at its front. Two disused entrances are also present, while a further two entrances recorded in previous surveys were noted to have collapsed.

3.8 S3 was recorded in 2008 and 2009 as being a main sett with four entrances. However, evidence recorded during the 2011 and 2012 surveys indicated that activity levels had reduced here, while nearby sett S4 (described below) showed higher levels of use, more indicative of use as the main sett for this social group. S3 was subsequently recorded as disused in 2013 with all four entrances being overgrown and subject to collapse. No signs of current use were recorded in June 2018 and it therefore considered that S3 is no longer a sett.

3.9 S4 was a large sett which lies adjacent to S3. The sett was recorded as active in 2008, 2009, 2011 and 2012 with higher levels of use in the 2011 and 2012 surveys. Following the survey in 2013 it was considered that S4 constituted a main sett. The survey in June 2018 recorded 11 active entrances, 12 inactive entrances and 2 possibly active entrances. A number of other blocked, collapsed or disused entrances were also present in the vicinity. Evidence of rabbit activity was also recorded across the area.

3.10 S5 was formerly recorded as an annex sett to the north of S4 with at least five entrances. The sett was recorded as active in 2008, with all five entrances in use. No evidence of Badger activity was recorded in the 2011, 2012 or 2013 surveys. Accordingly, S5 was no longer considered to be a sett at that time. Only a single inactive entrance was recorded in June 2018.

3.11 S6 was formerly a four entrance sett located north of S5. No evidence of regular activity was recorded through any of the surveys leading up to 2013. S6 was recorded as inactive June 2018 and has since been closed under licence.

3.12 S7 was previously recorded as a five entrance subsidiary sett to the north of S6. The sett was active in 2008. However, the surveys undertaken in 2009, 2011 and 2012 recorded a decline in activity. The entrances had collapsed by the 2013 survey and no recent evidence of Badger activity was recorded in the immediate vicinity. No evidence of Badger activity was recorded in June 2018. As such S7 is no longer considered present.

3.13 S8 was initially recorded as an active single entrance sett located to the north of S7 in an old boiler ash mound. Surveys undertaken in 2009, 2011 and 2012 reported that the sett was occupied by Rabbits and no evidence of Badger use was recorded. Furthermore, no evidence of Badger use was recorded in 2013 or June 2018, and so S8 is no longer deemed to be a sett.

3.14 S9 is a former five entrance sett located in the northern part of the Site. It was partially active in 2008, but disused and occupied by rabbits in 2009, 2011, 2012. The entrances were recorded to have collapsed in 2013 and no evidence of Badger activity was recorded in June 2018. Accordingly, S9 no longer represents a sett.

3.15 S10 was previously a two entrance sett located within dense scrub. The sett was recorded as active in 2008, 2009 and 2011, but not in 2012 or 2013 when the entrances had collapsed and were blocked by debris. No evidence of Badger activity was recorded in June 2018 and S10 is no longer considered to be a sett.

3.16 S11 was previously recorded in surveys undertaken in 2008, 2009 and 2011 as a single disused entrance occupied by Rabbits. In 2012 the sett appeared to be in use by Badgers again and new spoil was present. It was at that time considered to be an outlier sett associated with main sett S20 (described below). Activity levels had increased at the time of the 2013

survey. No Badger activity was recorded in June 2018 and the sett was instead occupied by Rabbits. Consequently, S11 is no longer considered to be a sett.

3.17 S12 was previously considered to be a main sett for the social group in this area of the Site in 2008, 2009 and 2011. However, surveys undertaken in 2012 recorded a new sett in the vicinity of S12 (sett S20) which exhibited far greater levels of use and it was considered that the new sett (S20) had become the new main sett. It was identified at the time that S12 then constituted an active annex or subsidiary sett to the new main sett. It was subject to a temporary exclusion exercise under licence (Licence ref: WLM/2012/2179) which allowed for demolition works to be undertaken in respect of a building on top of the concrete slab above the sett. Following this exercise the Badger gate was removed from the sett entrance. It was considered Badger had recolonised the sett in July 2013, but no evidence of use was recorded in June 2018. The area had scrubbed over and no evidence of Badger activity was recorded in the vicinity. Consequently S12 is no longer considered to be an active sett.

3.18 S13 was a single entrance sett. The sett was recorded as partially active in 2008 but was occupied by Rabbits in 2009. Following subsidence in 2009, the S13 is disused / collapsed and no longer considered a sett.

3.19 S14 was previously recorded as a single entrance sett below a steel tank, situated to the south of S13. The sett was recorded as possibly active in 2008; however since this date no evidence of use by Badgers has been recorded and it no longer constitutes a sett.

3.20 S15 was formerly a single entrance sett located in the south-eastern part of the ROF site. The sett was recorded as partially active in 2008 but was occupied by Rabbits in 2009, 2011 and 2012. In 2013 and June 2018 it exhibited no signs of use by Badger and is therefore no longer considered to be a sett.

3.21 S16 was recorded in 2008 as an active two entrance sett located to the east of S15 in the south-eastern part of the ROF site. It was occupied by Rabbits only in 2009, 2011 and 2012, while in 2013 the entrances had collapsed and were blocked by debris. No evidence of Badger activity was recorded in the vicinity in June 2018 and S16 is no longer considered to be a sett.

3.22 S17 is a former sett located to the east of S11 and S12. It was not in use by Badger from 2008 to 2012, although one entrance appeared to be used by a Fox *Vulpes vulpes* as an earth in 2012. Fresh digging and a guard hair indicated the sett was in use by Badger in 2013, but there was no evidence the sett was in use by Badger in the most recent survey in June 2018 with rabbits noted to have colonised the area. Accordingly, it is no longer considered to be a sett.

3.23 S18 was recorded in 2008 as a single entrance sett located in the south-eastern part of the ROF site adjacent to the security fence. Despite being

situated within an area of high Badger activity, with latrines and foraging signs close by, S18 has not been recorded as active in any of the subsequent surveys. As of 2013 the entrances had collapsed. S18 is considered to be disused and no longer represents a sett.

3.24 S19 was a single entrance sett located adjacent to the southern boundary of the ROF site. The sett was recorded as partially active in 2008; however, it was recorded as being used by Rabbits only in 2009. Subsidence / collapse was recorded in June 2009 and as of 2013 the former entrance had completely collapsed and was overgrown. No evidence of Badger activity was recorded in June 2018. Accordingly S19 is no longer a sett.

3.25 S20 was a four entrance sett located at the top of the blast bund close to S12. It was discovered in 2012 and a significant level of activity was recorded at that time, indicating it had become the main sett for the Badger social group in the area. Results from the July 2013 surveys found that the activity level of S20 had reduced. No evidence of use by Badger was recorded in June 2018, with the sett instead occupied by Rabbit. S20 is no longer considered to be a sett.

3.26 S21 was first recorded in 2013. It was considered to be a three entrance subsidiary sett, but no evidence of use was recorded in June 2018. Like S11, S12 and S20, it is currently occupied by Rabbits. Accordingly, it is no longer considered to be a sett.

3.27 Following the closure of the active setts as part of the licenced procedure, no active setts were considered to be present within the central part of the Site, except for the artificial badger sett.

3.28 **Update surveys**. The Site has been subject to regular surveillance for Badger since 2018 with update surveys undertaken in June 2020, October 2020 and July 2021. As has been described above, there has been a notable decline in activity over recent years. Of the setts historically recorded across the ROF site, currently none are considered to be active, with several having collapsed and no longer present.

3.29 Notwithstanding this, recent evidence of badgers, including latrines and foraging signs and visual sightings, have been recorded in areas near the ROF site boundaries (in the north west, south west and south east), confirming that this species continues to utilise the Site.

3.30 In 2018 the scrub which had grown around AS1 was subject to small scale clearance and baiting with peanuts and golden syrup to encourage badgers. However, further update survey work in 2021 found no evidence that the sett was active.

3.31 Sett BS1 is a main sett located in the west of the Site within an area of woodland and scrub. Sett BS1 is comprised of five entrances all of which were deemed as active during the latest survey in 2021. Evidence of high

levels of use were found around this sett with well worn paths and a latrine nearby.

3.32 Sett BS2 is located in the north-west of the development site along the disused railway corridor (see Plan ECO1). This sett is comprised of 7 entrances (4 deemed active and 3 inactive). Sett S2 is deemed to be a subsidiary sett for the social group.

3.33 Sett BS3 is located in the north-west of the development site along the disused railway corridor approximately 0.02km north-west of Sett BS2. Sett S3 was first recorded in 2020. This sett is composed of 8 entrances (4 deemed active and 4 inactive). Badger hairs were found at the entrance of three of the active entrances during the 2021 survey. Sett BS3 is deemed to be a subsidiary sett for the social group.

3.34 Sett BS4 is also located along the railway corridor, although on the opposite side of the M5 motorway to Setts S2 and S3. Sett S4 is comprised of 6 active entrances. Whilst the sett entrances are deemed to be active the level of activity is significantly lower than that seen at Sett BS1, with paths being less well defined and no other evidence presence of activity within the area.

3.35 The M5 is deemed to be a significant barrier to dispersal for badger and as such it is considered that BS4 is a sett constructed and inhabited by a different social group to Setts AS1, BS1, BS2 and BS3. BS4 as described above was recorded as having low levels of activity during survey undertaken in 2021 and is considered to be of low importance to the social group.

3.36 The entrances of Setts BS2, BS3 and BS4 are dug into the railway embankment, the soil here is particularly loose and a number of the tunnels are likely to have collapsed due to this. This explains the high number of entrances recorded for setts BS2, BS3 and BS4. None of the setts within the railway corridor exhibits signs of regular use, like that seen at Sett BS1.

Sett Status

3.37 The artificial sett AS1 is deemed to be an annexe sett. No evidence of AS1 being regularly inhabited by badgers has been recorded since its construction in 2013.

3.38 Sett BS1 is deemed to be the main sett for the social group, evidence of high levels of activity are noted around this sett including latrines and well worn paths

3.39 Setts BS2 and BS3 are both deemed to be subsidiary setts for the social group.

3.40 Sett BS4 is deemed to be a sett of low significance for a separate social group of Badgers that inhabit the western side of the M5.

3.41 As part of the pending Badger licence application, a new sett has been constructed in order to maintain opportunities for Badgers within the Site. A new artificial sett (NS1 on Plan ECO1) will be provided in the north-western part of the Site, in an area which is to remain unaffected by the proposals. The location and design of the sett has been agreed with Natural England.

3.42 The artificial sett comprises four chambers, multiple opportunities to expand the sett from the original structure will be available. The specification for the artificial sett is included at Appendix 12.4B.

3.43 The artificial sett will compensate primarily for the loss of sett S1, which is the most active sett. No specific alternative sett provision is considered necessary for setts S2, S3 and AS1 under the development proposals given the status of the setts and their limited use. However, the provision of a new sett will ensure that opportunities remain following future development of the Site for the social group.

3.44 The new sett location is being baited with trails of food to attract Badgers to the area and promote use of the sett prior to any licenced exclusion works taking place.

3.45 **Background records**. The data search undertaken with SERC returned one record of Badger recorded within the Site from 1998. The next closest record was from 0.2km north of the Site in 2018 where a dead badger was recorded.

3.46 As part of the work undertaken as part of the Hinckley C Power Connection, a number of Badger setts were identified in the wider areas to the south and east of the Site. Those setts in proximity to the Site were closed under licence in 2019. The locations are shown at Appendix 12.4B.

4. SUMMARY

4.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in April 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

4.2. The Site was surveyed for Badgers in 2020 and 2021. The results of the survey work undertaken are present within this report and it is considered that an extensive ecological baseline has been established that can fully inform any assessment / evaluation of the Site in ecological terms.

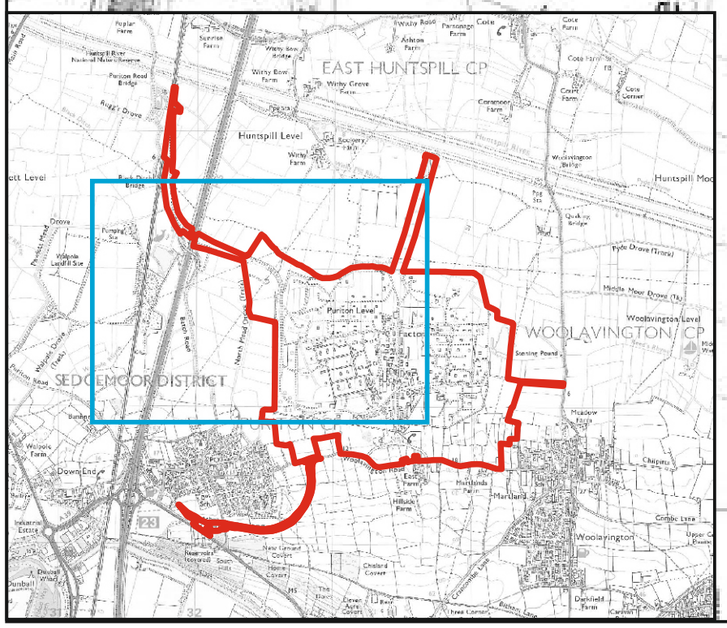
4.3. The survey work has inform the LDO process and the related Environmental assessment process.

PLANS

PLAN ECO1

Badger Survey Results

BS4
BS3
BS2
NS1
BS1
X4
AS1
Black Ditch
Puriton Level
Factory
Chys
Batch
Drove (Track)
Drove



- SITE LOCATION
- BS# ACTIVE SETT LOCATION
- AS# ARTIFICIAL SETT LOCATION
- NS# NEW ARTIFICIAL SETT LOCATION
- LATRINE

N

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7761: GRAVITY SMART CAMPUS

PLAN ECO1: BADGER SURVEY RESULTS

Rev: A

Sept 2021

APPENDICES

APPENDIX 12.4A

Historic Badger Survey Results

Puriton Level

Factory

AS1 S8 S7 S6 S5 S4 S3 S2 S1 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21

SETTS S2 AND S4 TO BE CLOSED UNDER LICENCE.

KEY:

- BOUNDARY OF SITE
- S4 ACTIVE BADGER SETT JULY 2013 NOW DISUSED
- S9 DISUSED BADGER SETT JULY 2013 & JUNE 2018
- S4 ACTIVE BADGER SETT JULY 2013 & JUNE 2018

N

ecology solutions ltd

5106: BAE PURITON, PURITON, SOMERSET

PLAN ECO2:
SITE WIDE BADGER SURVEY RESULTS

APPENDIX 12.4B

Records of Other Badger Setts

KEY:

SITE BOUNDARY

SETTS IDENTIFIED AR PART OF HINKLEY POINT C CONNECTION:

INACTIVE SETT (CLOSED 2019)

ACTIVE SETT (CLOSED 2019)

N

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7761: GRAVITY

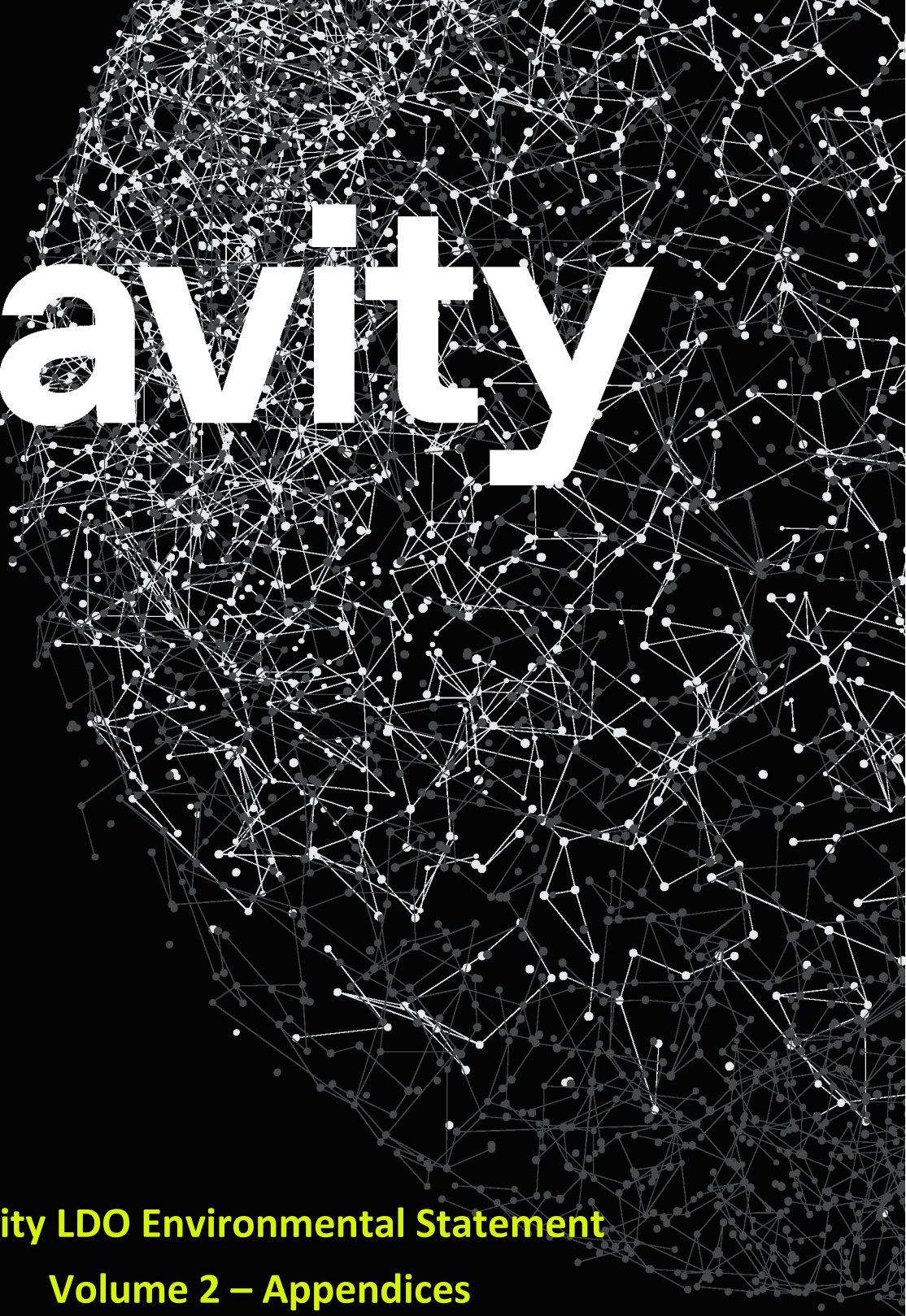
PLAN ECO2: RECORDS OF OTHER SETTS

Rev: A

Sept 2021

Gravity

Smart Campus



Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.5

Bird Survey Report

CONTENTS

PLANS

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.1. Bird Survey Report

1.1.1. This document describes the results of the reptile survey work undertaken and provides a broad assessment of the current ecological interest of the Site as a whole for this species group, based upon field and desk-based

studies. The importance of the Site for birds within the Site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1 The methodology utilised for the breeding bird survey work can be split into two areas, a desk study and specific faunal survey work. These are discussed in more detail below.

2.2 Desk Study

2.2.1 In order to compile background information on the use of the application site and its immediate surroundings by reptiles, Ecology Solutions contacted Somerset Ecological Records Centre (SERC). The records received are collated data from a number of sources and provide information on an array of bird species (covering a 3km search radius from the Site).

2.2.2 Information provided by SERC is referred to where relevant.

2.3 Breeding Bird Survey

2.3.1 The survey methodology utilised across the Site comprises of walked transects. Transect surveys are focussed on general breeding bird interest associated within the Site. The transects were planned to incorporate all habitat types (e.g. woodland, wetland and farmland) present within or adjacent to the Site.

2.3.2 Survey visits were carried out at suitable times (i.e. early mornings) in April 2020 and early June 2020. In general surveys were undertaken over a three to four hour period, with continual observations being taken for the duration of the survey.

2.3.3 Transects were walked by experienced ornithologists covering the Site. The activity of all bird species present within Site during the survey period were recorded.

2.3.4 To ascertain the breeding status of birds using the Site, the following criteria were applied following the methodology used in the 'Atlas' surveys of 1988-1991 (Gibbons et al, 1993). This accepts the following activities as denoting breeding (including those probably breeding although definite proof was lacking):

- Bird apparently holding territory;
- Courtship and display;
- Nest-building (including excavating nest-hole);
- Distraction display or feigning injury;
- Adult carrying faecal sac or food;
- Adult entering or leaving apparently occupied nest site;
- Nest with eggs or eggshells found, or bird sitting but not disturbed;
- Nest with young; or downy young of ducks, game-birds, waders and other nidifugous species; and

- Recently fledged young.

2.3.5 Observations were recorded within Site itself as well as adjacent suitable habitats, where present.

3. SURVEY RESULTS

3.1 Given the habitats present it is considered that the Site has potential to support a range of bird species.

3.2 **Previous surveys**. Breeding bird surveys were undertaken by EPI in April and May 2009. Dawn surveys were conducted to recorded general breeding behaviours as well as evening visits to look for evidence of Barn Owls *Tyto alba*.

3.3 The areas with most breeding activity within the Site were recorded to be the trees and scrub towards the periphery. In addition, high levels of breeding activity were recorded in the reed bed to the north, the disused railway to the north-west, the Borrow Pit to the east and the orchard to the south-east of the Site. Low levels of breeding activity were recorded throughout much of the central part of the Site.

3.4 In total of 67 species were recorded during the breeding bird survey. The survey identified a number of species listed on Schedule 1 of the Wildlife and Countryside Act, the UK and Somerset Biodiversity Action Plans (BAPs) and/or on the Red and Amber Lists of Species of High Conservation Concern. These species are listed in Table 1 below.

Species	Schedule 1	BAP Status	BoCC Status
Barn Owl	Yes	Somerset	Amber
Bullfinch		UK and Somerset	Amber
Cetti's Warbler	Yes		
Cuckoo		Somerset	Red
Dunnock			Amber
Herring Gull		Somerset	Red
Hobby	Yes	Somerset	
House Sparrow		Somerset	Red
Kingfisher	Yes	Somerset	Amber
Linnet		UK and Somerset	Red
Little Owl		Somerset	
Merlin	Yes	Somerset	Amber
Mistle Thrush		Somerset	Red
Reed Bunting		UK	Amber
Skylark		UK and Somerset	Red
Song Thrush		UK and Somerset	Red
Snipe		Somerset	Amber
Starling		Somerset	Red
Wood Warbler			Red

Table 1: Protected and notable bird species recorded in breeding bird survey 2009 by EPI

3.5 All of the buildings with opportunities for breeding Barn Owls on the Site have since been removed as part of the remediation process. Barn owl nesting opportunities have been provided at the Site in the form of an enclosed box within one of the Bat roost buildings and in two nesting boxes located close to suitable retained foraging habitat within the Site.

3.6 Sixteen Cetti's Warbler territories were recorded within the Site, associated with the scrub and reeds along ditches, particularly in the western and north-eastern parts of the site including the Fishing Lake.

3.7 **Update surveys.** Breeding bird surveys were undertaken by Ecology Solutions in April 2020 and May 2020. The full list of species recorded during the update survey is shown below in Table 2.

Bird Species		Signs of Breeding Behaviour Observed
Common Name	**Scientific Name**	
Blackbird	*Turdus merula*	✓
Blackcap	*Sylvia atricapilla*	✓
Bluetit	*Cyanistes caeruleus*	✓
Bullfinch	*Pyrrhula pyrrhula*	
Buzzard	*Buteo buteo*	
Carrion Crow	*Corvus corone*	✓
Cetti's Warbler	*Cettia cetti*	✓
Chaffinch	*Fringilla coelebs*	✓
Chiffchaff	*Phylloscopus collybita*	✓
Collared Dove	*Streptopelia decaoto*	
Cuckoo	*Cuculus canorus*	✓
Dunnock	*Prunella modularis*	✓
Goldcrest	*Regulus regulus*	✓
Goldfinch	*Carduelis carduelis*	✓
Great Spotted Woodpecker	*Dendrocopos major*	
Great Tit	*Parus major*	✓
Green Woodpecker	*Picus viridis*	
Greenfinch	*Carduelis chloris*	
Grey Partridge	*Perdix perdix*	
Herring Gull	*Larus argentatus*	
House Martin	*Delichon urbicum*	✓
House Sparrow	*Passer domesticus*	✓
Jackdaw	*Corvua monedula*	
Lesser Black Backed Gull	*Larus fuscus*	
Lesser Whitethroat	*Sylvia curruca*	✓
Linnet	*Carduelis cannabina*	✓
Longtailed Tit	*Aegithalos caudatus*	✓

Magpie	*Pica pica*	✓
Mallard	*Anas platyrhynchos*	
Marsh Harrier	*Circus aeruginosus*	
Mistle Thrush	*Turdus viscivorus*	✓
Pheasant	*Phasianus colchicus*	
Pied Wagtail	*Motacilla alba*	✓
Red Kite	*Milvus milvus*	
Reed Warbler	*Acrocephalus scirpaceus*	✓
Robin	*Erithacus rubecula*	✓
Rook	*Corvus frugilegus*	
Sedge Warbler	*Acrocephalus schoenobaenus*	✓
Shell Duck	*Tadorna tadorna*	
Song Thrush	*Turdus philomelos*	✓
Starling	*Sturnus vulgaris*	
Stock Dove	*Columba oenas*	
Swallow	*Hirundo rustica*	
Whitethroat	*Sylvia communis*	✓
Wood Pigeon	*Columba palumbus*	✓
Wren	*Troglodytes troglodytes*	✓
Kingfisher	*Alcedo atthis*	✓

Table 2: Bird species recorded in breeding bird survey 2020 by Ecology Solutions

3.8 Much like the previous surveys undertaken for breeding birds, the areas with most breeding activity within the Site related to trees, ditches and scrub towards the periphery and high levels of breeding activity were recorded in the reed bed to the north. Low levels of activity were recorded throughout much of the central part of the Site.

3.9 In total 47 species were recorded during these surveys with 28 of these species showing signs of breeding including singing, nest construction and territory displays. A further three species were recorded that were likely to be breeding however no confirmative evidence (e.g. nest sites) of this were recorded during the surveys (Kingfisher, Marsh Harrier and Barn Owl). The results of the survey work undertaken are shown graphically on Plan ECO1.

3.10 The survey identified a number of species listed on Schedule 1 of the Wildlife and Countryside Act, the UK and Somerset BAPs and/or on the Red and Amber Lists of Species of High Conservation Concern. These species are listed in Table 3 below.

Species	Schedule 1	BAP Status	BoCC Status
Bullfinch		UK and Somerset	Amber
Cetti's Warbler	Yes		
Cuckoo		Somerset	Red
Dunnock			Amber
Herring Gull		Somerset	Red
House Sparrow		Somerset	Red
Linnet		UK and Somerset	Red
Little Owl		Somerset	
Mistle Thrush		Somerset	Red
Reed Bunting		UK	Amber
Song Thrush		UK and Somerset	Red
Starling		Somerset	Red

Table 3: Protected and notable bird species recorded in breeding bird survey 2020 by Ecology Solutions

3.11 Cetti's Warbler territories were recorded within the Site, again associated with the scrub and reeds along ditches, particularly in the northern reed bed and north-eastern parts of the site including the Fishing Lake.

3.12 Kingfisher were recorded in the northeast of the Site, along rhynes during the surveys although no specific nesting sites was recorded. Similarly, Marsh Harrier were recorded flying over the reed bed with nesting behaviours recorded, although no nest site was confirmed. Evidence of Barn Owl using the Site was recorded and nest boxes for this species are present onsite, although no evidence of nesting has been confirmed.

3.13 Overall, given the extensive areas of land disturbance that has taken place as part of the clearance and remediation of the Site, the extent of suitable habitat for breeding birds has reduced. This is however, generally limited to the central areas of the Site that were of less value to bird species prior to clearance compared to the wetland and woodland features at the Site periphery. Other habitats in the wider areas such as improved grassland fields were of little interest to birds, although the boundary hedgerow and treelines do offer sheltering and breeding habitat for a range of common bird species.

3.14 The Site is not considered to be of any significant interest to wetland or farmland birds as evidenced through the lack of records of such species during surveys undertaken.

3.15 **Background records.** The desk study undertaken with SERC returned several records of protected or notable bird species from within the Site. These included Grey heron *Ardea cinerea*, Chiffchaff *Phylloscopus collybita*, Pintail *Anas acuta*, Cetti's Warbler *Cettia cetti*, Shoveler *Anas clypeata*, Goldeneye *Bucephala clangula*, Red-breasted Merganser *Mergus serrator*, Red-necked Grebe *Podiceps grisegena*, Pochard *Aythya farina*, Gadwall *Anas strepera*, Bittern *Botaurus stellaris*, Teal *Anas crecca*, Great Crested Grebe *Podiceps cristatus*, Gadwall *Anas strepera*.

4. SUMMARY

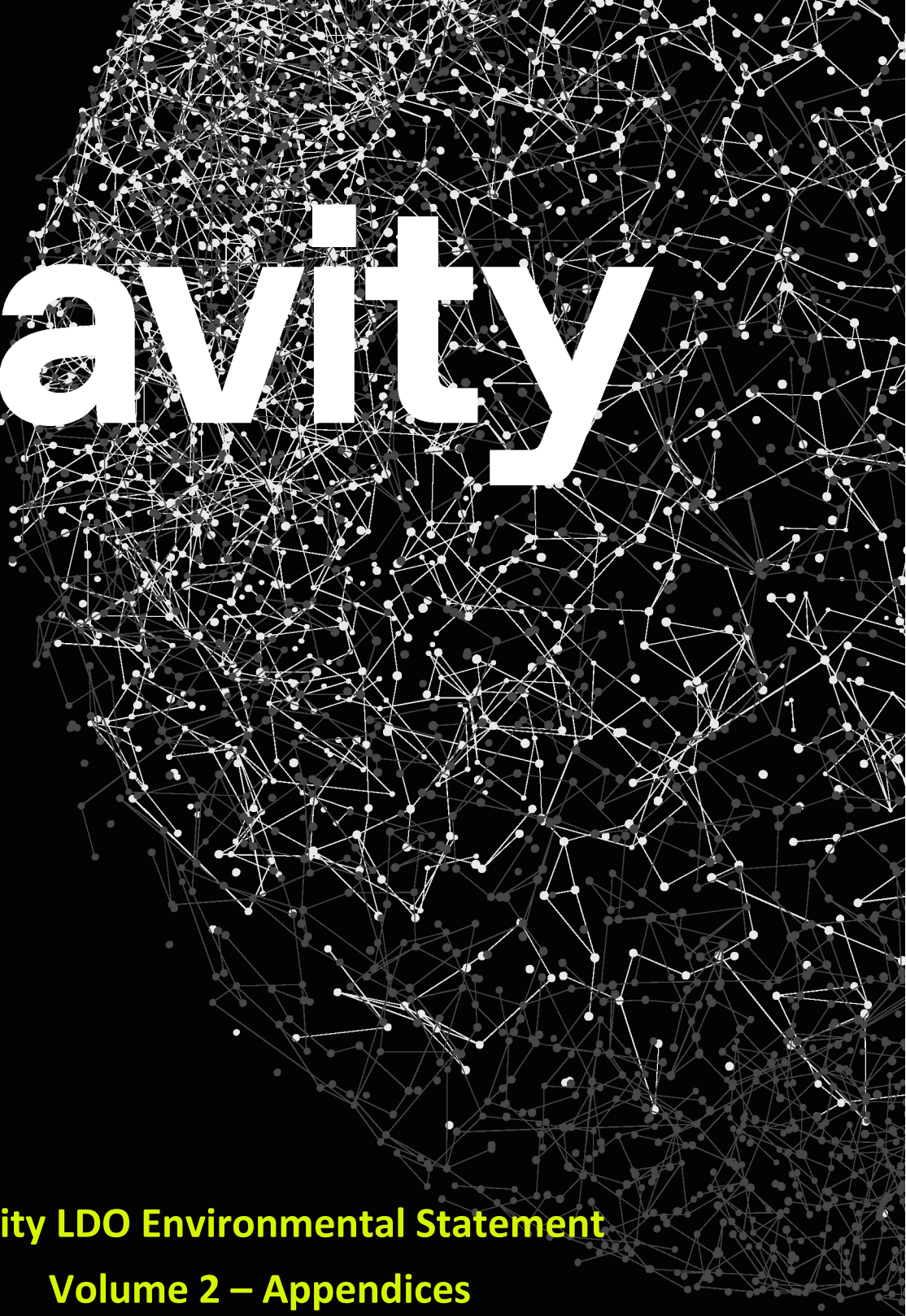
4.1 Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in April 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

4.2 The results of the survey work undertaken are present within this report and it is considered that an extensive ecological baseline for breeding bird species has been established that can fully inform any future assessment / evaluation of the Site in ecological terms.

4.3 The survey work has informed the LDO process and the related Environmental assessment process.

Gravity

Smart Campus



Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.6

Great Crested Newt Survey Report

CONTENTS

PLANS

APPENDICES

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.3. Great Crested Newt Survey Report

1.3.1. This document describes the results of ecological baseline habitat survey work undertaken and provides a broad assessment of the current ecological

interest of the Site as a whole, based upon field and desk-based studies. The importance of the habitats within the site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1 The methodology utilised for the Great Crested Newt survey work can be split into two areas, a desk study and specific faunal survey work. These are discussed in more detail below.

2.2 Desk Study

2.2.1 In order to compile background information on the use of the application site and its immediate surroundings by Great Crested Newt, Ecology Solutions contacted Somerset Ecological Records Centre (SERC). The records received are collated data from a number of sources and provide information on an array of amphibian species (covering a 3km search radius from the application site).

2.2.2 Information provided by SERC is referred to where relevant.

2.3 Great Crested Newt Survey

2.3.1 The Site contains a number of ponds and a network of rhynes as well as another aquatic habitat such as reedbed and fishing ponds. Furthermore, additional ponds have been identified within 500m of the Site, these were subject to further assessment for their suitability to support GCN.

2.3.2 The Site was subject to two licenced trapping and translocation exercises (completed in 2014 and 2017).

2.3.3 A trapping and translocation exercise (completed in 2014) was undertaken in the east of the Site as part of the installation of a pipeline. No specific receptor site was created as part of this process.

2.3.4 However, GCN were trapped within central areas of the Site (in 2017) and translocated to a purpose-built mitigation areas located in the north west and south east of the Site (see Plan ECO1).

2.3.5 The waterbodies present within these mitigation areas have been subject to regular presence / absence monitoring, utilising eDNA sampling, in the main.

2.3.6 eDNA testing was carried out according to the methodology outlined in the analytical and methodological development for the improved surveillance of Great Crested Newt, published by the Department for Environment, Food & Rural Affairs (DEFRA). This involves taking several water samples from various points around the waterbody. These are then combined and mixed with eight small samples of the mixture taken and added to a preservative liquid. Testing is then performed under laboratory conditions by SureScreen Scientifics in order to determine if Great Crested Newt DNA is present.

2.3.7 Specific aquatic surveys were also undertaken by Ecology Solutions during 2020 following standard guidance. The surveys undertaken were focussed on providing data to guide site management initiatives and to support any subsequent licence application. The majority of waterbodies within the Site were subject to at least an assessment for Great Crested Newt breeding suitability, with many also subject to detailed surveys.

2.3.8 Detailed surveys were undertaken during the period April and May 2020. A minimum of four survey visits were undertaken for each waterbody which maintained potential to support Great Crested Newts. Six visits were undertaken for any pond where presence was recorded. Surveys involved a combination of torching, bottle trapping, egg searching, netting (where applicable) and refuge searching.

4. SURVEY RESULTS

3.1 A number of waterbodies are located within the Site and wider area in the form of ponds, reed beds, rhynes and fishing lakes. Some of which are considered to offer potential value to breeding amphibians.

3.2 **Previous surveys.** Ecology Solutions carried out specific surveys for Great Crested Newts (GCN) during May and June 2011. A total of 49 waterbodies were surveyed. During these surveys all other amphibian species present were recorded including Smooth Newt *Lissotriton vulgaris* and Palmate Newt *Lissotriton helveticus*.

3.3 The above survey work was used to inform the licenced translocation of GCN from within the Site to two receptor areas (see Plan ECO1). A receptor area is located in the north west of the Site, where six new ponds were created as well as hibernacula and suitable habitats. It should be noted that ponds P1 and P3 are each made of two ponds that share a hydrological link when water levels rise, whilst they represent distinct pond features, for the purposes of surveying they are reported as a combined waterbody. An additional receptor area was located in the east of the Site, where a pond, hibernacula and suitable habitat was created. The translocation took place over the active period in 2017. In total 100 GCN were moved and Smooth Newt, Common Toad *Bufo bufo* and Common Frog *Rana temporaria* were also recorded.

3.4 In addition to the above translocation, a second translocation was also undertaken in the east of the Site, in relation to the installation of a pipeline. The licence was granted and trapping took place in 2014. 24 GCN were moved to the receptor area created in the east of the Site.

3.5 Rhynes and field ponds located to the south of the Site and wider areas were subject to surveys in 2018 to inform the development of the new access road. A single pond was recorded to hold GCN, although given its distance from the Site, it was considered that no impacts would arise. The location of these ponds is shown at Plan ECO2.

3.6 **Update surveys.** Monitoring surveys have been completed annually at both receptor sites, as per the conditions of the extant licences, and presence has been recorded each year utilising eDNA sampling techniques.

3.7 In addition, these ponds (13 ponds in total) were subject to a full suite of detailed surveys, including bottle-trapping, netting and torching techniques in 2020. The results of the survey are tabulated at Appendix 12.6A. Of the 13 ponds subject to survey, 5 ponds (ponds P1 and P2 in the north west of the Site and ponds P36, P35 and P32 in the south east of the Site) were recorded as supporting GCN.

3.8 The reed bed and adjacent rhynes to the north of the Site were also sampled for eDNA in 2020 and returned negative results for the presence of GCN.

3.9 Further eDNA sampling was undertaken in 2021 as part of licence monitoring requirements. The sampling recorded GCN presence in ponds P1, P4, P34, P31, P36, P33, P37, P32 and P35.

3.10 The results of recent GCN survey work is shown graphically at Plan ECO1.

3.11 **Background records.** The desk study undertaken with SERC returned two records of amphibian species within or immediately adjacent to the Site. The records of amphibians nearest to the Site are of Common Toad and GCN recorded in 1988. The desk study also returned records of Smooth newt and Palmate newt.

3.12 A number of the ponds surveyed by Ecology Solutions in 2018 and 2020 were subject to detailed surveys in respect to the Hinkley Point C connection project in 2013 and 2014. As part of the project a large study area, which includes eastern and south parts of the Site was subject to suitability assessments and detailed surveys. The results of these surveys on relevant ponds are detailed below.

3.13 During 2013 and 2014, detailed surveys were undertaken on ponds P10, P11, P12, P23, P31, P32, P35, P36, P37 and P38 (see Plan ECO1 and Plan ECO2), to inform the Hinkley Point C connection project. Of these ponds the presence of GCN was found in ponds P31, P35, P36 and P37.

3.14 During the surveys of P31 undertaken across 2013 and 2014 no adult GCN were recorded, however an unspecified number of GCN eggs were present. During the surveys undertaken at P35 across 2013 and 2014 a peak count of four individuals were recorded. During the surveys undertaken at both P36 and P37 across 2013 and 2014 a peak count of a single individual was recorded in each pond.

3.15 Additional ponds to the east and south of ponds P10 and P11 were found to support GCN in 2013 and 2013. However, both ponds are over 500 metres from the site and as such were not subject to detailed survey by Ecology Solutions.

4. SUMMARY

3.16 Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in April 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

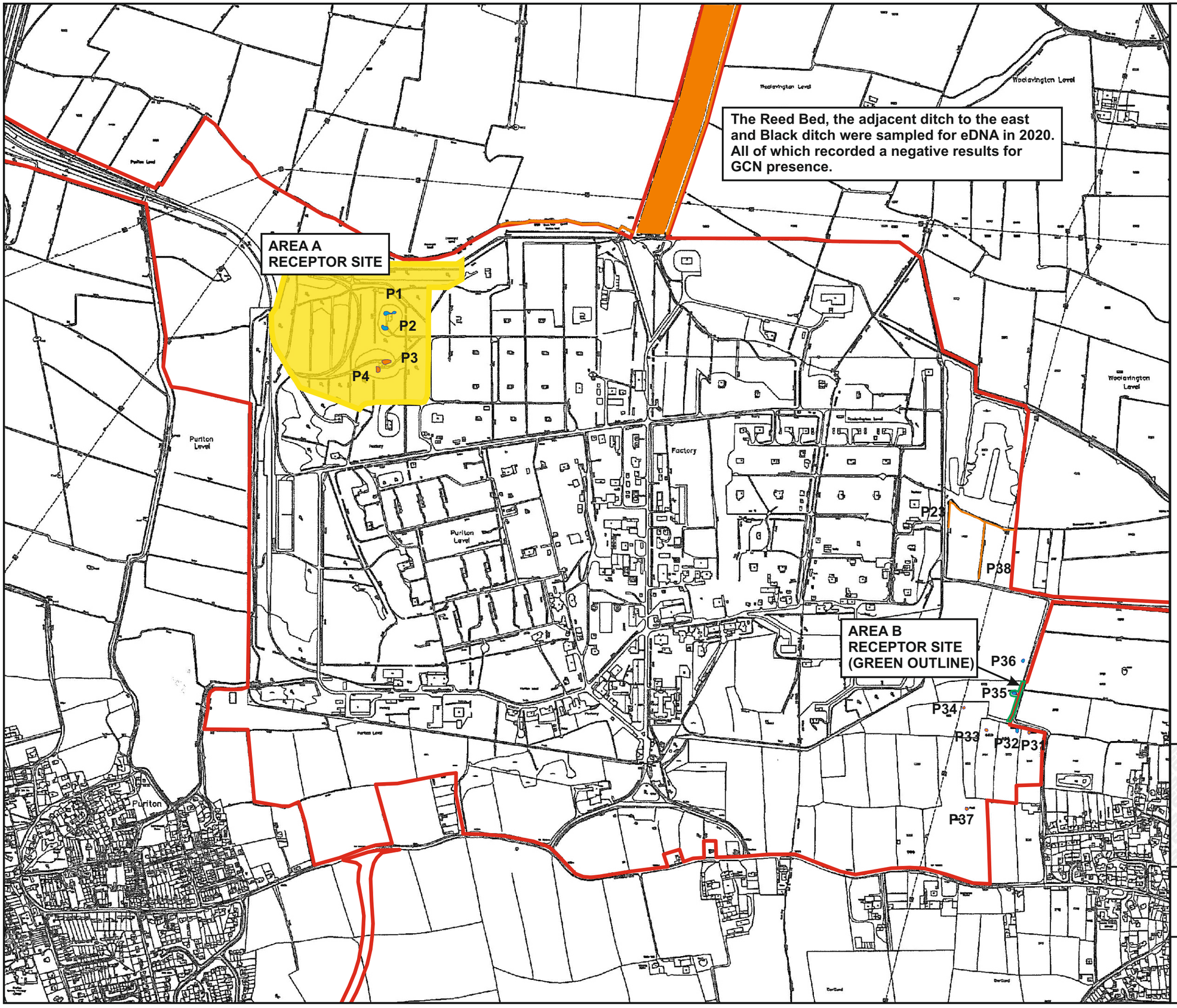
3.17 The results of the survey work undertaken are present within this report and it is considered that an extensive ecological baseline for Great Crested Newts has been established that can fully inform any assessment / evaluation of the Site in ecological terms.

3.18 The survey work has informed the LDO process and the related Environmental assessment process.

PLANS

PLAN ECO1

Detailed Aquatic GCN Survey Results 2020



KEY:

- BOUNDARY OF SITE
- WATERBODY WITH GCN PRESENT DURING 2020 SURVEYS
- WATERBODY WITH NO GCN PRESENT DURING 2020 SURVEYS

N

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7761: GRAVITY

PLAN ECO1: DETAILED AQUATIC GCN SURVEY RESULTS 2020

Rev: C

Aug 2021

PLAN ECO2

GCN Survey Results (South) 2018

Puriton Level

Factory

Puriton Level

Puriton Level

Puriton

D1

D2

D3

D4

D5

D6

D7

D8

D9

P8

P9

P10

P11

P12

P13

P14

Presence recorded during Hinkley Point C connection project surveys, not subject to detailed surveys by Ecology Solutions due to ponds exceeding 500m distance from the Site.

KEY:

BOUNDARY OF SITE

WATERBODY WITH GCN PRESENT DURING 2018 SURVEYS

WATERBODY WITH NO GCN PRESENT DURING 2018 SURVEYS

N

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7761: GRAVITY

PLAN ECO2: GCN SURVEY RESULTS (SOUTH) 2018

Rev: C

Sept 2021

APPENDICES

APPENDIX 12.6A

Great Crested Newts Survey Results Tables

Great Crested Newts Survey Results Tables

Survey Results for Pond P1		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
12/05/2020	0	1 Smooth Newt, 1 Common Frog
14/05/2020	1	8 Smooth Newt
27/05/2020	0	0
02/06/2020	0	0
09/06/2020	0	0
11/06/2020	0	1 Common Frog

Table 1: Survey dates and results for GCN surveys of P1

Survey Results for Pond P2		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
12/05/2020	0	1 Smooth Newt
14/05/2020	0	3 Smooth Newt
27/05/2020	0	0
02/06/2020	1	1 Smooth Newt, 1 Common Frog
09/06/2020	0	1 Smooth Newt
11/06/2020	0	0

Table 2: Survey dates and results for GCN surveys of P2

Survey Results for Pond P3		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
12/05/2020	0	0
14/05/2020	0	1 Smooth Newt
27/05/2020	0	1 Smooth Newt
02/06/2020	0	1 Smooth Newt
09/06/2020	0	2 Common Frog
11/06/2020	0	0

Table 3: Survey dates and results for GCN surveys of P3

Survey Results for Pond P4		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
12/05/2020	0	1 Smooth Newt
14/05/2020	0	8 Smooth Newt
27/05/2020	0	5 Smooth Newt
02/06/2020	0	0
09/06/2020	0	0
11/06/2020	0	1 Smooth Newt, 2 Common Frog

Table 4: Survey dates and results for GCN surveys of P4

Survey Results for Pond P23		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	0
08/05/2020	0	0
14/05/2020	0	0
25/05/2020	0	0
03/06/2020	0	0
09/06/2020	0	0
11/06/2020	0	0

Table 5: Survey dates and results for GCN surveys of P23

Survey Results for Pond 31		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	0
08/05/2020	0	0
13/05/2020	Pond Dry	Pond Dry
25/05/2020	Pond Dry	Pond Dry
03/06/2020	Pond Dry	Pond Dry
09/06/2020	0	0
11/06/2020	Pond Dry	Pond Dry

Table 6: Survey dates and results for GCN surveys of P31

Survey Results for Pond P32		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	1 Smooth Newt
08/05/2020	1	1 Smooth Newt
13/05/2020	1	0
25/05/2020	0	1 Smooth Newt
03/06/2020	Pond Dry	Pond Dry
09/06/2020	Pond Dry	Pond Dry
11/06/2020	Pond Dry	Pond Dry

Table 7: Survey dates and results for GCN surveys of P32

Survey Results for Pond 33		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	0
08/05/2020	0	0
13/05/2020	0	0
25/05/2020	Pond Dry	Pond Dry
03/06/2020	Pond Dry	Pond Dry
09/06/2020	Pond Dry	Pond Dry
11/06/2020	Pond Dry	Pond Dry

Table 8: Survey dates and results for GCN surveys of P33

Survey Results for Pond 34		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	0
08/05/2020	0	1 Smooth Newt
14/05/2020	Pond Dry	Pond Dry
25/05/2020	Pond Dry	Pond Dry
03/06/2020	Pond Dry	Pond Dry
09/06/2020	Pond Dry	Pond Dry
11/06/2020	Pond Dry	Pond Dry

Table 9: Survey dates and results for GCN surveys of P34

Survey Results for Pond 35		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	9	0
08/05/2020	1	0
13/05/2020	0	1 Smooth Newt
25/05/2020	6	0
03/06/2020	4	2 Smooth Newt
09/06/2020	13	5 Smooth Newt
11/06/2020	1	14 Smooth Newt, 1 Common Frog

Table 10: Survey dates and results for GCN surveys of P35

Survey Results for Pond P36		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	0
08/05/2020	0	0
13/05/2020	2	1 Palmate Newt
25/05/2020	0	0
03/06/2020	0	1 Smooth Newt
09/06/2020	16	0
11/06/2020	1	3 Smooth Newt

Table 11: Survey dates and results for GCN surveys of P36

Survey Results for Pond P37		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	0
08/05/2020	0	0
14/05/2020	Pond Dry	Pond Dry
25/05/2020	0	0
03/06/2020	Pond Dry	Pond Dry
09/06/2020	Pond Dry	Pond Dry
11/06/2020	Pond Dry	Pond Dry

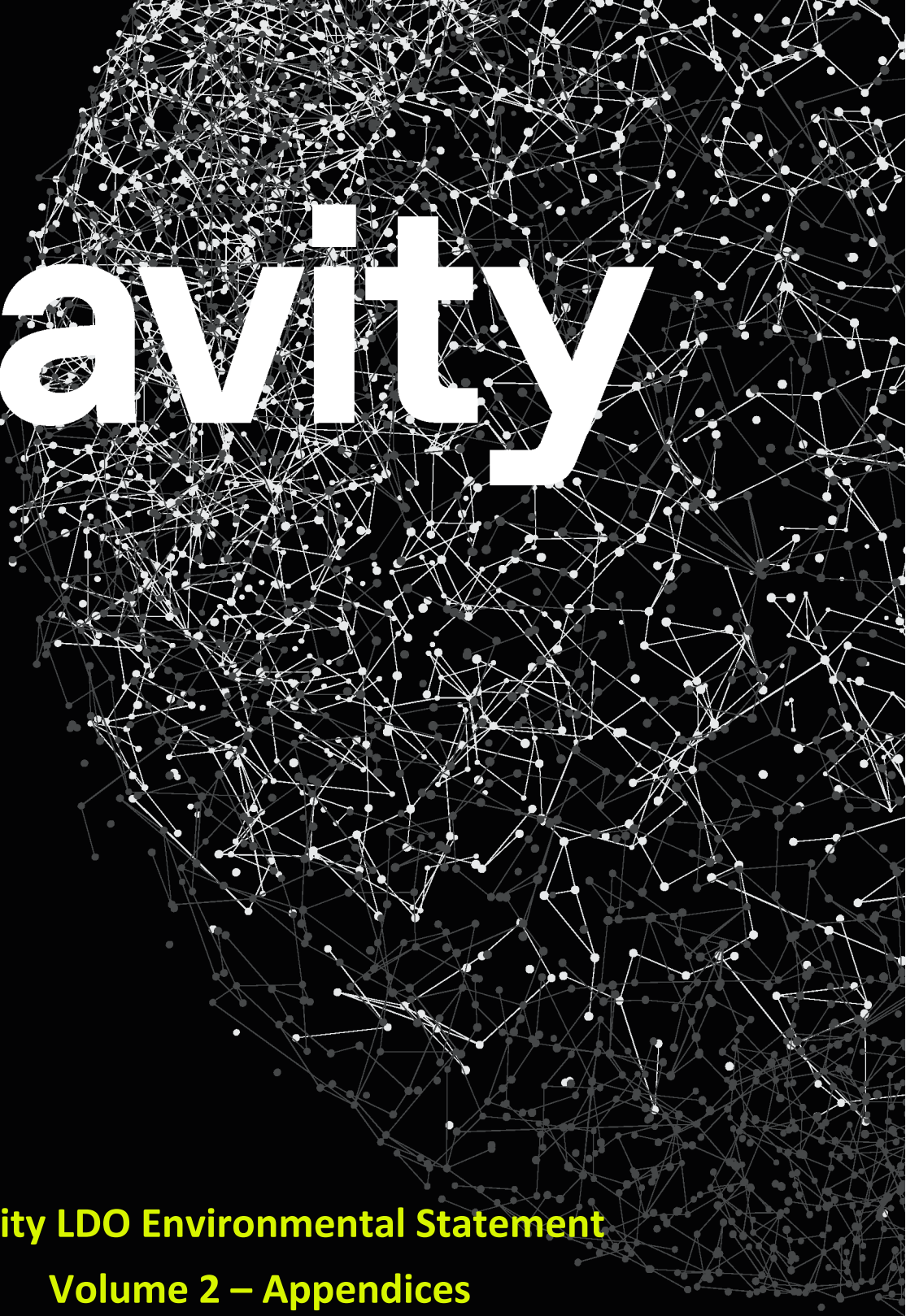
Table 12: Survey dates and results for GCN surveys of P37

Survey Results for Pond P38		
Survey Date	GCN recorded (Peak Count)	Other Amphibians Recorded
05/05/2020	0	0
08/05/2020	0	0
14/05/2020	0	0
25/05/2020	0	0
03/06/2020	0	0
09/06/2020	Pond Dry	Pond Dry
11/06/2020	0	1 Common Frog

Table 13: Survey dates and results for GCN surveys of P38

Gravity

Smart Campus



Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.7

Reptile Survey Report

CONTENTS

PLANS

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.1. Reptile Survey Report

1.1.1. This document describes the results of the reptile survey work undertaken and provides a broad assessment of the current ecological interest of the

Site as a whole for this species group, based upon field and desk-based studies. The importance of the Site for reptiles within the Site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1 The methodology utilised for the reptile survey work can be split into two areas, a desk study and specific faunal survey work. These are discussed in more detail below.

2.2 Desk Study

2.2.1 In order to compile background information on the use of the application site and its immediate surroundings by reptiles, Ecology Solutions contacted Somerset Ecological Records Centre (SERC). The records received are collated data from a number of sources and provide information on an array of reptile species (covering a 3km search radius from the Site).

2.2.2 Information provided by SERC is referred to where relevant below.

2.3 Reptile Survey

2.3.1 Specific surveys to identify the presence or absence of reptiles within the Site were undertaken during September 2020 and October 2020.

2.3.2 A total of 197 'tins' (0.5 x 0.5 metre squares of heavy roofing felt which are often used as refuges by reptiles) were distributed in areas comprising suitable habitat at the Site. Tins were placed within the Site at a density of to allow for a population size assessment to be undertaken, as set out within relevant guidance produced by Froglife[2].

2.3.3 The tins were left in place for several days to 'bed in' prior to surveys commencing. They were subsequently surveyed for reptiles beneath or upon them during suitable weather conditions.

2.3.4 Suitable weather conditions to carry out surveys are when the air temperature is between 9 and 18°C. Heavy rain and windy conditions should be avoided.

2.3.5 The tins provide shelter and heat up quicker than the surroundings in the morning and can remain warmer than the surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask and raise their body temperature which allows them to forage earlier and later in the day.

[2] Froglife (1999). Reptile survey: an introduction to planning conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

3. SURVEY RESULTS

3.1 The Site contains elements of grasslands, scrub, hedgerows and woodland edge habitat that are of value to common reptile species. Furthermore, the Site has areas of standing water, ditches and wetland habitats that are of particular value to Grass Snake. As such, the Site has been subject to detailed survey for this species group both historically and in 2020.

3.2 **Previous surveys.** Refugia surveys were undertaken at the Site by EPI between March and June 2009. In total 1137 tins were distributed within the Site.

3.3 The surveys recorded that there is a small population of Grass Snakes within the Site. Adults were recorded primarily in the northern and south-eastern parts of the Site, with sub-adults and juveniles also recorded in areas of suitable habitat in the southern, north-western, and eastern parts of the Site.

3.4 **Updated surveys.** Further update refugia surveys have been undertaken focussed on habitat of known value to reptiles. The survey was timed to cover the later part of the active season, when refugia surveys are known to be most effective. Tins were places within the Site at a density to allow for a population size assessment to be undertaken, as set out within relevant Froglife guidance. Areas subject to tinning include the grasslands / wetland adjacent to the ditch network and Fishing Lake to the north-east, meadow grassland in the north-west and marshy grassland to the south of the Site as well as the reedbed to the north. These areas are shown graphically on Plan ECO1.

3.5 The results of the updated survey work undertaken in 2020 are presented within Table 1 below.

Date	Cloud Cover %	Temperature (°C)	Grass Snake				
			M	F	J	U	Total
23/09/20	100	15	0	0	0	0	0
25/09/20	20	12	0	1	0	0	1
29/09/20	90	15	0	0	2	0	2
01/10/20	70	12	0	0	0	0	0
06/10/20	100	13	0	0	1	0	1
08/10/20	40	15	0	0	2	0	2
09/10/20	100	11	0	0	2	0	2

Table 1: 2020 reptile survey results

3.6 On the basis of the results of the 2020 survey work, it is considered that a small population of Grass Snake remains present within suitable habitat at the

margins of the Site. It is considered that no other reptile species are present at the Site.

3.7 **Background records.** The desk study undertaken with SERC did not return any records of reptiles from within or immediately adjacent to the Site. The nearest records returned are of Grass Snake from a location approximately 0.06km to the north-west in 2008. Slow worm *Anguis fragilis* were also recorded in the local area.

4. SUMMARY AND CONCLUSIONS

3.8 Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in April 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

3.9 The Site was surveyed based around the standard reptile good practice guidelines produced by Froglife.

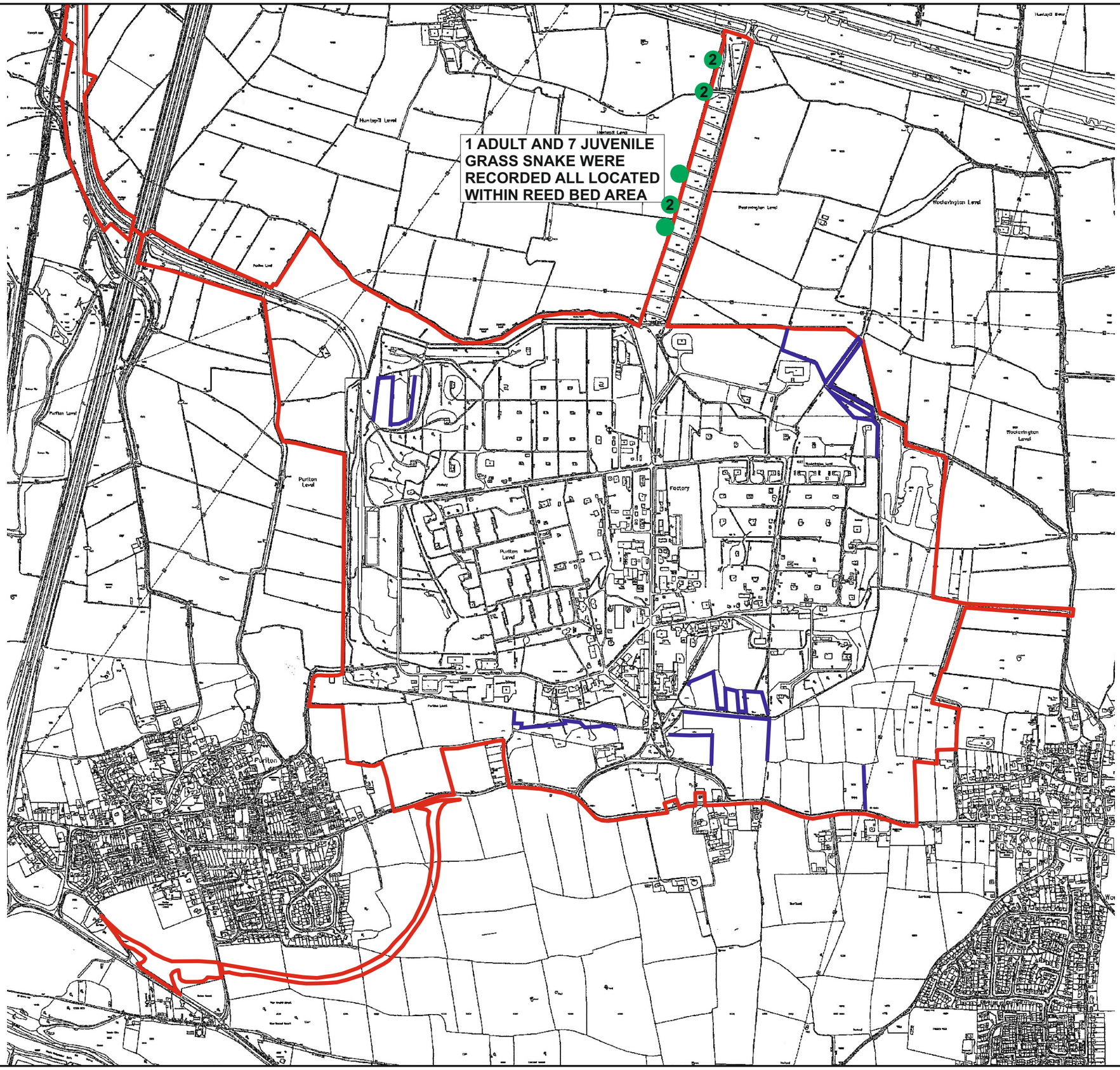
3.10 The results of the survey work undertaken are present within this report and it is considered that an extensive ecological baseline for reptiles has been established that can fully inform any future assessment / evaluation of the Site in ecological terms.

3.11 The survey work has informed the LDO process and the related Environmental assessment process.

PLANS

PLAN ECO1

Reptile Survey Results



KEY:

- SITE BOUNDARY
- APPROXIMATE TIN DISTRIBUTION
- GRASS SNAKE RECORDED

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7761: GRAVITY

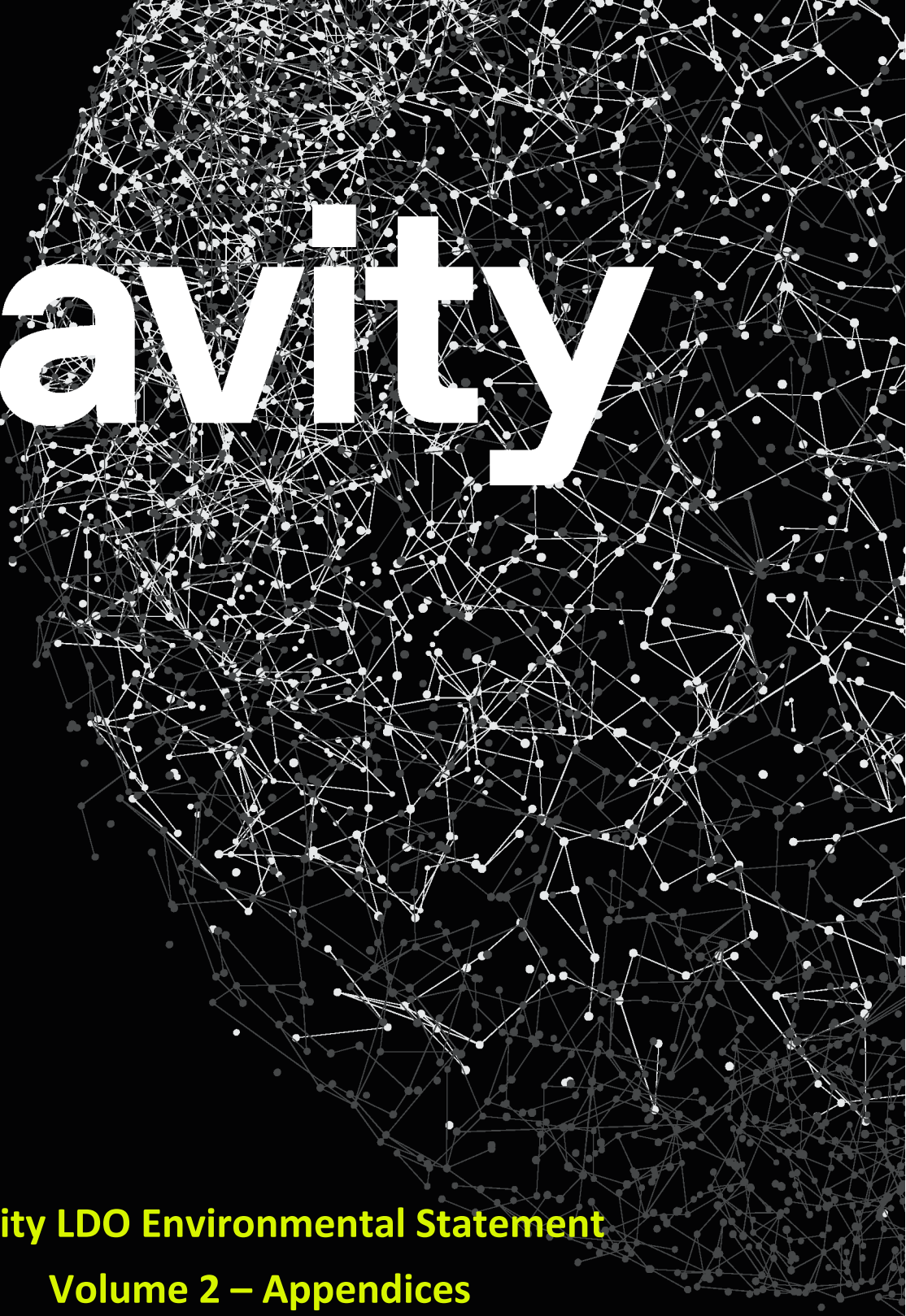
PLAN ECO1:
REPTILE SURVEY RESULTS

Rev: D

Aug 2021

Gravity

Smart Campus



Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.8

Water Vole Survey Report

CONTENTS

PLANS

1. INTRODUCTION

1.1. Background

1.1.1. Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in March 2020 to undertake a comprehensive programme of ecology survey work for This is Gravity Ltd (TIGL), at the site known as Gravity, at Puriton, near Bridgwater, Somerset; hereafter referred to as the 'Site'.

1.1.2. Survey work undertaken at the Site includes a range of habitat and species-specific surveys covering the 2020 survey period. This report has been produced in order to detail the methodologies and findings of the habitat survey work undertaken.

1.1.3. It should also be recognised that the Site has already been subject to previous extensive ecological survey and assessment work as part of the decommissioning and remediation works which have planning consent, as well as to inform the extant hybrid planning permission for the Site redevelopment and Natural England licence applications.

1.1.4. The majority of the Site has been the subject of numerous ecological surveys since 2008. EnvironPlus International Limited (EPI) undertook an initial suite of surveys in 2008, with Ecology Solutions having undertaken regular update work since 2011. The results of the survey works are detailed in the Environmental Statement (2013) and ES Addendum (2017) produced by Ecology Solutions in support of the extant planning permission.

1.1.5. The majority of the site and the previous surveys on it, did not include the 'full' Site, therefore as well as updating previous surveys, surveys of the additional land to be contained in the LDO were included.

1.1.6. The extensive historic survey information available has been used to inform the update survey work and is referenced, where necessary, within this report.

1.2. Site Characteristics

1.2.1. The main component of the Site is located to the north east of Puriton. In addition, the Site includes a railway spur to the north west, a road connection from Junction 23 of the M5 motorway to the south west of the Site and a reedbed system that connects the Site to the River Huntspill to the north. The Site is within an agricultural setting, and is located between the villages of Puriton (to the west) and Woolavington (to the east).

1.2.2. Broadly, the Site comprises grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.3. Habitat Survey Report

1.3.1. This document describes the results of ecological baseline habitat survey work undertaken and provides a broad assessment of the current ecological interest of the Site as a whole, based upon field and desk-based studies. The importance of the habitats within the site is evaluated with due consideration given to the guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) [1].

[1]CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

2. SURVEY METHODOLOGY

2.1 The methodology utilised for the Water Vole survey work can be split into two areas, a desk study and specific faunal survey work. These are discussed in more detail below.

2.2 Desk Study

2.2.1 In order to compile background information on the use of the Site and its immediate surroundings by Water Voles, Ecology Solutions contacted Somerset Ecological Records Centre (SERC). The records received are collated data from a number of sources and provide information on an array of species (covering a 3km search radius from the Site).

2.2.2 Information provided by SERC is referred to where relevant.

2.3 Water Vole Survey

2.3.1 Surveys involved careful searching along the banks of suitable aquatic habitat within the Site, using the standard methodology as advocated within The Water Vole Conservation Handbook and The Water Vole Mitigation Handbook[2]. Wherever possible, access was obtained to both banksides and a thorough search was possible to complete.

2.3.2 The basis of the surveys undertaken was to determine the presence / absence, and where necessary distribution and abundance of Water Voles within suitable habitat within the Site through the detection of signs such as burrows, feeding stations, latrines, faeces, lawns, footprints, and potentially from sightings of the animals themselves.

2.3.3 All survey visits were undertaken to coincide with stable weather conditions and timed to ensure coverage of the habitats across the optimum periods for Water Vole surveys. Multiple visits were undertaken throughout the survey period to ensure coverage of any seasonal / management related changes to habitats on site.

[2] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) *The Water Vole Mitigation Handbook* (the Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

3. SURVEY RESULTS

3.1 Evidence of Water Vole activity, in the form of physical sightings, burrows, feeding remains, prints and latrines, was recorded along a number of rhynes within the Site.

3.2 **Previous surveys.** Specific surveys were undertaken for Water Voles in 2008/09 by EPI with further surveys undertaken in 2011, 2013, 2015 and 2016 by Ecology Solutions. The species has been recorded in association with the northern and north-eastern part of the Site, including rhynes associated with cattle grazed pastures. More isolated drainage ditches in the central part of the Site were noted to support Water Voles. There were also a number of ditches to the west and south-west of the Site which supported Water Voles.

3.3 Over the course of the surveys undertaken the population levels and extent have been known to vary. This is possibly a result of the widespread variations in water levels within the ditches at the Site. Following a long dry spell in 2011 the water levels within many of the ditches within the Site (including ditches supporting Water Voles) were very low. This situation was followed by very wet weather in early 2012 which resulted in extensive flooding. These effects continue to effect the Site. As such the Water Voles may have been forced to vacate ditches within the Site. In addition, predation by Mink *Neovison vison* is also a likely key factor.

3.4 **Update surveys.** A full suite of update surveys were undertaken in 2020. The distribution of Water Vole is considered to remain broadly similar to recent years, with the rhynes in the west and north east providing the greatest extent of suitable habitat, with other isolated populations elsewhere.

3.5 A range of evidence of their presence was recorded across the Site, with some rhynes containing little more than old signs of feeding whilst others contained fresh evidence including active burrows. The greatest concentration of signs was in the north of the Site, associated with the Puriton Rhynes and Ponds Local Wildlife Site (LWS). The reed bed is considered to offer limited opportunities for Water Vole, due to the lack of fresh growth of vegetation and open water, although the species is present in this area to a limited extent. The adjoining rhynes offer more suitable habitat.

3.6 Other localised populations are located in the southwest of the Site where burrows, feedings signs and latrines were recorded in short lengths of permanent rhyne. The remaining records are considered to show small isolated populations made of a small number of individuals that have been forced into less suitable habitat as a result of habitat change (e.g. the overshadowing of rhynes) or through predation.

3.7 The distribution of Water Vole evidence across the Site is shown graphically on plan ECO7.

3.8 Mink continues to be observed onsite. Their continued presence is considered to be a cause of the dispersion of small populations of Water Vole across the Site.

3.9 **Background records**. The desk study undertaken with SERC returned five records of Water Vole from within the Site the most recent from 2015 as well as records six records of Otter *Lutra lutra* from within the Site most recently 2000.

3.10 The nearest records of Water Vole are from a location approximately 0.16km east of the Site, recorded in 1994.

4. SUMMARY

3.11 Ecology Solutions Ltd was commissioned on behalf of This Is Gravity in April 2020 to undertake a suite of ecology survey work at the site known as the Gravity Smart Campus, Puriton, Somerset.

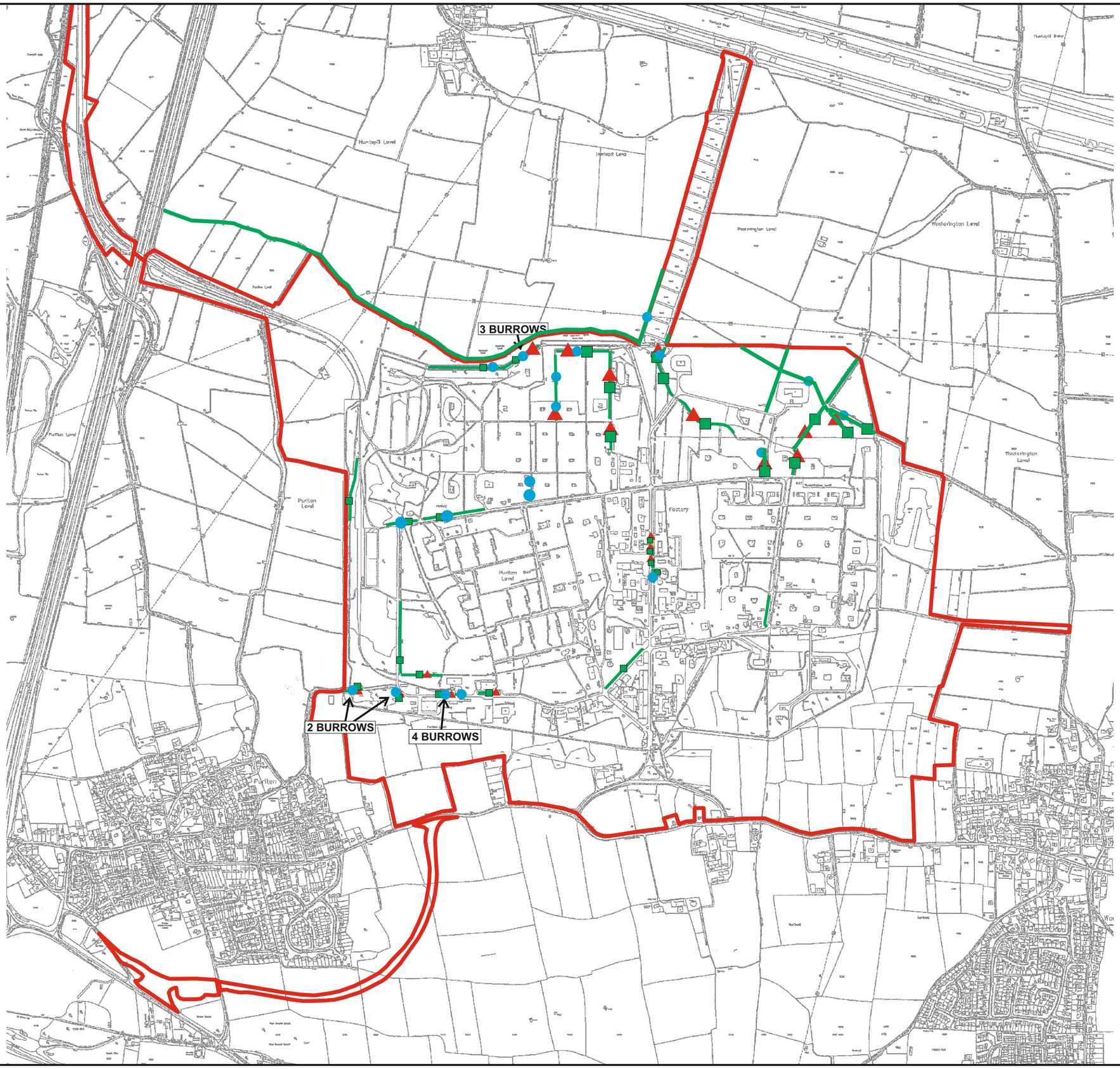
3.12 The results of the survey work undertaken are present within this report and it is considered that an extensive ecological baseline for Water Voles has been established that can fully inform any assessment / evaluation of the Site in ecological terms.

3.13 The survey work has informed the LDO process and the related Environmental assessment process.

PLANS

PLAN ECO1

Water Vole Survey Results



KEY:

- DITCHES WITH RECORDED EVIDENCE OF WATER VOLE
- BURROW
- FEEDING SIGNS
- LATRINE PRESENT

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7761: GRAVITY

PLAN ECO1: WATER VOLE SURVEY RESULTS

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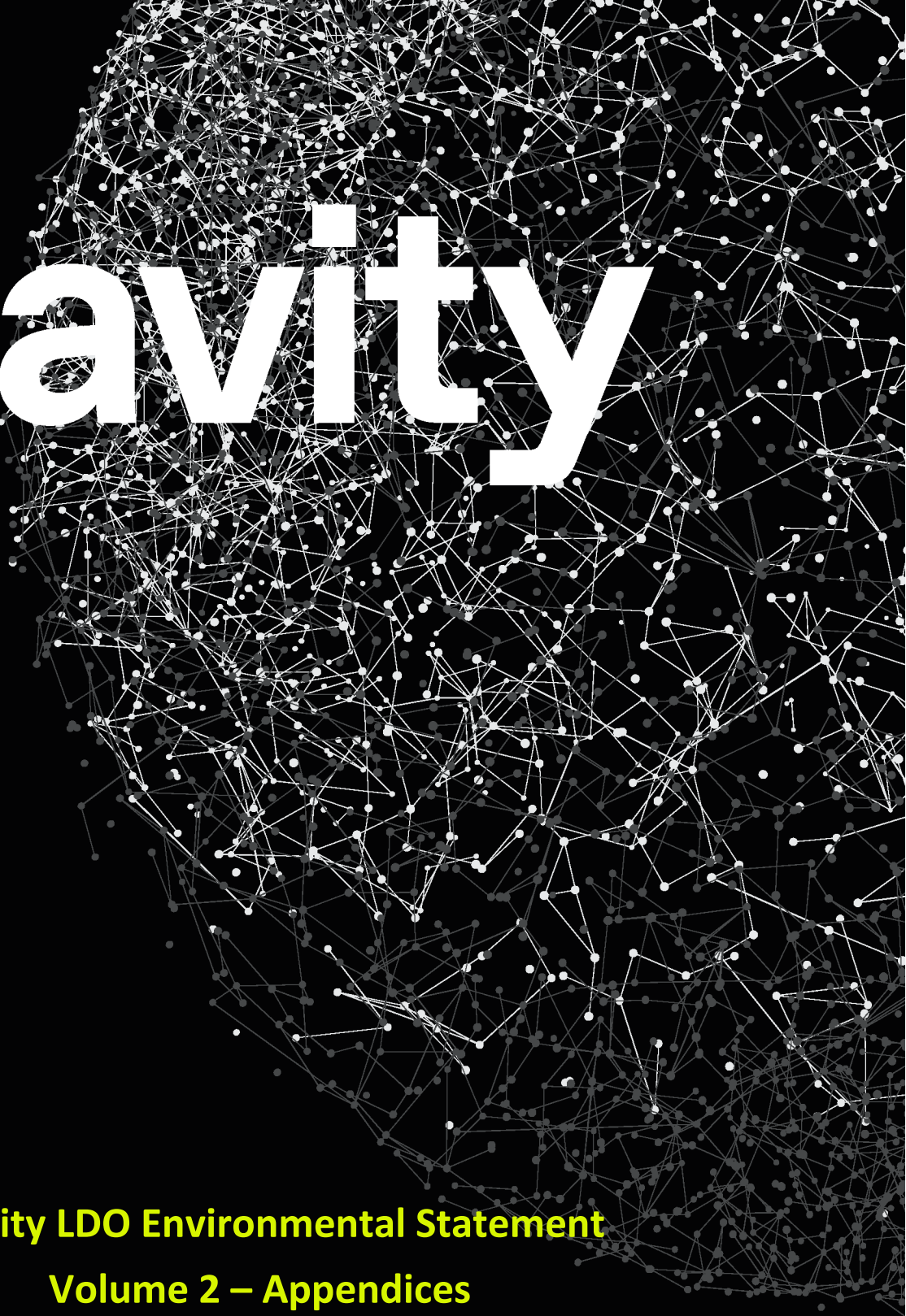
Gravity

Smart Campus



Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.9

Invertebrate Survey Report

Richard Wilson Ecology Limited

Terrestrial Invertebrate Survey, ROF Bridgwater, Puriton, Somerset

Final Report

Prepared for Ecology Solutions Limited

September 2021

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Notice

This document and its contents have been prepared for Ecology Solutions Limited and is intended solely for information and use in relation to the proposed mixed-use development located within the former Royal Ordnance Factory Bridgwater, Puriton in Somerset. This is the final report which should be used for the purposes of informing any ecological impact assessment, planning application or Development Consent Order.

Richard Wilson Ecology Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/ or its contents.

Document History

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2.0	Draft for Client (Final Report)	2nd February 2021	22 September 2021		
3.0	Final Issue				23 September 2021

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Appendix

Executive Summary

- Ecology Solutions Ltd commissioned Richard Wilson Ecology Limited to undertake terrestrial invertebrate surveys for the purpose of informing an Ecological Impact Assessment for a proposed mixed-use campus ('Gravity')within the former Royal Ordnance Factory (ROF) Bridgwater and adjacent land parcels ('the study site').

- The study site is located approximately 6 km north-east of Bridgwater, equidistant between the villages of Puriton and Woolavington in Somerset. It covers approximately 250 ha, of which the former ROF comprises just under 170 ha, The study site's habitats include woodlands, mature scrub and hedgerows, a traditional orchard, tall grasslands, reed-fen, short perennial vegetation and short swards,, open mosaic habitat on previously developed land, and disturbed vegetation communities on recently cleared ground. These have all been placed in context, considering invertebrate ecology, within the wider ecological landscape, based on the Somerset Levels and Moors Natural Character Area.

- Six land parcels within the study site (mostly contained within the former ROF) are designated within the local plan for their nature conservation interest as Local Wildlife Sites.

- For the purposes of description and evaluation, the study site has been divided in to three compartments:

    - Undesignated land within the former ROF;
    - LWS Network (i.e. land parcels designated as LWS within the study site); and
    - External Fields (i.e. land parcels outwith the security fence of the former ROF but within the study site).

- Reference to recent historical survey work within and immediately adjacent to the study site has been undertaken to place the 2020 data in context and consider potential for ongoing presence in the case of two butterfly species (dingy skipper and small blue) where adult flight periods may have been missed due to an early spring and delayed start owing to the Coronavirus (Covid-19) pandemic.

- Nine survey visits took place between mid-May and mid-September 2020 in reasonable to optimal weather conditions using a variety of methods including aerial netting, sweeping vegetation, vacuum sampling and direct observation. Static traps (pitfall traps, a Malaise Trap and three flight interception traps attached to mature apple trees in the traditional orchard) were deployed for a period of a month in summer to supplement the active surveying.

- A total of 565 species were recorded throughout the study site, of which 20 (3.5 % of the assemblage) are Key Species – those with a nature conservation status. Species-richness in each compartment is:

    - Former ROF: 289 species (6 Key Species);
    - LWS Network: 241 species (11 Key Species); and
    - External Fields: 253 species (7 Key Species).

- Of the 20 Key Species, one is a Rare Key Species, the Nationally Rare horsefly, *Atylotus rusticus*, which is associated with grazing marshes in southern England, including the Somerset Levels. Several other species including the Nationally Scarce spider, *Argenna subnigra*, rove beetle, *Hypnogyra angularis*; and pot beetle *Cryptocephalus bipunctatus* are scarce or rare in the county.

- Within the ROF Factory, but outside the LWSs, 34 species are reliant on the vegetation communities present to complete their lifecycle, of which 25 species are intrinsically linked with the disturbed vegetation communities associated with the recently cleared ground and which have a distinctive appearance, similar to arable field margins. One Key Species, the weevil *Larinus planus* is associated with this community. A further two Key Species (*Atylotus rusticus* and the ground beetle *Acupalpus exiguus*) species are associated with the wetland habitats present; the former with reed-fen and the latter with the grasslands. The beetle's ecology and association with periodically inundated grasslands is interpreted as inferring that the tall swards are remnant floodplain grasslands.

- Within the LWS Network, 38 species are reliant on the vegetation communities present to complete their lifecycle, of which most (35 species) are intrinsically linked with the open mosaic habitats (OMH) present within the Puriton Ash Ground LWS, though a further nine taxa are co-dependent on the presence of dead wood for larval development. The OMH shares similar characteristics with the disturbed vegetation communities such as free draining substrate and a rich flower resource of benefit to pollinators. The Nationally Scarce weevil *Larinus planus* was recorded within the OMH and disturbed vegetation communities, suggesting there may be interchange of faunas between the two habitats. Twenty taxa have a fidelity to calcareous grasslands, a habitat that shares some physical characteristics with OMH and which is widely acknowledged as being one of the most species-rich grassland types in Britain. These twenty species are therefore further indication of the importance that the habitats within the LWS network have for invertebrates.

- The External Fields support a noteworthy assemblage of invertebrates associated with wood decay, many of which were recorded from a brief targeted survey of the faunas associated with the mature apple trees in the traditional orchard. The wood decay fauna is not restricted to the apple trees, there being additional resource within the mature hedgerows, including the orchard's field boundaries, along the Woolavington Track

- The invertebrate assemblages associated with habitats within undesignated land within the former ROF have been evaluated to be of **at least district nature conservation value**, based on the relative quality and extent of the habitat resource present for invertebrates within the wider region (based on the NCA), number of Key Species and the proportion of stenotopic taxa (species dependent on restricted habitat conditions) recorded in specific assemblages, indicating favourable conservation status. The LWS Network has collectively been evaluated to be of **county nature conservation value**, and the External Fields have been evaluated to be of **at least county nature conservation value**.

- Survey work during 2020 has been thorough, sufficient to evaluate the nature conservation value of invertebrate assemblages present within the study site, and identify habitats and features of importance for terrestrial invertebrate assemblages. An outcome of the survey work has been the identification of a wood decay fauna (saproxylic invertebrates) currently primarily associated with the orchard, but likely to include the mature hedgerows and scrub which, based on the wider resource in the NCA, has the potential to be of substantial county, or regional interest.

- No further invertebrate survey work is considered proportionate or necessary to inform the Local Development Order on the assumption that the LWS Network's ecological integrity is retained in the final submitted layout; **and** the traditional orchard and associated hedgerow network, mature scrub and wet woodland within the External Fields and ROF Bridgwater compartments. However, *if* layouts have the potential to compromise integrity, then further, targeted survey is recommended, to fully understand the nature conservation value of the wood decay resource. This would necessarily involve flight interception trapping.

- A narrative on relevant mitigation principles is provided, identifying development-led opportunities and means by which the existing LWS network can be integrated within the proposed development and ensuring their resilience post-construction.

1 Introduction

1.1 Background

Richard Wilson Ecology Limited was commissioned by Ecology Solutions Ltd in early May 2020 to undertake terrestrial invertebrate surveys within the former Royal Ordnance Factory (ROF) Bridgwater site and adjacent land parcels to inform the Ecological Impact Assessment (EcIA) for the proposed mixed-use campus ('Gravity') development project.

An internal interim report was issued on the 3rd December 2020 to Ecology Solutions Limited for the purposes of providing a detailed summary of the results obtained from desk-based and field survey to demostrate the work undertaken in 2020 had been completed to comply with certain funding requirements.

This final report updates and expands on the details conveyed in the interim report, including a detailed data analysis and evaluation, which can inform the ecological impact assessment supporting the Local Development Order.

1.1.1 Previous Invertebrate Surveys

The study site has had a history of ecology survey dating back to at least 2007 as far as the author is able to ascertain, involving two major planning applications (Sedgemoor District Council Planning Reference: 42/11/00017 for the remediation work; and subsequently, the granting of Outline Planning Permission (Planning Reference: 42/13/00010). Of relevance to this report, both applications placed reliance on aquatic invertebrate surveys of various ditches and waterbodies within and outwith the former factory site, dragonfly transects, and butterfly surveys, including brown hairstreak (*Thecla betulae*) egg-searches, which were undertaken between March and August 2009 (Ecology Solutions, 2011).

Aquatic and some terrestrial invertebrate survey work has also been undertaken more recently (during summer 2013) which included land adjacent to the current study site, i.e. outwith the ROF Bridgwater and fields surveyed in 2020 (see Section 1.2 for details). These focussed on the numerous ditches and rhynes to inform the consented Hinckley Point C Connection Project (The Ecological Partnership, 2014) and included three ditches (referred to as TEP341, TEP327 and TEP246), all located to the east of the ROF Bridgwater's boundary. These were surveyed, targeting the lesser silver water beetle (*Hydrochara caraboides*), a [1]legally protected species and which has a Near Threatened status based on the most recent nature conservation assessment (Foster, 2010).

The results of these historical surveys, and the relevance to the study site, are discussed in more detail in Section 4.1.

1.2 Study Site

The former ROF Bridgwater site (site centre: ST 333 423) occupies approximately 167 ha on low-lying flat ground, equidistant between the villages of Puriton and Woolavington in Somerset (vice-county 6: North Somerset), 6 km north-east of Bridgwater city centre (town hall). The study site also includes additional land parcels outwith the ROF's boundary fence, including a linear reedbed system to the north (linking to the Huntspill River); a disused railway corridor to the north-west that once connected the former factory to the mainline railway network; and surrounding fields, mostly to the south-east, south and south-west. These additional land parcels collectively add an additional 85 ha; thus the study site covers an extensive area of just over 250 ha.

ROF Bridgwater was constructed on the Puriton Levels at the beginning of WW2 and opened in 1941, remaining operational until decommission in 2008. Concurrently with its construction, the artificial Huntspill River was dug to supply freshwater to the factory. This is connected to the factory via a linear 865 m long compartmentalised reedbed.

The study site is located on the western end of the Somerset Levels and Moors, an extensive area of low-lying ground sandwiched between two east-west orientated escarpements to the north (Mendip Hills) and south (Polden Hills). This low-lying ground supports a mosaic of wetlands and moors, inter-connected by rivers, ditches and rhynes (a ditch specifically engineered to drain land for pasture) in an open landscape. Land drained

[1] It is protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

by rhynes has resulted in a patchwork of rectilinear fields that is evident within the study site outwith the ROF itself.

Six land parcels within the study site are designated as Local Wildlife Sites (LWS) and are listed below; those marked with an '*' are within the former ROF:

- *Puriton Rhynes and Ponds LWS (ST 339 428);
- *Puriton Cowslip Field LWS (ST 331 420);
- Woolavington Road and Fields North LWS (ST 331 417);
- *Puriton Ash Ground LWS (ST 326 422);
- *Puriton Meadows and Rail Spur LWS (ST 327 427); and
- North Mead Drove Fields LWS (ST 324 429).

All the LWSs have their origins in the landscape's post-inclosure history, and those within the curtilage of the ROF are of more recent genesis, directly associated with the factory's construction. Puriton Cowslip Field LWS has developed a calciolous vegetation community, presumed to have arisen, either from importation of foreign base-rich material during the ROF's construction phase; or as an inert, non-hazardous (explosive) waste product from the manufacturing phase of the development. The substrate at Puriton Ash Ground LWS is assumed to be a mix of coal waste and material used for the foundations of the railway spur, which has resulted in the development of a short, perennial vegetation community with lichen-heath that has developed an open habitat, with scattered scrub.

Associated with the study site is a consented link road which was being constructed during 2020. This link road would connect the proposed development site direct to the M5 via the A39. The construction corridor passed through fields to the south-west of the ROF and north of Woolavington Road and occupies *c*. 2 ha.

1.2.1 Summary of Habitats and Vegetation Communities (2020)

Botanical surveys that have mapped vegetation communities within the study site have been completed on several occasions (2007 to 2009; and updated in 2011 (Ecology Solutions, 2011)). In combination with field notes and photographs taken by the surveyor, these have been used to provide the following description.

Within ROF Bridgwater itself, the central area, defined as land either side of the north-south orientated access road which bisects the Factory from the entrance gate has been, and was subject to ongoing remediation, resulting in areas of disturbed ground of varying topography and vegetation cover. This area is coincident with what was mapped as amenity and semi-improved grassland in 2011 (Ecology Solutions, 2011; Plan ECO3: Ecological Features). The vegetation community here is characteristic of recently disturbed soils, with a visual appearance similar to arable field margins or fallow ground. The community was characterised by an open structure with an abundant pollinator resource of varying species of which the Asteraceae (daisy family), and Apiaceae (carrot family, 'umbellifers') were a substantial component. These more recently disturbed habitat patches were interconnected with more stable vegetation communities, suggesting remediation had relaxed some years previously, allowing grasses to begin to form a taller, yet still open sward. Elsewhere, evidence of disturbance was less obvious, suggesting either any remediation had been of lower intensity, had occurred sufficiently historically (e.g. more than five years previously), or the community had developed from abandoned amenity grassland. Either way, the vegetation community in these habitat parcels had developed a continuous sward with bramble (*Rubus fruticosus* agg.) starting to encroach. This core area was therefore a highly heterogeneous mosaic of varying vegetation communities on a topographically varied landscape of spoil mounds and level ground, with a varied pollinator resource.

The ROF's margins supported more stable vegetation communities, the majority of which were associated with the four LWSs located within the curtilage of the factory. Outwith the non-statutory sites, these vegetation communities were predominantly tall, botanically species-poor grasslands with localised patches of tall herbs such as hogweed (*Heracleum sphondylium*). These fields, whilst botanically species-poor, exhibited some flora and structure suggestive of periodic inundation. Given the landscape within which the ROF was constructed, these fields, in addition to those within the LWS network , as being remnant floodplain grassland, a Habitat of Principal Importance (HoPI).

In the south-east quartile of the factory site, grasslands were bounded by mature hedgerows of hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*) and blackthorn (*Prunus spinosa*) with a fringe of bramble; or mature poplar (*Populus* sp.) and ash (*Fraxinus excelsior*) trees. These mature stands include a standing dead wood resource. The plantation woodland block in this corner supports immature specimens of oak (*Quercus* sp.), rowan (*Sorbus aucuparia*), ash, poplar and hawthorn with no lying or dead wood resource.

Within the non-statutory sites, the Puriton Rhynes and Ponds LWS comprises a series of grasslands, identified as floodplain grassland on the Multi-Agency Geographic Information for the Countryside (MAGIC) website, bounded by vegetated water-filled ditches and mature hedgerows and a narrow linear reedbed system divided into cells. The northern end of this reedbed is defined by a mature plantation woodland with an impenetrable bramble understorey. The Puriton Meadows and Rail Spur LWS consists of three rectilinear fields, identified as lowland meadow HoPI on MAGIC, which are divided by mature, wide hedgerows with a similar species mix as elsewhere but including willows (*Salix* spp.). Puriton Ash Ground LWS supports a mosaic of acid grassland, flower-rich short perennial vegetation with a locally frequent lichen community and scattered scrub, of which butterfly-bush (*Buddleia davidii*) is frequent. This habitat parcel supports a vegetation community that on first appraisal, is substantially different to that which is present elsewhere within the study site; but from an invertebrate ecology perspective, it shares similar features with vegetation communities on the recently disturbed ground. This includes exposures of bare ground, even if on a micro-scale; a varied topography, though not as extreme or obvious as the larger soil-dominated spoil heaps; and a vegetation community grading from short, open patchy cover through to relatively taller, more closed swards and scrub that form sheltered embayments.

Outwith the study site, the railway spur supports dense scrub which prevented access from within the ROF, or adjacent fields. The fields are a mix of cattle or sheep-grazed pasture in the north; or mostly managed for silage/ hay in the south. The exceptions to this are three orchards in the south-east quartile, associated with the village of Woolavington, and which are likely to have their origins in the late 1790s/ early 1800s when Sedgemoor was inclosed. The dominant fruit tree are apples (*Malus domestica*), which are all veteran specimens. Many of the trees have broken limbs or substantial trunk cavities and are sheltered by mature hedgerows. The orchard no longer appears to be managed and the grassland understorey was a mosaic of species-poor and more floristically diverse tall ruderal vegetation, with a couple of old waterbodies. To the west and north of these orchards are a series of fields bounded by mature hedgerows which fall within the footprint of the Hinckley Point C Connection Project. These fields are likely to have been grazed by cattle as there was an abundance of buttercups, which being unpalatable to bovids, are selectively avoided. This abundance can be an indication that the grasslands are of long-standing origin, which is likely to be the case in this instance. However, in early May 2020, the land was being subject to a great crested newt (*Triturus cristatus*) licenced mitigation project as temporary amphibian fencing was being erected to translocate the capturable population elsewhere.

In summary various habitats are present within the study site, ranging from recently disturbed ground through to long-standing grasslands, some of which are interpreted as remnant floodplain grassland, and others identified as being this HoPI, bounded by mature hedgerows and associated old orchards. The topographical variations, especially within areas recently remediated and in combination with the habitat mosaics and diversity have provided a complex resource for terrestrial invertebrates. The composition of the invertebrate assemblages present will be influenced by the study site's relationship with the wider ecological landscape and this is considered in more detail below, and when evaluating the results (see Section 5).

1.2.2 Context with Surrounding Landscape

The study site is located at the western end of an area of low-lying land situated between rising ground to the north (Mendip Hills), south (Polden Hills) and east (Mid-Somerset Hills and Yeovil Scarplands), within the [2]Somerset Levels and Moors National Character Area (NCA). The NCA is a flat landscape of wetlands, rivers, ditches and rhynes, the latter having been engineered to drain the landscape for agriculture between the 1750s and 1850s, resulting in a patchwork mosaic of fields such as is evident within parts of the study site. This patchwork contributes to the largest area of lowland wet grassland and associated wetland habitats in Britain, and includes marginal areas which grade towards a more tree-associated biotope with scrub, hedgerows and riparian woodland (Natural England, 2013). It is in this context that the study site seems to fit, with the grasslands in the External Fields, with their associated hedgerows and in three instances an orchard, providing the gradation away from the more extensive wetlands evidenced within the Somerset Levels National Nature Reserve (NNR) and conjoining Sites of Special Scientific Interest (SSSI) and Ramsar site.

[2] Available on-line here: http://publications.naturalengland.org.uk/publication/12320274?category=587130; last accessed on the 28th January 2021.

Given that the ROF's footprint is located within the previously more extensive Puriton Levels, which itself was part of a connected network of heaths and moor such as Edington Moor and Catcott Heath that linked to the more extensive Shapwick Heath and Ham Wall NNRs, the habitats present within the study site are considered likely to have some functional connection to these high value habitats that are currently managed for nature conservation; either via the existing network of watercourses, including rhynes, or as a consequence of remnant habitat patches whose origins lie within the study site's historical relationship. As a consequence, the invertebrate assemblages, particularly more mobile groups such as the Diptera may have affinities with these biotopes that are present in the not too distant wider landscape, including the statutory site network 3 km to the east of the study site

1.2.3 Proposed Development Footprint

The proposed development is for a mixed-use campus within the study area. No draft layout has been provided as the intention is to use the baseline information to inform the final design.

1.3 Survey Limitations

1.3.1 Coronavirus Pandemic

In mid-March 2020, following the emergence of Coronavirus (Covid-19), the UK and devolved Governments announced a strict lockdown which extended through until late April 2020. This lockdown required all but essential workers to stay at home. As a consequence, and until the Chartered Institute of Ecology and Environmental Management (CIEEM) issued guidance following confirmation from Defra, it was uncertain whether ecology surveys (within the planning system) were included in the definition of 'essential worker'. This was resolved in early May 2020, and thus the first survey commenced shortly after. The implications of this delayed start are discussed below.

1.3.2 Weather Limitations

The spring of 2020 was remarkable for its prolonged dry and hot weather. Weather conditions leading up to the first main visit (late May 2020) were generally warmer and substantially drier than the long-term average (Meteorological Office [3] website). This was followed by a generally average, in terms of warmth (temperature), but a wetter and cloudier early to mid-summer (Meteorological Office [4]website). This combination of an exceptionally warm and dry spring followed by a cloudier and wetter summer is considered likely to have affected invertebrate species, especially their larval stages. Spring and early summer faunas are considered to have emerged early, in response to the clement weather, or died before emerging as adults due to desiccation. This, in combination with the delayed start as a consequence of Government restrictions arising from the Coronavirus Pandemic (see Section 1.3.1) resulted in this initial spring emergence possibly being at least partially missed.

The results of the surveys undertaken are likely to have been influenced by the conditions (weather and Pandemic) experienced in 2020 in that some species, if present, may have been missed. The significance of this is discussed in Section 4.1 (paragraphs after Table 1). in the context of continued presence of scarce butterflies previously recorded within the study site. Evaluating the data will have a greater focus on invertebrate assemblages and not just individual species of conservation interest. This, combined with a thorough survey effort and consideration of habitat features, including presence/ likely absence of foodplants (for example) will ensure a robust evaluation of the study site and individual land parcels such as the LWSs, enabling an informed conclusion.

[3] See https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/summaries/uk_monthly_climate_summary_spring_2020_may.pdf; accessed on 22nd September 2020.
[4] See https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/summaries/uk_monthly_climate_summary_summer_2020_3.pdf; accessed on 22nd September 2020.

2 Legislation

2.1 Legislation

Sixteen species of invertebrate present in the UK are protected through international law. These were originally included in Appendices to the the European Union's Habitats Directive and transposed into UK domestic legislation by the Conservation of Habitats and Species Regulations 2017 (as amended). Since January 2021, following the UK's departure and the end of the transition period, retained EU-derived legislation has been carried over via Sections 2 and 3 of the European Union (Withdrawal Agreement) Act 2018 (as amended). This Act ensures the retention of the 2017 Regulations on and after departure day (1st January 2021). Further, for the purposes of biodiversity, the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 have been made to address failures of retained EU law to operate effectively and other deficiencies, by amending the 2017 Regulations to ensure their validity.

Approximately 50 species of invertebrate are included in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

Section 40 of the Natural Environment and Rural Communities Act 2006 requires all local authorities to consider biodiversity when undertaking their public duty. In achieving this, the Government has published a list of Species of Principal Importance (SoPI) for nature conservation in England, which includes invertebrates. Somerset County Council has published a Pollinator Action Plan whose broad aims seek, amongst others, to protect, increase and enhance pollinator habitat (Somerset County Council, 2018).

A full list of all species covered by legislation and policy is available via the Buglife's [5]website.

2.2 Policy

Paragraphs 170 to 177 inclusive of the National Planning Policy Framework (NPPF) conveys national policy on conserving and enhancing the natural environment including protecting habitats and biodiversity in the planning system (Ministry of Housing, Communities and Local Government, 2019). Guidance underpinning the NPPF is available [6]on-line and provides a detailed narrative on considerations to protect and enhance biodiversity as part of the planning process. Relevant paragraphs are 009 to 035.

The National Pollinator Strategy is particularly relevant for invertebrate nature conservation and emphasises:

"The National Planning Policy Framework (2012) [subsequently updated] *requires planning authorities to promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations. It prescribes that local plans should have a clear strategy for enhancing the natural, built and historic environment and supporting wider biodiversity networks, including planning at a landscape scale across local authority boundaries and supporting Nature Improvement Areas."* (Defra, 2014; Section 5).

[5] See https://cdn.buglife.org.uk/2019/07/Policy-and-legislation-summary-final-2014_0.pdf; last accessed on the 21st January 2021.
[6] See https://www.gov.uk/guidance/natural-environment#biodiversity-geodiversity-and-ecosystems; last accessed on 21st January 2021.

3 Methodology

3.1 Desk Study

The ecological desk study has been undertaken by Ecology Solutions and any relevant historical records of invertebrates received from the Somerset Environmental Records Centre will be forwarded on for the final report. Further information sources have been referred to as necessary, including from the author's library, in addition to referencing previous survey work (referred to in Section 1.1.1).

3.2 Field Survey

The purpose of the work was to undertake an appraisal of the study site's nature conservation value for terrestrial invertebrates and is therefore not intended to provide an exhaustive list of invertebrate taxa present. In achieving the these aims, the surveys followed the methodologies described in Drake *et al*. (2007) using a variety of techniques, including sweeping of vegetation and aerial netting for flying invertebrates using a light-weight butterfly net as well as a more heavy duty sweep-net. This was complemented by vacuum sampling (using a commercially available modified garden blow-vac), sieving leaf-litter, searching under refugia and direct observation.

Specimens collected were either identified in the field or retained for subsequent microscopic identification. Surveys paid particular attention to those groups most likely to include species of nature conservation interest, focussing on aculeate Hymenoptera (solitary bees and wasps), Diptera (flies), Araneae (spiders), Coleoptera (beetles) and Hemiptera (bugs). However, a wide range of invertebrate orders were recorded including day-flying Lepidoptera (butterflies and moths).

3.3 Evaluation Methodologies

There is currently no standard frame of reference to evaluate the nature conservation value of invertebrate assemblages for the purposes of EcIA, though increasingly, in addition to placing reliance on professional judgement of the surveyor and associates, the use of Pantheon (Webb *et al*., 2018) is being applied.

3.3.1 Proportion of Key Species

An initial indication of a study site's nature conservation value is the proportion of species with a nature conservation status (NCS) recorded. NCS species are those that are assigned a formal status based on three systems applied to British invertebrates since the late 1980s. Details are provided in Appendix B but in summary, all NCS species are assigned a formal status which initially included Red Data Book (Shirt, 1987; Bratton, 1991), and Nationally Notable species (by various species status reviews administered by the Joint Nature Conservation Committee). Since 2001, consideration of a species threat to survival such as through habitat loss, based on the International Union for the Conservation of Nature's (IUCN) criteria (IUCN, 2012) has been adopted and this is gradually replacing the old Red Data Book categories. Running parallel with the IUCN criteria are two British rarity categories, which are based on the hectad system, which again are being defined by [7]updating species status reviews.

Telfer (2017) provided a means of evaluating a study site's potential nature conservation value by considering the proportion of NCS species present within a study site, on the basis that the higher the percentage of NCS species, the more important the study site is. He refers to NCS species as 'Key Species' and splits this in to two groups: Rare Key Species, which are those taxa assigned Red Data, IUCN Threatened and Data Deficient, and Nationally Rare status; and Scarce Key Species, which are those assigned IUCN Near Threatened, Least Concern, and Nationally Scarce/ Notable status. As a rule of thumb, if close to 10 % of the species recorded are Key Species; and more than 1 % are Rare Key Species, it is suggestive that the study site is potentially of national significance for its invertebrate fauna.

[7] Updated species status reviews are published on the JNCC website: http://jncc.defra.gov.uk/page-3352

3.3.2 Invertebrate Assemblages

In considering species assemblages, the taxa recorded within the study site have been entered into Pantheon, a database tool developed by Natural England and the Centre for Ecology & Hydrology to analyse invertebrate sample data (Webb *et al*., 2018). Pantheon has incorporated the Invertebrate Species-habitat Information System (ISIS) developed by Derek Lott and referenced in Drake *et al*., (2007) but takes the analysis further by attaching associated habitats and resources, habitat fidelity scores and other ecological information against each species. This is currently based on approximately 13,000 invertebrate species out of an estimated 37,000 species known from the UK. The taxa primarily used for this analysis are Coleoptera, Diptera, Hemiptera, Lepidoptera, aculeate Hymenoptera and Araneae; hence the focus on these groups for survey. As for the original ISIS, some caution must be applied as strictly speaking, survey effort would normally require standardisation such as timed sweeps.

For the purposes of EcIA, the methods have allowed what [8]Webb *et al*. (2018) describe as a semi-ISIS approach, stated to include some standardised methods such as timed vacuum sampling, static trapping such as pitfall or Malaise trapping; but extending to include more freeform sampling such as focussed searches for pollinators in a non-standardised way. Nevertheless, Pantheon can at least inform which invertebrate assemblages recorded are of particular importance within a site, such as those associated with wood decay, floristically rich habitats or both. A positive aspect of this approach is that attention is given to assemblages rather than solely relying on the national status of individual species, though the latter can also be indicative, especially as a proportion of the total species recorded.

Pantheon interrogates the composition of the terrestrial invertebrate assemblage in terms of biotopes, habitats, and the distribution of stenotopic species i.e. those terrestrial invertebrates with very specific and restricted habitat requirements and have an intrinsic nature conservation value; referred to as [9]Specific Assemblage Types (SAT) (Webb *et al*., 2018). In doing so, the limitations of Pantheon as a tool have been recognised based on the semi-ISIS compliant approach and confidence in the reported condition is therefore medium. To mitigate this confidence level, professional judgement has been applied where necessary to assist robust valuation.

Pantheon can only identify whether a site is in favourable or unfavourable condition expected for SSSIs, and condition is not strictly analogous with value. However, if favourable condition is concluded then this can, taking into account other factors, provide evidence that objectives for sites of national value (SSSIs) are being met and this seems a reasonable proxy in this instance for national value. However, use of unfavourable condition to argue against national value is more problematic and requires a degree of caution and application of professional judgement to determine the appropriate geographic scale of nature conservation value. In addition, as the survey did not strictly comply with methods described in Drake *et al.* (2007), such as timed sweeps, a degree of caution and professional judgement is likewise necessary to accommodate for any bias (detracting or enhancing) within the analysis that might introduce subjectivity into the evaluation.

In an attempt to inject some objectivity into the use of Pantheon SATs to inform evaluation of nature conservation value and to counteract some of the caveats given above, the threshold limits for each of the SATs has been noted with the intention of providing a reasonable judgement. This can be made in terms of the Proportion to Threshold (PtT) achieved for each SAT identified. The threshold referred to is the number of species within a SAT expected to be present if a site is considered to be in favourable condition (FC). Thus, if a SAT records or exceeds the expected threshold, the PtT will be 100 % or greater and this is taken as the basis for considering assigning national value. In the absence of other guidance, where the PtT is < 100 %, professional judgement is used to assist with the rationale for assessing a nature conservation value of the invertebrate assemblage in a sub-national context (i.e. regional, county, district, local). The further away from the threshold, the lower the nature conservation value the SAT. Other factors considered when determining the value include species-richness, proportion of Key Species in the assemblage, proportion of county rarities or significant records (where known), and site context within the landscape (i.e. availability and connectivity to similar semi-natural habitat, whether statutorily protected or not). Thus, whilst Pantheon remains a useful guide when assessing the nature conservation value for each of the land parcels for terrestrial invertebrates, professional judgement incorporating other evidence is necessary to come to a defensible evaluation.

[8] See http://www.brc.ac.uk/pantheon/lexicon/reported-condition; last accessed on the 16th January 2019

[9] SATs are characterised by species restricted to certain features within habitats (= stenotopic species) such as types of decaying wood (e.g. sapwood, or heartwood), fluctuating marsh or rich flower resource. Some SATs such as rich flower resource are cross-cutting, i.e. can be present in more than one habitat.

3.3.3 Designated Site Guidelines

3.3.3.1 Statutory Sites

The Joint Nature Conservation Committee (JNCC) has recently updated and [10] published its guidance on invertebrates for the selection of biological SSSIs (Curson *et al*., 2019). This document has been useful in considering the study site's nature conservation value based on the presence of, for example, Key Species, edge of range species or species assemblages, and placing this in context with the Area of Search, which for the purpose of this approach, is taken to be the relevant NCA. The relevant NCA profile to the study site is the Somerset Levels and Moors NCA (Natural England, 2013).

In summary, Curson *et al*. (2019) state that any species which are Critically Endangered, Endangered or Vulnerable (IUCN); or Nationally Rare (British rarity status) should be represented in SSSIs; and Near Threatened and Nationally Scarce taxa should also be considered if certain caveats apply. The presence of any such designated species at a site is not in itself sufficient for that site to be formally designated, but it would reach a threshold *for it to be considered*. Therefore, the presence of Critically Endangered, Endangered, Vulnerable ([11]IUCN), or Nationally Rare species in a site can be considered as a proxy for considering national importance. The presence of Near Threatened or Nationally Scarce species in the absence of any of the previous four categories would need to consider additional factors such as their status in the vice-county/ region. A Near Threatened or Nationally Scare species that is new, or rare in the vice-county would potentially merit consideration; whereas if it is frequent, it will likely fall short of the threshold for consideration.

3.3.3.2 Non-Statutory Sites

Somerset's guidelines which define how LWSs are selected (Biron, 2010) provides five bespoke criteria (6S9.1 to 6S9.5) for which a land parcel can be considered for designation as a non-statutory site based on invertebrates recorded. Three are relevant to this study (the other two relate to aquatic invertebrates) and are conveyed below:

- *6S9.1 Sites with a recently recorded RDB* [Red Data Book] *species;*
- *6S9.3 Sites containing ≥ 2 Nationally Scarce, or ≥ 3 Somerset Notable species, or Somerset Priority species.*
- *6S9.4 Sites with veteran trees with a saproxylic invertebrate ecological index of continuity > 15.*

There is an additional relevant criterion covering arable/ ruderal species communities (Biron, 2010; page 32) which makes specific reference to invertebrate assemblages:

- *6H12.3 Arable field margins supporting at least one species from a list of taxa on Buglife's [12]webpage related to cereal field margins.*

The presence of arable/ ruderal communities within the study site is discussed in Section 4.3.1.

3.4 Personnel

The invertebrate survey (field visits) was undertaken by Richard Wilson CEnv MCIEEM Mem.RES MSc; an experienced field entomologist. He is a [13]recognised arachnid (spiders and harvestmen) specialist though he is familiar with a wider range of taxonomic groups. In addition to the arachnids, Richard identified some Diptera families such as the hoverflies (Syrphidae) and larger Brachycera (e.g. robberflies (Asiliidae)) and aculeate Hymenoptera in addition to groups readily identifiable in the field such as the Lepidoptera (butterflies and moths) and Odonata (dragonflies and damselflies). Steven Falk FRES, who is a recognised specialist in pollinators identified other Diptera families (e.g. Muscidae) and verified some of the aculeate Hymenoptera (e.g. *Lasioglossum* spp.). Steve Lane identified most of the Coleoptera and Hemiptera collected.

[10] Guidance is available via their website: https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/; last accessed on 29th October 2020.
[11] International Union for the Conservation of Nature. See https://www.iucnredlist.org/assessment/process for more information.
[12] See https://cdn.buglife.org.uk/2019/07/0420Notable20invertebrates20associated20with20cereal20field20margins-1.pdf; last accessed on 21st January 2021.
[13] Richard is the YNU's spider recorder, the Yorkshire, County Durham and Northumberland recorder for the national spider recording scheme; and sits on the conservation committee of the British Arachnological Society.

4 Results and Interpretation

4.1 Desk Study

Survey work supporting the Hinckley Point C Connection Project recorded the lesser silver water beetle in three watercourses, of which ditch TEP341, centred on ST 3427 4334, and approximately 325 metres north of the nearest ditch network within the study site is the nearest. It is therefore feasible that this aquatic water beetle is present within Puriton Rhynes and Ponds LWS's ditch network. The Project also recorded *Hydaticus transversalis* from ditch TEP341 referring to it as an IUCN Vulnerable species. However, Foster (2010) downgraded this species to Nationally Scarce. A second Nationally Scarce water beetle, *Peltodytes caesus* was recorded from ditch TEP327.

In spring and summer 2009, butterfly and dragonfly transects, an egg-search for brown hairstreak and aquatic invertebrate surveys were undertaken to inform the then proposed remediation of the study site. The surveys were completed both within and outwith the former ROF Bridgwater site; and based on the Phase 1 habitat map, the study site covered a similar footprint to 2020 surveys (Ecology Solutions, 2011). A total of 22 species of butterfly were recorded between April and July 2009, and 13 species of dragonfly and damselfly (between May and August 2009). The Key Species recorded were small blue (*Cupido minimus*), dingy skipper (*Erynnis tages*), brown hairstreak and variable damselfly (*Coenagrion pulchellum*). Aquatic invertebrate surveys were undertaken from 17 sampling points in May and a total of 102 species were recorded. Of the 137 species recorded as part of this earlier work, nine (see Table 1 below) have a nature conservation status. Note that since, or shortly before, the surveys were undertaken in 2009, water beetles (Foster, 2010), butterflies (Fox, Warren and Brereton, 2010) and Odonata (Daguet, French and Taylor, 2008) had their nature conservation status' reviewed against IUCN guidelines; hence the reduced number of taxa (particularly water beetles) compared to that listed in Ecology Solutions (2011).

Table 1: Key species recorded historically between April and August 2009 within study area.

Order	Family	Species	Conservation status
Coleoptera	Dytiscidae	*Hydaticus transversalis*	Nationally Scarce
Coleoptera	Hydraenidae	*Limnebius papposus*	Near Threatened; Nationally Scarce
Hygrophila	Lymnaeidae	*Stagnicola palustris* agg.	Data Deficient
Lepidoptera	Hesperiidae	Dingy skipper	Vulnerable; SoPI
Lepidoptera	Lycaenidae	Small blue	Near Threatened; SoPI
Lepidoptera	Lycaenidae	Brown hairstreak	Vulnerable; SoPI
Odonata	Coenagrionidae	Variable damselfly	Near Threatened
Odonata	Libellulidae	Scarce chaser (*Libellula fulva*)	Near Threatened
Unionoida	Unionidae	*Anodonta cygnea*	Near Threatened (European)

No information has been provided on the location(s) within the study site where the above taxa were recorded. Based on the author's knowledge of species' ecologies, it is possible that the small blue and dingy skipper were recorded within Puriton Cowslip Field LWS; and possibly Puriton Ash Ground LWS (within the ROF); whilst variable damselfly and scarce chaser could have been recorded within the Puriton Rhynes and Ponds LWS. Brown hairstreak lays its eggs on the young growth of blackthorn (*Prunus spinosa*) which is a widespread shrub within the tree-associated biotopes in the study site such as within the hedgerows of the Puriton Rhynes and Ponds LWS and Puriton Meadow and Spur LWS.

None of the taxa recorded in 2009 were observed during the 2020 field season. Both small blue and dingy skipper's flight periods are May through to early June and it is conceivable that the exceptionally warm and dry April hastened their emergence prior to the initial site visit. This said, their food plants (common bird's-foot trefoil (*Lotus corniculatus*) in the skipper's case, and kidney vetch (*Anthylis vulneraria*) for small blue) were not observed. Further, whilst the spring may have brought flight seasons forward, it is likely that if dingy skipper remained present, any surviving adults would have been observed. Small blue can form discrete colonies and

require a small number of plants to survive, so whilst it is theoretically possible that a population persists within Puriton Cowslip Field LWS, assuming this is where the records pertain to, it seems unlikely. For the purposes of this report, it is assumed that neither small blue or dingy skipper remain within the study site.

No variable damselflies or scarce chasers were observed during 2020 though suitable habitat remains within the Puriton Rhynes and Ponds LWS. As no aquatic invertebrate survey methods were deployed, this explains the absence of records in 2020 for water beetles and other freshwater fauna.

4.2 Field Survey

4.2.1 Summary of Survey Results

Nine survey visits were completed during reasonable to optimal weather conditions for the time of year between mid-May and mid-September 2020. The details are conveyed in Table 2, including the various locations where surveys took place on each visit.

Table 2: Weather conditions for survey visits.

Date	Weather	Notes
12th May 2020	**Cloud:** 3/8; **Temperature:** 14°C warming to 19°C; **Wind Speed:** Calm to 1. Cool start but then warming.	Scope site and survey fields, including orchard NW of Woolavington. Survey fields in SE corner of ROF Bridgwater
13th May 2020	**Cloud:** 4/8 to 7/8; **Temperature:** 13°C; **Wind Speed:** 2 NNE. Cool and breezy day.	Scope & survey within ROF Bridgwater: • Puriton Rhynes & Ponds LWS • Puriton Cowslip Field LWS • General area within ROF
8th June 2020	**Cloud:** 3/8; **Temperature:** 20°C; **Wind Speed:** 1 (2) NW	• Survey fields NE of Puriton.
9th June 2020	**Cloud:** 3/8 (high cloud); **Temperature:** 17°C; **Wind Speed:** 1 (2) W	• Puriton Rhynes & Ponds LWS • Puriton Meadows & Rail Spur LWS, • General areas within ROF Bridgwater. Set up Malaise trap and pitfall traps
10th June 2020	**Cloud:** 8/8 (high cloud); **Temperature:** 14°C; **Wind Speed:** 1 W. Heavy rain and then drizzle.	• Survey land NW of Woolavington Set up flight interception traps in orchard
7th July 2020	**Cloud:** 8/8 clearing to 6/8; **Temperature:** 17°C warming to 20°C; **Wind Speed:** 1 (2) W. Warm and humid	• Puriton Ash Ground LWS • Puriton Rhynes & Ponds LWS • General areas within ROF Bridgwater. Retrieve static traps
29th July 2020	**Cloud:** 6/8; **Temperature:** 18°C; **Wind Speed:** Calm	• Survey land NW of Woolavington • General areas within ROF Bridgwater.
30th July 2020	**Cloud:** 1/8; **Temperature:** 20°C; **Wind Speed:** 2 (3) SE	• Puriton Rhynes & Ponds LWS
15th September 2020	**Cloud:** 1/8; **Temperature:** 23°C; **Wind Speed:** 1	• Puriton Meadows & Rail Spur LWS • General areas within ROF Bridgwater.

A total of 565 species were recorded across all land parcels within the study corridor, of which 20 taxa (excluding Research Only) are Key Species (as defined by Telfer (2017) with definitions provided in Appendix B). Table 5 provides the breakdown of species-richness for each land parcel surveyed and Table 4 by taxonomic group. A complete list of species in taxonomic order is provided in Table 14 (Appendix C).

In describing and evaluating the results, the study site has been divided in to three compartments:

- ROF Bridgwater (land not designated as a LWS);
- the LWS Network (i.e. all LWSs, some of which straddle land either side of the ROF's boundary fence); and
- land outwith the former ROF Bridgwater security fence and not designated as a LWS (the 'External Fields').

Whilst survey work was not standardised across the various compartments; for example, pitfall trapping was only undertaken within the Puriton Ash Grounds LWS, the number of, and proportion of records collected for each compartment (Table 3) suggests that the data collected was broadly similar between each compartment studied, regardless of whether you include or exclude the data associated with static traps. Therefore, comparing the results for each compartment for the purposes of a broad overview of the results is a reasonable approach.

Table 3: Indication of survey effort based on number of records for each compartment.

Compartment	Records (with static traps)	Records (excluding static traps)
Study Site (all compartments)	1085	882
ROF Bridgwater (including LWSs)	766	621
ROF Bridgwater (excluding LWSs)	418 (38.5 %)	342 (38.8 %)
LWS Network	348 (32.1 %)	279 (31.6 %)
External Fields	319 (29.4 %)	261 (29.6 %)
Percentages are number of invertebrate records collected from each compartment as a proportion of the total collected in the study site.		

The location of static traps are provided in the table below.

Table 4: Location of static traps.

Trap	National Grid Reference	Compartment & habitat
Malaise trap)	ST 3370 4193	Edge of mature hedgerow, neutral grassland and mature poplars within non-designated area of ROF.
Pitfall traps	ST 3267 4208	OMH and scattered scrub within Puriton Ash Ground LWS
FITs	ST 3426 4180 ST 3421 4178	Three traps attached to mature apple trees within orchard located within External Fields.

The data presented in Table 5 provides an indication of species-richness and proportion of the invertebrate assemblage that are Key Species in the different compartments within the study site. The data suggests that the LWS Network, which is largely contained within ROF Bridgwater, supports approximately twice the number of Key Species as a proportion of species-richness compared to habitats outwith the LWS Network, but within the ROF. Further, the aggregated data for the LWSs suggest these land parcels in the context of the study site support a disproportionate invertebrate assemblage compared to those present outwith the designated network.

Table 5: Total species-richness distribution within study site and individual compartments.

Compartment	Species-Richness	Key Species	Proportion Key Species
Study site (all compartments)	565	20	3.5 %
ROF Bridgwater (including LWSs)	432	16	3.7 %
ROF Bridgwater (excluding LWSs)	289	6	2.1 %
LWS Network	241	11	4.5 %
External Fields	253	7	2.8 %

Table 6 provides a breakdown of taxonomic groups recorded in each of the compartments; the differences in this case are considered a reflection of survey methods. For example, the 119 species of Diptera recorded within

non-designated land inside ROF Bridgwater, when compared to the 60 species within the LWS Network is a consequence of the Malaise trap's location.

Table 6: Distribution of main taxonomic groups studied. Red numbers in parentheses equate to Key Species (excluding Research Only – see text for explanation).

Taxonomic Group	Study site	ROF Bridgwater (including LWS)	ROF Bridgwater (excluding LWS)	LWS Network	External Fields
Arachnida, Araneae & Opiliones (Spiders & harvestmen)	58 (2)	49 (2)	25 (0)	34 (2)	14 (0)
Coleoptera (Beetles)	147 (10)	106 (8)	45 (4)	84 (5)	60 (2)
Diptera (Flies)	194 (4)	143 (2)	119 (1)	60 (1)	103 (3)
Hemiptera (Bugs)	53 (0)	42 (0)	28 (0)	24 (0)	24 (0)
Hymenoptera (Bees, wasps & allies)	60 (3)	46 (3)	33 (1)	25 (2)	28 (2)
Lepidoptera (Butterflies & moths)	31 (1)	27 (1)	23 (0)	7 (1)	13 (0)
Others	22 (0)	19 (0)	16 (0)	7 (0)	11 (0)

4.2.2 Key Species

A total of 20 Key Species were recorded within the study site, of which two are Rare Key Species, including taxa that subject to a formal status review, will likely be downgraded. These 20 Key Species represent 3.5 % of the total number of species recorded within the study site; ranging between 2.1 % to 4.5 % depending on the compartment. Rare Key Species represent less than 1 % of the fauna. Details, including their ecology and occurrence at the study site is conveyed in Table 7.

Table 7: Selection of species recorded with an NCS within the stidy site.

Species	Status	Compartment(s) Recorded	Ecology
Styloctetor compar (=*Ceratinella scabrosa*) Araneae, Linyphiidae	Nationally Scarce	LWS Network	A small money-spider associated with dry (often calcareous) unimproved grasslands. Relatively widespread in south-east England but becoming scarce in the Midlands and in the south-west with few records in Somerset (Spider Recording Scheme, 2021).
Argenna subnigra Araneae, Dictynidae	Nationally Scarce	LWS Network	A ground-dwelling spider associated with sparsely vegetated open grasslands, including those characteristic of brownfield sites. It is rare in western England and represents the first records for Somerset.
Acupalpus exiguus Coleoptera, Carabidae	Nationally Scarce	ROF Bridgwater	A small pitchy-black ground beetle associated with wet grassland sites such as flood meadows, often on clay soils, though it has also been recorded in coastal localities on salt-marsh (Telfer, 2016).
Tachyporus formosus (Coleoptera, Staphylinidae)	Nationally Scarce	ROF Bridgwater	A small predatory orange and black rove beetle with a strong association with wetlands and marshy grassland (Lane, 2019).
Stenus palustris (Coleoptera, Staphylinidae)	Nationally Scarce (Nb)	LWS Network	A small predatory rove beetle strongly associated with fens, marshes and other wetland habitats, typically recorded within reed and sedge litter.
Hypnogyra angularis (Coleoptera, Staphylinidae)	Nationally Scarce (Na)	External Fields	This predatory rove beetle is a saproxylic species, associated with woodland, particularly pasture

Species	Status	Compartment(s) Recorded	Ecology
			woodland, parkland estates and orchards. Examples of its immediate habitat often involve wood mould, rot holes, and decayed tree trunks. There may be some association with bird nests in tree cavities.
Longitarsus lycopi (Coleoptera, Chrysomelidae)	Nationally Scarce	External Fields	A small yellowish flea beetle, most often associated with short sward grassland habitats where it is phytophagous on members of the Lamiaceae, commonly ground ivy (*Glechoma hederacea*) but also self-heal (*Prunella vulgaris*).
Cryptocephalus bipunctatus (Coleoptera, Chrysomelidae)	Nationally Scarce	LWS Network	A relatively large and convex pot beetle strikingly marked with black longitudinal patches on a gloss yellow elytral background. It is typically recorded in open woodland and scrub habitats (including on heathland), where adults feed on a variety of broad-leaved trees, perhaps with preference for hazel, willow and birch. The larvae are cased and free-living in the ground layer or on foliage and may be ant-associated.
Diplapion stolidus Coleoptera, Apionidae	Nationally Scarce (Nb)	LWS Network	A small phytophagous, grey-black weevil which is associated with ox-eye daisy (*Leucanthemum vulgare*) in field margins, road verges and other grassland habitats. The larvae probably develop in the rootstock or stems of the plant. In Britain, adults have been recorded mainly between May and September.
Oxystoma cerdo Coleoptera, Apionidae	[Nationally Scarce (Nb)]	ROF Bridgwater	This small grey-black weevil is distributed locally throughout Britain, commonly encountered in the Midlands and south-east England. It is typically recorded in grassland, sometimes in tall herb communities within other habitats. The adults and larvae feed on vetches, particularly tufted vetch (*Vicia cracca*), the larvae developing in the seed pods. Adults have been found between May and September. This species has increased in the last two decades and no longer deserves its status.
Tanymecus palliatus Coleoptera, Curculionidae	Nationally Scarce (Nb)	LWS Network	This is a moderately large weevil, which superficially resembles a very large Sitona in appearance. It is phytophagous, the adults being associated primarily with plants in the thistle family, although its foodplant associations may well be broader than this. The beetle is found in verge and other more-or-less open grassland habitats where it is usually found by sweeping vegetation.
Larinus planus Coleoptera, Curculionidae	[Nationally Scarce (Nb)]	LWS Network ROF Bridgwater	A moderately large, blackish, elongate weevil which is phytophagous on a variety of thistles in the genera *Carduus* and *Cirsium* in grassland. Adults are active in the field between April and September.
Atylotus rusticus (Diptera, Tabanidae)	Nationally Rare	ROF Bridgwater External Fields	A medium sized horsefly associated with grazing marsh and wetland vegetation. There are scattered records in southern England, mostly in and around Otmoor, near Oxford; and the Pevensey Levels (around Brighton). The species is known from the Somerset Levels (Stubbs and Drake, 2014).

Species	Status	Compartment(s) Recorded	Ecology
Beris clavipes Diptera, Stratiomyidae	Nationally Scarce	External Fields	A widespread though localised species associated with wetland habitats throughout England and lowland Wales, rare in Scotland (Stubbs and Drake, 2014).
Fannia clara (Diptera, Fanniidae)	pNationally Scarce	External Fields	A lesser housefly recorded from southern England but with a few records from southern Scotland. It is typically recorded in old broad-leaved woodland where the larvae develop in bird nests (Falk and Pont, 2017).
Hydrotaea pilipes (Diptera, Muscidae)	pNationally Scarce	LWS Network	A widespread but very local housefly reported from assorted habitats including woodland and saltmarsh edge. Larvae will be predators of other Diptera larvae in common with other members of the genus (Falk and Pont, 2017).
Small heath (*Coenonympha pamphilus*) (Lepidoptera, Nymphalidae)	Near Threatened; SoPI	LWS Network	Although a widespread species in the UK, this otherwise common species has experienced a substantial decline in both abundance and occurrence (Fox *et al*., 2015), hence its classification as Near Threatened.

4.3 Baseline Invertebrate Assemblage Analysis

The following section describes the invertebrate assemblages recorded within the three compartments that make up the study site (ROF Bridgwater (outwith the LWS Network), LWS Network, and Outwith ROF Bridgwater). The species list for each of these has been analysed using Pantheon to identify the habitat associations and dependencies of the terrestrial invertebrate assemblage associated with each land parcel. The analysis first considers stenotopic species i.e. those terrestrial invertebrates with very specific and [14] restricted habitat requirements. They are considered to have an intrinsic nature conservation value as stenotopic species are generally only recorded on sites that are of nature conservation value. The analysis then considers the habitat affinities of the wider assemblage.

4.3.1 ROF Bridgwater (outwith LWS Network)

The compartment analysed here comprises all habitats within the curtilage of the former ROF Bridgwater, but outwith those areas designated as LWSs (see Figure 1; Appendix A). A total of 289 species were recorded in this compartment of which 256 have been [15]analysed by Pantheon.

A total of 34 stenotopic species were recorded, representing approximately 12 % of the invertebrate fauna identified from the compartment (see Table 15; Appendix C). Most (25 stenotopic species) are associated with the open habitat biotopes (SAT codes prefixed with an 'F' in Table 15), of which 17 species are interpreted as being associated with the habitat patches of disturbed ground that are scattered throughout this compartment where historical clearance work has taken place (see Photograph 1). These disturbed habitat patches, which occur on spoil mounds and level ground have a distinctive appearance similar to arable field margins. However, none of the species, stenotopic or more widespread, are included in Buglife's list (refer to Footnote 5) referenced in Biron (2010). One species of bee, *Lasioglossum fulvicorne*, though widespread in Britain, has a [16]high fidelity to calcareous soils (Alexander, 2003; Else and Edwards, 2018; p. 651). The relevance of calcareous grassland fidelity is discussed in more detail in Section 4.3.2 in relation to the species listed in Table 9 but the presence of a species which has a high fidelity has the potential to amplify the value of a habitat present within a study site. The Nationally Scarce (though increasing) weevil *Larinus planus* (Coleoptera, Curculionidae) has been recorded in the open habitat SAT, short sward and bare ground (F112) on thistles (*Cirsium* spp.) with which it is associated.

Two additional Key Species, the Nationally Rare horsefly *Atylotus rusticus*, (Diptera, Tabanidae) and the National Scarce ground beetle *Acupalpus exiguus* (Coleoptera, Carabidae) are associated with wetland habitat SATs: reed-

[14] Referred to as Specific Assemblage Types (SAT) in Pantheon (Webb *et al*. 2018).
[15] Pantheon analyses species, attaching associated habitats and resources, assemblage types (adapted from the Invertebrate Species-habitat Information System), conservation status, habitat fidelity scores and other information against them.
[16] Alexander (2003) defined high fidelity as a species routinely recorded from calcareous grasslands. They may also be recorded to a greater or lesser degree from other open habitats on freely draining soils, but it is likely that they are mainly dependent on calcareous grasslands to sustain viable populations.

Photograph 1: Nectar-rich resource in disturbed ground with bare ground just north of main offices (left) and spoil heap (right) within ROF Bridgwater.

fen and pools (W314) and undisturbed fluctuating marsh (W221) respectively. The horsefly was recorded throughout the study site in mid-summer but the ground beetle was recorded on one occasion within the fields at the southern end of the ROF Bridgwater, just east of the entrance gate. The Nationally Scarce ground beetle, *Acupalpus exiguus* suggest that these grasslands may be periodically inundated, and whilst they are not florisitically species-rich, they are nevertheless a habitat of higher value for invertebrates than the botanical diversity may suggest. These grasslands are interpreted as being remnant examples of lowland floodplain grassland that would have been present prior to the factory's construction in the 1940s on the Puriton Levels and characteristic of the wider NCA. The presence of *A. rusticus* is supportive of this interpretation given its restricted distribution.

4.3.2 LWS Network

The LWS Network comprises all habitats within the curtilage of the former ROF Bridgwater that are designated as non-statutory sites (see Figure 1; Appendix Y). A total of 241 species were recorded in this compartment of which 224 have been analysed by Pantheon. Whilst the analysis has considered the four LWS studied as a single compartment, each of the individual LWSs are described with Table 8 providing a breakdown of species-richness (full species list for each individual LWS is provided in Table 17; Appendix C).

Table 8: Comparison of species data between individual LWSs within the study site.

	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Species-richness	96	23	62	111
Key Species	5	2	3	2
Stenotopic Species	25	3	10	9

A total of 38 stenotopic species were recorded across all LWSs, representing approximately 16 % of the invertebrate fauna (see Table 16; Appendix C). Almost all (35 stenotopic species) are associated with the open habitat biotopes (SAT codes prefixed with an 'F' in Table 16), but several (five species) are reliant on the proximity of two SATS such as the dead wood resource (for the larval stages) and scrub edge (for the adult phase). However, the majority (25 species) within the LWS Network are dependent on either the presence of the rich flower resource, bare sand and chalk, or open short sward SATs; three-quarters (18 species) having been recorded within the Puriton Ash Ground LWS (see Photograph 2). Of the 25 stenotopic species, nine taxa (all bees) were also recorded within the wider ROF Bridgwater site, suggesting there is some interchange between the disturbed habitat on the spoil heaps.

Surveys in 2020 recorded 96 species in the Puriton Ground LWS, a small (*c.* 2.3 ha) land parcel within the ROF, of which five are Key Species; and 25 stenotopic species (see Table 17; Appendix C for a full list). The pot beetle, *Cryptocephalus bipunctatus* (Coleoptera, Chrysomelidae) is phytophagous on various broad-leaved trees, including birches (*Betula* spp.), poplars (*Populus* spp.) and hazel (*Corylus avellana*), though it can occur on dog rose (*Rosa canina*) (Cox, 2007) and whilst it may have wandered from adjacent hedgerows, it could equally be present within the LWS's scattered scrub. The Nationally Scarce weevil, *Larinus planus*, was recorded within the LWS, as well as elsewhere within ROF Bridgwater, thus further emphasising the similarity between the OMH and the disturbed vegetation communities associated with the spoil heaps.

Photograph 2: Puriton Ash Ground LWS (left) and recently landscaped spoil heap adjacent (right).

The Puriton Rhynes & Ponds LWS (*c.* 23 ha) is located in the north-east of the former ROF and includes the 865 m long reed-bed linking the study site to the Huntspill River NNR. Survey work focussed on the triangular fields (centred on ST 339 428) and the western edge of the reedbed (between ST 3344 4301 and ST 3364 4365). Of the 111 species recorded within this LWS, 78 species were recorded from the reedbed and 46 species from the grassland fields. Only one stenotopic species, the Nationally Scarce rove beetle *Stenus palustris* (Coleoptera, Staphylinidae) was recorded from this LWS, from the reedbed. A second Nationally Scarce beetle, a weevil *Tanymecus palliatus* was recorded from the grassland fields. This is a polyphagous species on various grassland Asteraceae including thistles in the genera *Cirsium* and *Carduus*.

The Puriton Meadows & Rail Spur LWS, which is located in the north-west of the former ROF Bridgwater site comprises three fields and wet woodland, plus linear dense scrub associated with the former railway line ('the rail spur'). Survey work resulted in 62 species being recorded, though this should be considered a snapshot of the fauna within this LWS. Of the three Key Species recorded, the provisionally Nationally Scarce housefly (Diptera, Muscidae) *Hydrotaea pilipes* is considered to be the most significant record from the LWS as there are limited number of records in Britain. The predatory larvae are soil-dwellers, hunting other dipteran larvae, and there may be an association with woodlands, though little is known about its ecology beyond this (Falk and Pont, 2017).

Limited recording was undertaken within the Puriton Cowslip Field LWS, but nevertheless, despite only 23 species being recorded, the Nationally Scarce mesh-webbed spider (Arachnida, Araneae, Dictynidae) *Argenna subnigra* occurs here. This is a ground-dwelling spider of open, sparsely vegetated grasslands where it resides under stones and the base of vegetation (Spider Recording Scheme, 2021b). This is a species which is rare in Somerset, having only been recorded the once, from Berrow Dunes, near Burnham-on-Sea (VC 6) in May 1990. The record is thus the first for thirty years and given the lack of records in the wider region, it is a regionally rare species. Further, the Nationally Scarce weevil *Diplapion stolidum* is also present here, a species associated with ox-eye daisy.

A component of the invertebrate fauna recorded within the network of LWSs are the 20 species (see Table 9) which have a [17]fidelity to calcareous grasslands (Alexander, 2003), which in this context, includes free draining soils that are typical on brownfield sites.

[17] **Moderate:** species routinely recorded from calcareous grasslands, but also from semi-natural open habitats on freely-draining soils over all or part of their geographical area of distribution. **Low:** species frequently recorded in numbers from calcareous grasslands, but predominantly associated with other types of open habitats over all their British area of distribution.

Table 9: Invertebrates scoring moderate or low fidelity to calcareous grassland recorded on the three brownfield sites in 2020 (after Alexander, 2003).

Order	Family	Species	Conservation status	Habitat score
Araneae	Linyphiidae	*Micrargus subaequalis*		Moderate
Araneae	Linyphiidae	*Styloctetor compar*	Nationally Scarce	Moderate
Araneae	Lycosidae	*Pardosa monticola*		Moderate
Coleoptera	Apionidae	*Diplapion stolidum*	Nationally Scarce (Nb)	Moderate
Coleoptera	Chrysomelidae	*Cryptocephalus bipunctatus*	Nationally Scarce	Moderate
Coleoptera	Chrysomelidae	*Longitarsus dorsalis*		Moderate
Coleoptera	Elateridae	*Agrypnus murinus*		Moderate
Hemiptera	Cicadellidae	*Anaceratagallia ribauti*		Moderate
Hymenoptera	Halictidae	*Lasioglossum morio*		Moderate
Araneae	Gnaphosidae	*Zelotes latreillei*		Low
Araneae	Hahniidae	*Hahnia nava*		Low
Araneae	Linyphiidae	*Bathyphantes parvulus*		Low
Araneae	Salticidae	*Heliophanus flavipes*		Low
Araneae	Salticidae	*Talavera aequipes*		Low
Coleoptera	Curculionidae	*Larinus planus*	[Nationally Scarce (Nb)]	Low
Coleoptera	Curculionidae	*Hypera zoilus*		Low
Coleoptera	Curculionidae	*Otiorhynchus ovatus*		Low
Coleoptera	Curculionidae	*Phyllobius roboretanus*		Low
Hymenoptera	Halictidae	*Lasioglossum pauxillum*		Low
Hymenoptera	Halictidae	*Sphecodes ephippius*		Low

Calcareous, or base-rich grasslands, are one of the most species-rich grassland types in Britain (Alexander, 2003; page 11) and so assemblages that support species with a moderate or high degree of fidelity to this habitat are potentially of nature conservation value. Eight out of the nine taxa identified as having moderate fidelity were recorded within the Puriton Ash Ground LWS (*Diplapion stolidum* being the exemption). Of these, four beetles (*Cryptocephalus bipunctatus*, *D. stolidum*, *Longitarsus dorsalis* and *Agrypnus murinus*); and a halictid bee (*Lasioglossum morio*) are also stenotopic (see Table 16, Appendix C), thus underlining the importance of these habitats within the context of the study site. Whilst species with a fidelity to calcareous grasslands are not restricted to the LWS network (e.g. *L. fulvicorne*), the majority of them are, emphasising the relative value of these designated sites. However, the presence of *L. fulvicorne*, a bee which was only recorded in two locations within the former ROF Bridgwater but outwith the LWS network reiterates the narrative that the disturbed vegetation communities are functionally similar to the OMH.

4.3.3 External Fields

The External Fields comprises all habitats outwith the security fence of the former ROF Bridgwater, which for the avoidance of doubt, includes the orchard immediately to the north of Woolavington and the fields to the north-east of Puriton (see Figure 1; Appendix Y). A total of 253 species were recorded in this compartment of which 229 have been analysed by Pantheon.

A total of 50 stenotopic species were recorded, representing approximately 20 % of the invertebrate fauna identified from the compartment (see Table 18; Appendix C). Just under half (23 stenotopic species) are associated with the decaying wood habitat (SAT codes prefixed with an 'A' in Table 18), and 25 species are associated with the open habitat biotopes SAT codes prefixed with an 'F' in Table 18).

A substantial proportion (*c*. 30 %) of the wood decay fauna (saproxylic invertebrates) was collected from three aerial flight interception traps (FITs) attached to the old apple trees within the orchard located outside the village of Woolavington. A total of 176 species were recorded by all methods within the orchard, of which 76 species

were directly collected from the trees and hedgerow shrubs by FITs (52 spp.) and beating the lower branches (29 spp.). Whilst only one Nationally Scarce species was recorded (the rove beetle *Hypnogyra angularis*, which is associated with wood mould in tree cavities), the 25 saproxylic species recorded throughout this compartment is noteworthy given the lack of ancient woodland within the NCA (Natural England, 2013; Section 4.2). This dead wood resource is not restricted to the orchard but is also present as boundary features (mature and over-mature hedgerows) within the ROF and elsewhere in the External Fields such as the track that skirts the orchard's eastern boundary from Woolavington, north towards Stoning Pound ('the Woolavington Track'). However, the plantation woodland, for example in the south-east corner of the ROF (centred on ST 3393 4195), lacked a dead wood resource. The analysis has also identified the importance of the juxtaposition of the open habitat biotope with the dead wood resource as ten species of solitary wasp including five species of *Ectemnius* (*E. cavifrons*, *E. cephalotes*, *E. continuus*, *E. lapidarius* and *E. lituratus*) co-depend on dead wood (for nesting) and open habitat (for foraging).

5 Nature Conservation Evaluation

As stated in Section 3.3, there is no standard frame of reference to evaluate a study site's invertebrate assemblages' nature conservation value. Instead, reliance is placed on various sources, including proportion of Key Species recorded, and analysis using Pantheon (Webb *et al*., 2018). Added to this is recent guidance which considers how Key Species can best be represented in protected sites (SSSIs) (Curson *et al.*, 2019). Whilst the presence of Key Species in themselves is not a sole indication of national value, it is considered a useful guide as to where a particular site may sit in a geographical hierarchy. This underlying principle has been of value for the purposes of informing the evaluation within the study site's compartments.

Curson *et al*. (2019) suggests that sites can be valued based on:

- individual species that are considered to be threatened species (IUCN and British rarity, see this report's Appendix B for details), species of country conservation priority (i.e. SoPI), species with restricted or disjunct ranges, and edge of range species; and

- assemblages of specialised habitats and habitat-based assemblages such as OMH faunas, and habitat heterogeneity/ mosaics.

In addition to the above, it remains relevant to assess the invertebrate assemblage recorded against non-statutory site guidelines, if applicable. The administrative region's guidelines includes reference to terrestrial invertebrates (Biron, 2010) and the criteria are referred to in Section 5.1.3, Section 5.2.3 and Section 5.3.3.

This approach forms the basis for the following evaluation and in doing so, takes into consideration the criteria referred to above and more general points such as the relative value of how terrestrial invertebrate assemblages relate to both the importance and uniqueness of the habitats present, and the characteristics of the assemblage itself. The assessment first considers the presence of individual species recorded, also taking in to account the likelihood of continued presence of historically recorded taxa where relevant, followed by the assemblages recorded (i.e. not just the rarer taxa).

Following assessment of this, as explained in more detail below, ROF Bridgwater (excluding LWSs) is considered to support an assemblage of terrestrial invertebrates of **district nature conservation value**; the LWS Network is considered to support an assemblage of terrestrial invertebrates of **county nature conservation value**; and the External Fields is considered to support an assemblage of terrestrial invertebrates of **county nature conservation value**.

5.1 ROF Bridgwater (excluding LWS)

5.1.1 Individual Species

Out of a total species list of 289, six Key Species and one Rare Key Species (based on Telfer, 2017) were recorded, representing 2.1 % and 0.3 % of the assemblage respectively. Both these proportions are substantially below the proposed threshold for national importance (Key Species (10 %) and Rare Key Species (1 %)).

Applying Curson *et al*. (2019) one species, the Nationally Rare horsefly *Atylotus rusticus* (see Table 7 for details) has been recorded, and based on Harvey (2018), there is a single [18] record from East Huntspill, approximately 2.5 km to the north, from August 2017. Two of the SSSIs which are located to the east of ROF Bridgwater (Catcott Edington & Chilton Moor SSSI, and Shapwick Heath SSSI) are known to support important invertebrates, including the W314 reed-fen and pools SAT which *A. rusticus* is part of. Although there are no records of this horsefly from these land parcels, and no mention of the species from the [19]citation relating to the Somerset Levels and Moors Ramsar Site, it is considered probable that the species is present in suitable habitat within the statutory sites and the wider landscape. Likewise, two additional Key Species (*Acupalpus exiguus* and *Tachyporus formosus*) have been recorded within the grassland habitats and their ecologies suggest that these

[18] Record info available from the NBN Atlas: https://records.nbnatlas.org/occurrences/3762b3ae-1aba-4a6f-ad46-205fb603e780; available under CC-BY Licence; last accessed on 27th January 2021.
[19] See https://rsis.ramsar.org/RISapp/files/RISrep/GB914RIS.pdf; last accessed on 27th January 2021.

habitats are similar to, and possibly represent remnant lowland wet grasslands of the once more extensive Puriton Levels, and that the grasslands retain a functional ecological connectivity with the wider Somerset Levels, albeit of diminished extent and quality as a consequence of the site's previous use.

5.1.2 Habitat Assemblages

The relative value of the terrestrial invertebrate assemblages relates to both the importance and uniqueness of the habitats present, and the characteristics of the assemblage itself.

5.1.2.1 Landscape context

Within the Somerset Levels and Moors NCA in south-west England, Natural England (2013) state that there are 43,393 ha of coastal and floodplain grazing marsh, a HoPI, and one of the dominant open habitat biotopes within the Somerset Levels. Based on the MAGIC website, within a 2 km buffer, there are [20]*c*. 1,465 ha of floodplain grassland, representing approximately 3.4 % of the NCA's resource, though all are outside the statutory sites. Based on the survey work, and reference to readily available aerial photography on-line, it is estimated that there are approximately 10 ha of similar grassland habitat inside this compartment, which represents an approximate additional 0.7 % of the immediate resource, and a mere additional *c*. 0.02 % of the total NCA resource. Therefore, whilst this additional 10 ha, supports Key Species, including a Nationally Rare horsefly, it represents a tiny contribution to the total resource, even within the immediate vicinity.

5.1.2.2 Stenotopic Species

The relative value of the notable habitats present for terrestrial invertebrate species can be interrogated in more detail regarding the stenotopic species recorded by the survey. As explained in Section 3.3, stenotopic species are dependent on quite specific and restricted habitat conditions that are rarely encountered in the wider landscape. Therefore, stenotopic species are considered to have an intrinsic nature conservation value and generally only occur in association with sites of relatively high nature conservation importance.

Pantheon has been used to investigate this further by interrogating the composition of the terrestrial invertebrate assemblage in terms of biotopes, habitats, and the distribution of stenotopic species recorded. In doing so, the limitations of Pantheon as a tool have been considered, and professional judgement has been applied where necessary to assist robust valuation.

Table 10: Invertebrate assemblage assessment for ROF Bridgwater (outwith LWS Network).

Broad biotope	Habitat	SAT	No. of species	FC Threshold	Proportion to Threshold	Species with conservation status
Open habitats	Cross-cutting	F002: Rich flower resource	16	15	107%	
Open habitats	Cross-cutting	F001: Scrub edge	7	11	64%	
Wetland	Marshland	W221: Undisturbed fluctuating marsh	2	4	50%	1
Tree-associated	Decaying wood	A212: Bark & sapwood decay	5	19	26%	
Wetland	Running water	W125: Slow-flowing rivers	1	4	25%	
Open habitats	Short sward & bare ground	F112: Open short sward	3	13	23%	1
Open habitats	Cross-cutting	F003: Scrub-heath & moorland	1	9	11%	
Wetland	Peatland	W314: Reed-fen & pools	1	11	9%	1
open habitats	Short sward & bare ground	F111: Bare sand & chalk	1	19	5%	

[20] This includes 10.7 ha present within fields outwith the former ROF Bridgwater site, but within the wider study site.

Following review of the number of stenotopic species recorded and the thresholds published in Drake *et al*. (2007), as conveyed in Table 10, the cross-cutting rich flower resource (F002) has exceeded the threshold considered to represent FC status, which is dominated by pollinators such as bees and flies. However, cross-cutting SATs have a poor discriminatory value in nature conservation terms (i.e. exceeding the threshold is not sufficient on its own to conclude national significance) (Webb *et al*., 2018) and whilst it is considered to be partly influenced by the vegetation community developing on the disturbed soils such as on spoil heaps as illustrated on Photograph 1, the open short sward SAT (F112), which has a low PtT score of 23 % requires the rich flower resource (F002) PtT exceedance to be tempered. So whilst this transient habitat has intrinsic interest, the rich flower resource exceedance is not sufficient to conclude an assemblage of high nature conservation value given the lower PtT scores for associated relevant short sward and bare ground habitats.

The undisturbed fluctuating marsh (W221) PtT score of 50 %, which can be considered analogous to floodplain grassland, is a substantial distance away from the FC threshold, a possible reflection on the limited resource present within the context of the wider landscape, and is consistent with the narrative in Section 5.1.2.1.

It should be recalled that survey work missed the spring season (i.e. late April through to early May) and in combination with the very dry spring (see Section 1.3.2) was generally observed to have had a negative effect on insect activity, particularly pollinators, as the ground vegetation suffered from desiccation. This may have reduced activity and possibly resulted in increased species mortality at the pre-adult stage (larvae or pupae), or more rapid adult mortality, resulting in lower species-richness than otherwise may have been the case. Had surveys been undertaken, they may have resulted in additional stenotopic species being recorded within the undisturbed fluctuating marsh SAT, pushing it closer to FC status; though the current low PtT score for the open short sward is not thought likely to come substantially closer to the threshold. Nevertheless, professional judgement has been applied and it is considered that whilst the FC status threshold for both SATs are unlikely to have been met, it would likely have been closer and this has influenced the conclusion on the compartment's nature conservation value for invertebrates.

5.1.3 Taxonomic Assemblages

In addition to the guidelines for statutory site designation (refer back to Section 5.1.1), there are published guidelines for non-statutory site designation (Local Wildlife Sites) in Somerset (refer back to Section 3.3.3.2). The guidelines provide a coherent means by which the compartment can be assessed against. Applying the criteria, the compartment would meet the guidelines for LWS designation based on one criterion:

- Criterion 6S9.3: on the basis that there are three taxa (*Atylotus rusticus*, *Acupalpus exiguus* and *Tachyporus formosus*) that are genuinely Nationally Rare/ Nationally Scarce and likely to be scarce or rare in Somerset.

It is worth highlighting that no species were recorded within the disturbed vegetation communities that are included on Buglife's list of species association with arable field margins. So, whilst these vegetation communities support a pollinator assemblage, they fail to meet Criterion 6H12.3.

5.1.4 Conclusion

The invertebrate assemblage recorded within the compartment in 2020 includes six Key Species, of which one is a Rare Key Species. However, only three are considered to genuinely retain their nature conservation status, the Nationally Rare horsefly and two Nationally Scarce beetles, which are also rare in Somerset. The study site supports 34 stenotopic species, most being intrinsically linked to the open habitat biotopes, though the undisturbed fluctuating marsh, interpreted as being remnant examples of lowland floodplain grassland, are important for supporting the Key Species. However, the estimated 10 ha of this grassland that is present within this compartment represents a tiny proportion of the available resource within the NCA and immediate vicinity, and is not evaluated to be in favourable conservation status. Whilst the rich flower resource is identified to be in favourable condition as mentioned in Section 5.1.2.2, it has poor discriminatory value in conservation terms and in combination with the open short sward's low PtT score, and lack of Key Species, the dominant habitat within this compartment has a reduced nature conservation value than the data suggests on first appraisal.

Whilst the presence of three Key Species meets Criterion 6S9.3 (Biron, 2010), some professional judgement is necessary. The Key Species occur in a habitat that represents a tiny proportion of the adjacent landscape's resource, It is possible that they occur in suitable habitat within the statutory site network approximately 3 km to the east but within a 2 km buffer of the compartment, the habitats are not statutorily protected for nature conservation. On balance, the habitat within the compartment is not essential to maintain these taxa's favourable conservation status, within the NCA or county, but they do make a substantial contribution more

locally. For all the reasons summarised above, it is justifiable to conclude that the habitats within this compartment are of **at least district nature conservation value** for their invertebrate assemblages.

5.2 LWS Network

5.2.1 Individual Species

Out of a total species list of 241, 11 Key Species (one being Near Threatened) but no Rare Key Species (based on Telfer, 2017) were recorded, representing 4.6 % and 0 % of the assemblage respectively. Both these proportions are substantially below the proposed threshold for national importance (Key Species (10 %) and Rare Key Species (1 %)).

Of the eleven Key Species, the ground-dwelling mesh-web weaver *Argenna subnigra* (Araneae, Dictynidae) is a rare species in Somerset, there being only one other record; and the weevil *Tanymecus palliatus* (Coleoptera, Curculionidae) is similarly scarce. The provisionally Nationally Scarce housefly *Hydrotaea pillipes* (Diptera, Muscidae) may be new to the county, but there is no national recording scheme for this family, so confidence on the comprehensiveness of distributional data available from reliable sources such as the NBN Atlas is low. However, whilst it may be under-recorded, it is not likely to be anything more than occasional in the county, in suitable habitat. Curson *et al*. (2019) state that in the absence of threatened or Nationally Rare taxa, the presence of Nationally Scarce species should only be considered if they are rare or new to the county. *A. subnigra* can be stated with certainty, to be rare in Somerset (administrative county) and vice-county, as can *T. palliatus* as it is a notable Somerset species (Large, 2000). *H. pillipes* is likely to be a genuinely scarce species in the county.

5.2.2 Habitat Assemblages

5.2.2.1 Landscape context

Puriton Rhynes and Ponds LWS supports *c*. 14 ha of floodplain grassland, a HoPI, based on the MAGIC website database. This represents just under 1 % of the resource within the immediate vicinity (i.e. within a 2 km buffer). The weevil, *T. palliatus* was recorded from this LWS. As previously discussed (Section 5.1.2.1), within the context of the wider landscape, floodplain grassland is an abundant resource and the component within the this compartment represents a tiny fraction of the resource available.

Puriton Meadows and Rail Spur LWS supports a mosaic of wet woodland, scrub and approximately 1.6 ha of what MAGIC identifies as 'good quality lowland semi-improved grassland', but has a general appearance similar to most of the other grasslands within the study site. From an invertebrate ecology perspective, the three fields are similar to the floodplain grassland, but with a more enclosed aspect, sheltered by the mature hedgerows and scrub. Within the wider landscape, there are scattered pockets of similar habitat, for example around Tadham Moor in the Brue Valley to the north-west and in some of the fields north-west of Puriton, about 0.9 km to the south-east of this LWS. The rare muscid fly, *H. pillipes* was recorded from this location, which is consistent with its ecology of wet grassland and tree-associated biotopes in close proximity. It is this feature that is probably of greatest relevance when considering the compartment's nature conservation value, and the LWS's contribution rather than the grasslands *per se*.

Based on the MAGIC database, there are approximately 97.3 ha of OMH within the NCA, though none within a 2 km buffer of the compartment. The OMH land parcels are fragmentary and range between just over 34 ha to 0.32 ha (n = 26), though two land parcels account for two-thirds of the resource and the rest are below 5 ha (the median area is 1.1 ha including the two largest land parcels). Whilst the area of OMH within the compartment is approximately twice the NCA average (median), and represents an additional 2.4% of the resource, it is a scarce and fragmentary resource and the invertebrate fauna recorded here is likely to have closer associations with free-draining habitats elsewhere within the immediate vicinity. The example in the study site, which is probably most closely associated with this characteristic is the calcareous (base-rich) grassland within Puriton Cowslip Meadow LWS, in addition to the disturbed vegetation communities present within the wider ROF Bridgwater site described in Section 5.1. Seven Key Species, including two Nationally Scarce spiders: *A. subnigra* and *Styloctetor compar* (Araneae, Linyphiidae); and the pot beetle *C. bipunctatus* amplifies the value of these habitats, which in combination with the pollinator species-richness, enhances the interest of the OMH and calcareous grassland disproportionately to their contribution to the NCA's resource.

5.2.2.2 Stenotopic Species

Following review of the number of stenotopic species recorded and the thresholds published in Drake *et al*. (2007), as conveyed in Table 11, the cross-cutting rich flower resource (F002) has exceeded the threshold

considered to represent FC status, which is dominated by pollinators such as bees and flies. However, as previously stated, cross-cutting SATs have a poor discriminatory value in nature conservation terms (Webb *et al*., 2018) and therefore, it requires other SATs to score highly to retain an evaluation of high nature conservation value. The two other short sward and bare ground habitat SATs (bare sand and chalk (F111) and open short sward SAT (F112)) both have a low PtT score (37 % and 31 % respectively) so whilst the OMH and calcareous grasslands have intrinsic interest, the rich flower resource exceedance is not sufficient to conclude an assemblage of high nature conservation value given the other low PtT scores.

Again, survey work missed the spring season (i.e. late April through to early May) and in combination with the very dry spring (see Section 1.3.2) was generally observed to have had a negative effect on insect activity, particularly pollinators, for reasons previously explained. As for the other compartments, had surveys been undertaken, they may have resulted in additional stenotopic species being recorded but given the low PtT scores, it is not thought likely that they would have been substantially closer to the threshold, but may have been closer.

Table 11: Invertebrate assemblage assessment for LWS Network.

Broad biotope	Habitat	SAT	No. of species	FC Threshold	Proportion to Threshold	Species with Conservation Status
Open habitats	Cross-cutting	F002: Rich flower resource	17	15	113%	
Open habitats	Cross-cutting	F001: Scrub edge	7	11	64%	1
Open habitats	Short sward & bare ground	F111: Bare sand & chalk	7	19	37%	2
Open habitats	Short sward & bare ground	F112: Open short sward	4	13	31%	3
Wetland	Running water	W125: Slow-flowing rivers	1	4	25%	
Open habitats	Cross-cutting	F003: Scrub-heath & moorland	2	9	22%	
Wetland	Peatland	W313: Moss & tussock fen	1	6	17%	
Tree-associated	Decaying wood	FA212: Bark & sapwood decay	3	19	16%	
Tree-associated	Decaying wood	A213: Fungal fruiting bodies	1	7	14%	
Wetland	Peatland	W314: Reed-fen & pools	1	11	9%	

5.2.3 Taxonomic Assemblages

Eleven Key Species across all LWSs were recorded in 2020 with each individual designated site supporting between two and five taxa. Applying the guidelines' criteria (refer back to Section 3.3.3.2), collectively, and individually (see Table 17; Appendix C) , the existing LWSs would meet the guidelines for LWS designation based on Criterion 6S9.3.

5.2.4 Conclusion

The invertebrate assemblage recorded within the compartment in 2020 includes eleven Key Species (one being Near Threatened and a SoPI), though none are a Rare Key Species. Of these, eight are considered to genuinely retain their nature conservation status and several are also rare in Somerset. The study site supports 38 stenotopic species, almost all linked to the open habitat biotopes. Twenty species are further evaluated to have an association with calcareous (or base-rich) grasslands, which in the context of the habitats within the compartment, include the Puriton Cowslip Field LWS and the OMH habitat within the Puriton Ash Ground LWS, which share similar edaphic conditions such as free draining substrates. Faunas associated with calcareous grasslands (or similar environments) are considered to potentially support assemblages of nature conservation value and this is the case here, as evidenced by the Nationally Scarce (and rare in Somerset) spider *Argenna subnigra*.

Consideration of OMH within the compartment, in the context of the NCA, suggests that whilst the habitat represents an additional 2.4 % of this resource, the extent present is about twice the median (i.e. 2.3 ha versus 1.1 ha). In combination with the calcareous grassland habitat, seven Key Species, including two Nationally Scarce spiders: *A. subnigra* and *Styloctetor compar*; and the pot beetle *C. bipunctatus* attests to the disproportionate value this habitat has, despite the relatively small proportion it represents within the NCA. This, in combination with the pollinator species-richness, enhances the interest of the OMH and calcareous grassland disproportionately to their contribution to the NCA's resource.

The presence of eleven Key Species meets Criterion 6S9.3 (Biron, 2010), which include Somerset rarities. Whilst they occur in habitats that represent a relatively small proportion of the adjacent landscape's resource, unlike the grasslands summed up in Section 5.1.4, several of these occur in OMH habitat (or similar) which is fragmentary and typically in substantially smaller land parcels within the NCA.

On balance, the habitats within the compartment are essential to maintain these taxa's favourable conservation status, within the NCA or county. For all the reasons summarised above, it is justifiable to conclude that the highlighted habitats within this compartment are of **county nature conservation value** for their invertebrate assemblages.

5.3 External Fields

5.3.1 Individual Species

Out of a total species list of 253, seven Key Species and one Rare Key Species (based on Telfer, 2017) were recorded, representing 2.8 % and 0.4 % of the assemblage respectively. Both these proportions are substantially below the proposed threshold for national importance (Key Species (10 %) and Rare Key Species (1 %)).

Of the seven Key Species, the Nationally Rare horsefly *Atylotus rusticus* was recorded (see Section 5.1.1 for details and some context). A further four taxa are genuinely Nationally Scarce, including a rove beetle associated with dead wood (*Hypnogyra angularis*) and a lesser housefly, *Fannia clara* (Diptera, Fanniidae), which is associated with bird's nests in woodland; neither of which are included in Large (2000) and would appear to be new county records based on the NBN Atlas.

5.3.2 Habitat Assemblages

5.3.2.1 Landscape context

As highlighted in Section 4.3.3, a substantial proportion of the invertebrate assemblage recorded within this compartment, was associated with wood decay, including the rove beetle *H. angularis*. Woodland within the NCA is a scarce resource, with approximately 1,181 ha present (all types), of which 141 ha is estimated to be ancient semi-natural woodland (Natural England, 2013), though there are no examples anywhere close to the compartment based on the MAGIC dataset. There is estimated, based on MAGIC, to be approximately 121 ha of traditional orchards within the NCA (including the 1.59 ha within the compartment), which are not described in detail in Natural England (2013), despite the recognition of the importance of this HoPI. Whilst ancient semi-natural woodland and traditional orchards are an indicator of wood decay resource, it is not exclusive to this habitat; mature hedgerows, scrub and within-field trees will also contain this habitat feature. However, for the purposes of landscape context, the presence of traditional orchards in the wider landscape is discussed below, taking in to consideration the presence of the mature hedgerows, scrub and additional features.

Within the immediate vicinity of the compartment (2 km buffer), there are approximately 15.53 ha of traditional orchard, including the 1.59 ha present within three fields in this compartment, and 121 ha within the NCA. The compartment's orchards therefore represent just over 10 % of the immediate, and 1.3 % of the NCA's resource. However, the average orchard within the NCA covers an area of 0.38 ha (within the buffer: 0.32 ha), thus the compartment's orchard is approximately four-times greater in area than the NCA and immediate vicinity. This is not a complete narrative on the wood decay resource availability as the mature hedgerows and scrub within the field network that is also present within the compartment (and within the ROF Bridgwater site) provides additional habitat. Nevertheless, it presents a contextual description of the potential availability and given the scarcity of tree-associated biotopes within the NCA and immediate vicinity, it amplifies the importance of this resource within the compartment.

5.3.2.2 Stenotopic Species

Following review of the number of stenotopic species recorded and the thresholds published in Drake *et al*. (2007), as conveyed in Table 12, the cross-cutting rich flower resource (F002) and scrub edge (F001) have exceeded the threshold considered to represent FC status. However, as they have a poor discriminatory value in nature conservation terms (Webb *et al*., 2018), it requires other SATs to score highly to retain an evaluation of high nature conservation value. It is therefore notable that the bark and sapwood decay (A212) SAT has a PtT score of 95 %. There are three other decaying wood SATS (A211: heartwood decay (50 %); A215: epiphyte fauna (30 %) and A213: fungal fruiting bodies (7 %)), which whilst scoring moderately (A211) to poor, support a narrative that the wood decay resource within the compartment is noteworthy.

Table 12: Invertebrate assemblage assessment for External Fields.

Broad biotope	Habitat	SAT	No. of species	FC Threshold	Proportion to Threshold	Species with conservation status
Open habitats	Cross-cutting	F001: Scrub edge	16	11	145%	
Open habitats	Cross-cutting	F002: Rich flower resource	15	15	100%	
Tree-associated	Decaying wood	A212: Bark & sapwood decay	18	19	95%	
Tree-associated	Decaying wood	A211: Heartwood decay	3	6	50%	
Tree-associated	Decaying wood	A215: Epiphyte fauna	1	3	33%	
Wetland	Peatland	W314: Reed-fen & pools	2	11	18%	1
Open habitats	Short sward & bare ground	F112: Open short sward	2	13	15%	1
Tree-associated	Decaying wood	A213: Fungal fruiting bodies	1	7	14%	

A second means by which the nature conservation value of wood decay (saproxylic) invertebrate faunas are the two systems have been devised for the relative assessment of site quality for nature conservation using saproxylic beetles: the Index of Ecological Continuity (revised in Alexander, 2004) and the Saproxylic Quality Index (Fowles, Alexander and Key, 1999).

5.3.2.2.1 Index of Ecological Continuity

The Index of Ecological Continuity (IEC) has been used to identify Britain's most important sites for the saproxylic invertebrates of ancient trees and wood-pasture and parkland type habitats, and a hierarchical site table has been developed. The Index calculation is based on the presence or absence of a select list of beetle species (major revision by Alexander, 2004, plus subsequent adjustments). The species are graded according to their degree of association with Britain's remaining areas of old growth, mainly the ancient wood pastures and historic parklands; and these grades are used as the basis for a scoring system. The total of these scores provides the Index.

The species in the qualifying list include many which are difficult to find on demand and so the Index is best built up over a number of years. Records from earlier recording therefore contribute to the Index. A control on old records is however imposed, with only post-1950 records being used in the calculation. All records have arisen during 2020 and so this control is not relevant here. The cumulative nature of the IEC means that the figure at any one time is a minimum figure; the Index can only increase as previously overlooked species are revealed.

Experience has suggested that sites of national importance have an IEC in the range of 25 – 80, while IEC values of 15 – 24 are of regional importance (Alexander, 2004). Sites in excess of 80 are considered to be of European significance.

The IEC value of the compartment is three, which clearly indicates a score of low British significance.

5.3.2.2.2 Saproxylic Quality Index

The Saproxylic Quality Index (SaQI) (Fowles, Alexander and Key, 1999) is designed to take the whole saproxylic beetle fauna into account and to include some control of recording effort. The species are scored according to the level of their national status and on a geometric scale: from 1 point for common species through to 32 points for the rarest. The total of these scores is termed the Saproxylic Quality Score and the SaQI is calculated by dividing this score by the number of qualifying saproxylic species recorded and then multiplying the result by one hundred.

The SaQI calculation has certain provisos:

- A threshold of 40 qualifying species have been recorded from the site;
- the list should be complete, i.e. include all qualifying species recorded during surveys; and
- the same attention should have been applied to recording common species as rare ones.

Fowles, Alexander and Key (1999) suggest that a SaQI of 500 is probably an appropriate threshold for assessing national importance.

The Saproxylic Quality Index for the compartment is based on twelve scoring species (see Table 13), which is below the minimum threshold of 40 species; so caution has to be applied in considering the SaQI score (derived by the sum of the SQI score divided by species-richness multiplied by 100).

Table 13: Saproxylic beetles recorded within External Fields in 2020.

Family	Saproxylic Species	Conservation Status	SQI Score	IEC Score
Staphylinidae	[21]*Hypnogyra angularis*	Nationally Scarce (Na)	16	2
Anobiidae	*Anobium punctatum*	Common	1	0
Anobiidae	*Ptilinus pectinicornis*	Common	1	0
Cryptophagidae	*Cryptophagus dentatus*	Unknown	1	0
Erotylidae	*Triplax russica*	Local	4	1
Salpingidae	*Salpingus planirostris*	Common	1	0
Cerambycidae	*Grammoptera ruficornis*	Common	1	0
Cerambycidae	*Pogonocherus hispidulus*	Local	2	0
Cerambycidae	*Pogonocherus hispidus*	Local	2	0
Cerambycidae	*Tetrops praeustus*	Local	2	0
Curculionidae	*Scolytus multistriatus*	Common	1	0
Curculionidae	*Scolytus rugulosus*	Local	2	0

Fowles, Alexander and Key (1999) suggest that a SaQI of 500 is probably an appropriate threshold for assessing national importance with 590 for international importance. The 2020 survey resulted in a SaQI of 283 which is substantially below the level for national significance. However, the SaQI was derived from only a dozen species and survey effort using FITs was restricted to a single period between the 9th June and 7th July 2020 so an element of caution should be applied.

5.3.3 Taxonomic Assemblages

Seven Key Species (one of which is a Rare Key Species) were recorded in 2020. Applying the non-statutory site guidelines' criteria (refer back to Section 3.3.3.2), the compartment would meet the guidelines for LWS designation based on Criterion 6S9.3.

Whilst the IEC score of three is below the threshold given in Criterion 6S9.4 of > 15 in Biron (2010), this likely down to survey effort, rather than a genuine reflection of the compartment's true value for saproxylic

[21] As *Xantholinus angularis* in Fowles, Alexander and Key (1999).

invertebrates. FITs were only active for a short period in summer, when a prolonged survey between spring and autumn would have likely resulted in further saproxylic species with IEC scores being recorded. As the IEC score for a site is a cumulative score, it is anticipated that further appropriate survey effort would potentially come close to the threshold for LWS designation.

5.3.4 Conclusion

The invertebrate assemblage recorded within the compartment in 2020 includes seven Key Species (one a Rare Key Species). The study site supports 50stenotopic species, of which around half are associated with the decaying wood habitat and 25 are associated with open habitat biotopes. A dozen species of saproxylic beetles were recorded, including the Nationally Scarce rove beetle *Hypnogyra angularis*, which is almost certainly an underestimate, influenced by the FIT survey effort targeting three apple trees in the orchard. The correct approach to assessment is therefore to recognise that species numbers would be higher. Habitats supporting high quality wood decay such as ancient semi-natural woodland and traditional orchards are rare (ancient woodland), or scattered and fragmentary (orchards) within the NCA, thus whilst the habitat represents 1.3 % of the NCA's total resource, the extent present (1.59 ha) is about four-times the average orchard area (0.38 ha). Furthermore, within a 2 km buffer, the resource within the compartment represents about 10 % available in the vicinity. This presence of wood decay habitat within the hedgerow network and scrub will add to the nature conservation value of this resource, which, if further survey is undertaken, is likely to result in additional saproxylic stenotopic and Key Species, possibly raising the nature conservation value above what the current data suggests.

The presence of seven Key Species meets Criterion 6S9.3 (Biron, 2010), which include Somerset rarities, and whilst Criterion 6S9.4 is not met, it is evaluated that if further survey effort is undertaken, the IEC score will increase from three to closer to 15.

On balance, the habitats within the compartment are essential to maintain these taxa's favourable conservation status, within the NCA or county. For all the reasons summarised above, it is justifiable to conclude that the orchard, including the mature hedgerows and adjacent fields support an invertebrate assemblage of **at least county nature conservation value**.

6 Recommendations and Mitigation Principles

6.1 Recommendations

Nine survey visits were completed between mid-May and mid-September 2020 and material collected by various methods was obtained from representative broad biotopes and habitats within the study site. For the purposes of evaluation, the study site has been divided in to three compartments and the data analysed, concluding that they are of at least district (non-designated habitats within the former ROF) or at least county (LWS Network and External Fields) nature conservation value for their terrestrial invertebrate assemblages.

Consideration has been given to whether further survey effort is proportionate and justifiable to inform the Local Development Order (LDO) even having considered the constraints described in Section 1.3 and the limiting factors in to account; or whether as a consequence of the results, further, more specialist survey work such as deployment of FITs, would substantially alter the evaluation's conclusions: for example, raising the nature conservation value of a habitat or feature such that this could require additional or alternative mitigation, including avoidance.

Survey work applying general methods (aerial netting, sweeping the field layer, vacuum sampling ground vegetation and direct observation) has resulted in a total of 565 species (20 Key Species) which is a diverse assemblage. This has been supplemented by some limited targeted static trapping (pitfall traps within the Puriton Ash Ground LWS, a Malaise trap set on the edge of scrub within non-designated habitat of the former ROF, and three FITs attached to apple trees within the orchard). This effort has been sufficient for the purposes of evaluating the nature conservation value of the broad biotopes and habitats within the study site's compartments **and** on the understanding that key habitats including mature scrub, hedgerows and orchard will be maintained, including but not limited to no direct habitat loss, no further survey or assessment work is justified.

However, where habitats are to be directly affected, through habitat loss or alteration; or through meaningful indirect effects such as changes to nocturnal lux levels through inappropriate external lighting, then further survey work *may be* justified. On this point, the loss of the orchard's integrity, either in whole, or in part will result in a not insubstantial loss of an important and specific dead wood resource, that cannot be straightforwardly replaced. Log piles or other artificial dead wood provision will not necessarily recreate the specific conditions for the relevant fungi to develop; and it is this process, which breaks down the woody material, which provides the specialist habitat that saproxylic invertebrates, and particularly those with IEC scores, require.

Therefore, whilst survey effort has been sufficient to understand the nature conservation value for the purposes of the currently understood proposed development footprint, it is recommended that if this changes and has the potential to result in further losses to those habitats of heightened value, including, but not limited to the orchard, negatively affecting ecological integrity, the requirement for further survey and assessment should be reviewed.

6.2 Mitigation Principles

The following mitigation principles are provided for the purposes of informing the design and assumes no further survey work is required (see above).

The survey work has identified that the OMH within Puriton Ash Ground LWS and the disturbed vegetation communities elsewhere within the former ROF share similar features such as bare ground, rich flower resource, topographic and vegetation structural diversity. Whilst the LWS's integrity is currently understood to be protected, the disturbed vegetation communities will inevitably be lost to the development. These disturbed vegetation communities are temporary in nature and a 'do nothing' approach would result in their eventual loss to less diverse habitats such as tall, species-poor grasslands. Thus, there is a development-led opportunity to recreate and retain these habitats within the intended greenspace provision and advantageously, extend the existing Puriton Ash Ground LWS by doing so within land on the former ROF's south-western and western boundary; linking with the Gravity Link Road embankment/ verge. By recreating this habitat in the boundary space of the proposed development, it increases the LWS's resilience and provides a substantial biodiverse

corridor for pollinators that supports national (Defra, 2014) and Somerset pollinator policies (Somerset County Council, 2018), it has the potential to meet or possibly exceed Biodiversity Net Gain targets which will become a legal obligation though planning law, with the added potential benefit of reduced soft estate management. Details will be provided in a separate landscape and ecological management plan (or similar document) but it is sufficient to state here that there will be a requirement to reflect existing conditions with a varied topography, bare ground and a dominant rich flower resource. By reducing the grass cover, this will likely reduce mowing rates and volume of arisings (cut material) from being disposed.

The grassland communities in the non-designated habitats within the former ROF are interpreted as being remnant examples of floodplain grassland, which also occur in the External Fields. These grasslands support invertebrate faunas that are associated with periodic inundation and which then slowly dry out during the late spring and summer. A similar habitat could be created through careful design of Sustainable Urban Drainage Systems or swales which could accommodate excessive rainfall, with some areas over-deepened to provide more permanent wetlands. Appropriate locations within the ROF's eastern boundary would create linkages with similar habitat to the east (towards the orchard) and the Puriton Rhynes and Pond LWS.

Finally, the importance of the wood decay resource within the orchard and mature hedgerows has been discussed above. Consideration to extend the orchard by planting appropriate varieties of apple trees, including consideration of heritage varieties native to Somerset, to provide future resilience to the orchard habitat would enhance the pollinator resource and integrate the biological value with this aspect of Somerset's cultural heritage.

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A. Appendix A: Recording Effort in 2020.

Figure 1: Indicative sampling locations and transects walked (May to September 2020).

B. Appendix B: Nature Conservation Status Categories (Definitions)

Introduction

The up to date status of species of conservation concern have been taken from Pantheon, the web-based analytical package maintained by the national biological records centre and developed by Webb *et al*. (2018) but reference to the various published Species Status Reviews; and the [22]Joint Nature Conservation Committee database of species designations has been undertaken where the author is aware there might be a discrepancy. However, no guarantee is given that this has been entirely comprehensive and reliance has largely been placed on Pantheon#s accuracy.

Great Britain Rarity Status

Nationally Rare (NR) species are those that have been recently reassessed and are roughly equivalent to the old Red Data Book categories. These are defined as occurring in 15 or fewer hectads (10 km Ordnance Survey grid squares) and where there is reasonable confidence that intensive recording effort won't increase the number of hectads above 15.

Nationally Scarce (NS) species are those that are not NR and which have not been recorded in more than 100 hectads, and where there is reasonable confidence that intensive recording effort won't increase the number of hectads above 100.

Where taxa have yet to be reassessed under the Species Status Reviews, they formally retain their status based on historical reviews, which may date back to the late 1980s or early 1990s. These status' should be treated with caution as it is likely a significant proportion are no longer accurate, either due to a better understanding of their ecology, or have subsequently spread due to climate change or other amenable factors (e.g. they are more frequent and no longer deserve a nature conservation status); or they have declined; and may merit upgrading to a threat category.

Nationally Notable - species recorded, or likely to be restricted to 16 - 100 hectads in Britain. Historically, for some better recorded invertebrate taxa, they were further divided between Notable-A (Na) for species thought to occur in 30 or fewer hectads, and Notable-B (Nb) for those thought to occur between 31-100 hectads. These are referred to as Nationally Scarce (Na), or Nationally Scarce (Nb). Within Pantheon, some status' have been placed in square brackets, e.g. [Nationally Scarce (Nb)]. This denotes that in the professional judgement of the specialists (Webb et. al., 2018), this status is unreliable, but they have not been formally assessed against up to date criteria. The species are included in the relevant table in this report for the avoidance of doubt.

Red Data Book (RDB) species –species occurring in fewer than 16 10-km squares of the National Grid, divided as:

RDB 1: Endangered - for species known from a single population or in continuous recent decline and now known from five or fewer 10-km squares;

RDB 2: Vulnerable - likely to become endangered (RDB 1) if causal factors continue;

RDB 3: Rare: - species at risk but not qualifying as vulnerable; and

RDB K: Insufficiently Known - species likely to qualify at least as rare.

UK Biodiversity Action Planning

Species of Principal Importance as listed in Section 41 of the National Environment and Rural Communities Act, 2006. These are abbreviated as NERC-S41. Approximately 70 species of moth have been included in a list which proposes 'for Research only'; a frequently encountered example is the cinnabar (Tyria jacobaeae). These are widespread species which are believed to have experienced a decline and have been included to enable funding to be allocated for research. These species have not been included in Table 7.

[22] Joint Nature Conservation Committee, http://jncc.defra.gov.uk/page-3408

UK Legal Protection

Approximately 50 species of invertebrate species in Britain receive legal protection through Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). About half receive limited protection; for example it is illegal to sell, or advertise for sale, a number of butterfly species. The remaining 28 species are more strictly protected, for example it is an offence to take or kill specimens without an appropriate licence. These species are generally extremely rare, restricted to a few, or a single site and none are likely to occur anywhere in the region.

IUCN Threat Categories

In recent years, invertebrate taxa in Great Britain have been assessed against the International Union for the Conservation of Nature's (IUCN) threat criteria that considers factors influencing a species survival. These include population decline or geographic contraction through habitat loss. These assessments are ongoing as part of the Species Status Reviews, overseen by the Joint Nature Conservation Committee and mostly published by Natural England. The criteria are defined by the IUCN, which places an assessed taxon in one of seven categories from Extinct down to Least Concern, based on one of the five main criteria. The following categories are defined as Threatened (Red List):

Critically Endangered (CR): A taxon is Critically Endangered when the best available evidence indicates that it is considered to be facing an extremely high risk of extinction in the wild.

Endangered (EN): A taxon is Endangered when the best available evidence indicates that it is considered to be facing a very high risk of extinction in the wild.

Vulnerable (VU): A taxon is Vulnerable when the best available evidence indicates that it is considered to be facing a high risk of extinction in the wild.

A further category, Near Threatened (NT), is applied to a taxon, which following assessment, came close to, but failed to qualify as a Threatened species. However, it is considered that if the factors influencing its assessment continue, it is likely to move in to one of the threat categories; and thus it acts as a watching brief.

C. Appendix C: Species Lists

Table 14: Species recorded within the study site's compartments, ROF Bridgwater, Puriton during 2020.

Class	Order	Family	Species	Vernacular	National Status	LWS Network	ROF Bridgwater (Outwith LWS)	External Fields	ROF Bridgwater
Arachnida	Araneae	Theridiidae	*Theridion pictum*				x	x	x
Arachnida	Araneae	Theridiidae	*Theridion varians*					x	
Arachnida	Araneae	Theridiidae	*Neottiura bimaculata*			x			x
Arachnida	Araneae	Theridiidae	*Paidiscura pallens*					x	
Arachnida	Araneae	Theridiidae	*Enoplognatha latimana*			x			x
Arachnida	Araneae	Theridiidae	*Enoplognatha thoracica*			x			x
Arachnida	Araneae	Linyphiidae	*Ceratinella brevipes*				x		x
Arachnida	Araneae	Linyphiidae	*Walckenaeria antica*				x		x
Arachnida	Araneae	Linyphiidae	*Dicymbium nigrum*				x		x
Arachnida	Araneae	Linyphiidae	*Pocadicnemis pumila sens. str.*			x			x
Arachnida	Araneae	Linyphiidae	*Pocadicnemis juncea*			x	x		x
Arachnida	Araneae	Linyphiidae	*Oedothorax retusus*			x	x		x
Arachnida	Araneae	Linyphiidae	*Cnephalocotes obscurus*			x	x		x
Arachnida	Araneae	Linyphiidae	*Styloctetor compar*		Nationally Scarce	x			x
Arachnida	Araneae	Linyphiidae	*Micrargus subaequalis*			x			x
Arachnida	Araneae	Linyphiidae	*Erigone dentipalpis*			x			x
Arachnida	Araneae	Linyphiidae	*Agyneta rurestris*				x		x
Arachnida	Araneae	Linyphiidae	*Agyneta saxatilis sens. str.*			x			x
Arachnida	Araneae	Linyphiidae	*Agyneta affinis*			x			x
Arachnida	Araneae	Linyphiidae	*Bathyphantes gracilis*			x	x	x	x
Arachnida	Araneae	Linyphiidae	*Bathyphantes parvulus*			x			x
Arachnida	Araneae	Linyphiidae	*Tenuiphantes tenuis*			x			x
Arachnida	Araneae	Linyphiidae	*Tenuiphantes mengei*				x		x
Arachnida	Araneae	Linyphiidae	*Microlinyphia pusilla*			x	x		x
Arachnida	Araneae	Tetragnathidae	*Tetragnatha extensa*					x	
Arachnida	Araneae	Tetragnathidae	*Pachygnatha degeeri*			x	x		x
Arachnida	Araneae	Araneidae	*Gibbaranea gibbosa*					x	
Arachnida	Araneae	Araneidae	*Araneus diadematus*	Garden Spider			x		x
Arachnida	Araneae	Araneidae	*Araneus quadratus*				x		x
Arachnida	Araneae	Araneidae	*Larinioides cornutus*				x	x	x
Arachnida	Araneae	Lycosidae	*Pardosa monticola*			x			x
Arachnida	Araneae	Lycosidae	*Pardosa palustris*			x			x
Arachnida	Araneae	Lycosidae	*Pardosa pullata*			x	x		x
Arachnida	Araneae	Lycosidae	*Pardosa prativaga*			x			x
Arachnida	Araneae	Lycosidae	*Pardosa tenuipes*			x		x	x
Arachnida	Araneae	Lycosidae	*Alopecosa pulverulenta*			x			x

Class	Order	Family	Species	Vernacular	National Status	LWS Network	ROF Bridgwater (Outwith LWS)	External Fields	ROF Bridgwater
Arachnida	Araneae	Lycosidae	*Piratula latitans*				x		x
Arachnida	Araneae	Pisauridae	*Pisaura mirabilis*					x	
Arachnida	Araneae	Agelenidae	*Agelena labyrinthica*					x	
Arachnida	Araneae	Hahniidae	*Hahnia nava*			x			x
Arachnida	Araneae	Dictynidae	*Dictyna arundinacea*			x	x		x
Arachnida	Araneae	Dictynidae	*Dictyna uncinata*				x	x	x
Arachnida	Araneae	Dictynidae	*Lathys humilis*					x	
Arachnida	Araneae	Dictynidae	*Argenna subnigra*		Nationally Scarce	x			x
Arachnida	Araneae	Phrurolithidae	*Phrurolithus festivus*			x			x
Arachnida	Araneae	Clubionidae	*Clubiona reclusa*				x		x
Arachnida	Araneae	Clubionidae	*Clubiona neglecta sens. str.*			x	x		x
Arachnida	Araneae	Clubionidae	*Clubiona lutescens*				x		x
Arachnida	Araneae	Gnaphosidae	*Zelotes latreillei*			x			x
Arachnida	Araneae	Philodromidae	*Philodromus cespitum*				x		x
Arachnida	Araneae	Philodromidae	*Philodromus albidus*					x	
Arachnida	Araneae	Thomisidae	*Xysticus cristatus*			x	x		x
Arachnida	Araneae	Thomisidae	*Xysticus kochi*				x		x
Arachnida	Araneae	Thomisidae	*Ozyptila simplex*			x			x
Arachnida	Araneae	Salticidae	*Heliophanus flavipes*			x			x
Arachnida	Araneae	Salticidae	*Euophrys frontalis*			x			x
Arachnida	Araneae	Salticidae	*Talavera aequipes*			x			x
Arachnida	Opiliones	Leiobunidae	*Leiobunum rotundum*					x	
Insecta	Coleoptera	Carabidae	*Nebria brevicollis*			x			x
Insecta	Coleoptera	Carabidae	*Bembidion guttula*			x			x
Insecta	Coleoptera	Carabidae	*Pterostichus madidus*			x			x
Insecta	Coleoptera	Carabidae	*Calathus fuscipes*			x			x
Insecta	Coleoptera	Carabidae	*Oxypselaphus obscurus*			x			x
Insecta	Coleoptera	Carabidae	*Amara aenea*			x			x
Insecta	Coleoptera	Carabidae	*Amara communis*			x			x
Insecta	Coleoptera	Carabidae	*Amara convexior*			x			x
Insecta	Coleoptera	Carabidae	*Amara lunicollis*			x			x
Insecta	Coleoptera	Carabidae	*Amara ovata*			x			x
Insecta	Coleoptera	Carabidae	*Amara similata*					x	
Insecta	Coleoptera	Carabidae	*Amara tibialis*			x			x
Insecta	Coleoptera	Carabidae	*Curtonotus aulicus*				x		x
Insecta	Coleoptera	Carabidae	*Harpalus affinis*			x			x
Insecta	Coleoptera	Carabidae	*Harpalus rufipes*			x			x

Class	Order	Family	Species	Vernacular	National Status	LWS Network	ROF Bridgwater (Outwith LWS)	External Fields	ROF Bridgwater
Insecta	Coleoptera	Carabidae	*Acupalpus dubius*				x		x
Insecta	Coleoptera	Carabidae	*Acupalpus exiguus*		Nationally Scarce		x		x
Insecta	Coleoptera	Carabidae	*Badister bullatus*			x			x
Insecta	Coleoptera	Carabidae	*Demetrias atricapillus*			x			x
Insecta	Coleoptera	Carabidae	*Paradromius linearis*			x	x		x
Insecta	Coleoptera	Carabidae	*Calodromius spilotus*					x	
Insecta	Coleoptera	Carabidae	*Philorhizus melanocephalus*			x			x
Insecta	Coleoptera	Carabidae	*Syntomus foveatus*			x			x
Insecta	Coleoptera	Carabidae	*Syntomus obscuroguttatus*			x	x		x
Insecta	Coleoptera	Carabidae	*Microlestes minutulus*			x			x
Insecta	Coleoptera	Helophoridae	*Helophorus grandis*				x		x
Insecta	Coleoptera	Staphylinidae	*Tachyporus dispar*			x	x		x
Insecta	Coleoptera	Staphylinidae	*Tachyporus formosus*		Nationally Scarce		x		x
Insecta	Coleoptera	Staphylinidae	*Tachyporus hypnorum*			x	x	x	x
Insecta	Coleoptera	Staphylinidae	*Tachyporus nitidulus*			x		x	x
Insecta	Coleoptera	Staphylinidae	*Tachyporus solutus*			x			x
Insecta	Coleoptera	Staphylinidae	*Tachinus rufipes*			x			x
Insecta	Coleoptera	Staphylinidae	*Haploglossa villosula*					x	
Insecta	Coleoptera	Staphylinidae	*Aloconota gregaria*					x	
Insecta	Coleoptera	Staphylinidae	*Amischa analis*				x		x
Insecta	Coleoptera	Staphylinidae	*Mocyta fungi*			x			x
Insecta	Coleoptera	Staphylinidae	*Aleochara bipustulata*			x	x		x
Insecta	Coleoptera	Staphylinidae	*Drusilla canaliculata*			x			x
Insecta	Coleoptera	Staphylinidae	*Cypha longicornis*			x			x
Insecta	Coleoptera	Staphylinidae	*Platystethus nitens*				x		x
Insecta	Coleoptera	Staphylinidae	*Anotylus tetracarinatus*					x	
Insecta	Coleoptera	Staphylinidae	*Stenus fulvicornis*			x	x		x
Insecta	Coleoptera	Staphylinidae	*Stenus latifrons*			x			x
Insecta	Coleoptera	Staphylinidae	*Stenus similis*			x	x		x
Insecta	Coleoptera	Staphylinidae	*Stenus picipes*				x		x
Insecta	Coleoptera	Staphylinidae	*Stenus aceris*			x			x
Insecta	Coleoptera	Staphylinidae	*Stenus ossium*			x	x		x
Insecta	Coleoptera	Staphylinidae	*Stenus palustris*		Nationally Scarce (Nb)	x			x
Insecta	Coleoptera	Staphylinidae	*Paederus littoralis*			x	x		x
Insecta	Coleoptera	Staphylinidae	*Paederus riparius*			x			x
Insecta	Coleoptera	Staphylinidae	*Astenus lyonessius*				x		x
Insecta	Coleoptera	Staphylinidae	*Philonthus cognatus*				x		x

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Insecta	Coleoptera	Staphylinidae	*Ocypus aeneocephalus*			x			x
Insecta	Coleoptera	Staphylinidae	*Tasgius globulifer*			x			x
Insecta	Coleoptera	Staphylinidae	*Quedius cruentus*					x	
Insecta	Coleoptera	Staphylinidae	*Quedius schatzmayri*			x			x
Insecta	Coleoptera	Staphylinidae	*Hypnogyra angularis*		Nationally Scarce (Na)			x	
Insecta	Coleoptera	Staphylinidae	*Xantholinus linearis*			x			x
Insecta	Coleoptera	Scarabaeidae	*Onthophagus joannae*			x			x
Insecta	Coleoptera	Scirtidae	*Microcara testacea*			x			x
Insecta	Coleoptera	Scirtidae	*Cyphon coarctatus*			x	x	x	x
Insecta	Coleoptera	Elateridae	*Agrypnus murinus*			x		x	x
Insecta	Coleoptera	Elateridae	*Athous bicolor*			x			x
Insecta	Coleoptera	Elateridae	*Agriotes sputator*			x		x	x
Insecta	Coleoptera	Cantharidae	*Cantharis lateralis*			x	x	x	x
Insecta	Coleoptera	Cantharidae	*Cantharis flavilabris*			x	x	x	x
Insecta	Coleoptera	Cantharidae	*Cantharis rufa*			x	x	x	x
Insecta	Coleoptera	Cantharidae	*Cantharis rustica*					x	
Insecta	Coleoptera	Cantharidae	*Rhagonycha fulva*			x	x	x	x
Insecta	Coleoptera	Anobiidae	*Anobium punctatum*	Woodworm				x	
Insecta	Coleoptera	Anobiidae	*Ptilinus pectinicornis*	Fan-bearing Wood-borer				x	
Insecta	Coleoptera	Malachiidae	*Cordylepherus viridis*				x		x
Insecta	Coleoptera	Kateretidae	*Brachypterus glaber*			x		x	x
Insecta	Coleoptera	Kateretidae	*Brachypterus urticae*	Nettle Pollen Beetle		x			x
Insecta	Coleoptera	Nitidulidae	*Epuraea aestiva*					x	
Insecta	Coleoptera	Nitidulidae	*Meligethes flavimanus*					x	
Insecta	Coleoptera	Nitidulidae	*Meligethes nigrescens*					x	
Insecta	Coleoptera	Silvanidae	*Psammoecus bipunctatus*			x			x
Insecta	Coleoptera	Phalacridae	*Phalacrus caricis*				x		x
Insecta	Coleoptera	Phalacridae	*Olibrus aeneus*					x	
Insecta	Coleoptera	Cryptophagidae	*Cryptophagus dentatus*					x	
Insecta	Coleoptera	Cryptophagidae	*Atomaria gutta*			x			x
Insecta	Coleoptera	Cryptophagidae	*Atomaria rubella*			x			x
Insecta	Coleoptera	Erotylidae	*Triplax russica*					x	
Insecta	Coleoptera	Coccinellidae	*Rhyzobius litura*			x	x		x
Insecta	Coleoptera	Coccinellidae	*Psyllobora vigintiduopunctata*	22-spot Ladybird			x		x
Insecta	Coleoptera	Coccinellidae	*Propylea quattuordecimpunctata*	14-spot Ladybird			x	x	x
Insecta	Coleoptera	Coccinellidae	*Adalia bipunctata*	2-spot Ladybird				x	
Insecta	Coleoptera	Coccinellidae	*Coccinella septempunctata*	7-spot Ladybird		x	x	x	x

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Insecta	Coleoptera	Coccinellidae	*Tytthaspis sedecimpunctata*	16-spot Ladybird		x	x	x	x
Insecta	Coleoptera	Coccinellidae	*Subcoccinella vigintiquattuorpunctata*	24-spot Ladybird		x			x
Insecta	Coleoptera	Latridiidae	*Enicmus transversus*			x			x
Insecta	Coleoptera	Latridiidae	*Corticaria impressa*			x			x
Insecta	Coleoptera	Latridiidae	*Melanophthalma suturalis*			x			x
Insecta	Coleoptera	Latridiidae	*Cortinicara gibbosa*					x	
Insecta	Coleoptera	Oedemeridae	*Oedemera nobilis*	Swollen-thighed Beetle		x	x	x	x
Insecta	Coleoptera	Oedemeridae	*Oedemera lurida*			x			x
Insecta	Coleoptera	Salpingidae	*Salpingus planirostris*					x	
Insecta	Coleoptera	Scraptiidae	*Anaspis garneysi*					x	
Insecta	Coleoptera	Scraptiidae	*Anaspis maculata*					x	
Insecta	Coleoptera	Cerambycidae	*Grammoptera ruficornis*					x	
Insecta	Coleoptera	Cerambycidae	*Pogonocherus hispidulus*					x	
Insecta	Coleoptera	Cerambycidae	*Pogonocherus hispidus*					x	
Insecta	Coleoptera	Cerambycidae	*Leiopus linnei*					x	
Insecta	Coleoptera	Cerambycidae	*Tetrops praeustus*					x	
Insecta	Coleoptera	Chrysomelidae	*Bruchus loti*					x	
Insecta	Coleoptera	Chrysomelidae	*Bruchus rufimanus*	Bean Beetle				x	
Insecta	Coleoptera	Chrysomelidae	*Phyllotreta undulata*				x		x
Insecta	Coleoptera	Chrysomelidae	*Longitarsus dorsalis*			x			x
Insecta	Coleoptera	Chrysomelidae	*Longitarsus luridus*					x	
Insecta	Coleoptera	Chrysomelidae	*Longitarsus lycopi*		Nationally Scarce (Nb)			x	
Insecta	Coleoptera	Chrysomelidae	*Longitarsus parvulus*				x		x
Insecta	Coleoptera	Chrysomelidae	*Neocrepidodera ferruginea*			x			x
Insecta	Coleoptera	Chrysomelidae	*Neocrepidodera transversa*			x	x		x
Insecta	Coleoptera	Chrysomelidae	*Crepidodera plutus*				x	x	x
Insecta	Coleoptera	Chrysomelidae	*Chaetocnema arida*			x			x
Insecta	Coleoptera	Chrysomelidae	*Chaetocnema hortensis*			x	x	x	x
Insecta	Coleoptera	Chrysomelidae	*Sphaeroderma testaceum*				x		x
Insecta	Coleoptera	Chrysomelidae	*Cryptocephalus bipunctatus*		Nationally Scarce	x			x
Insecta	Coleoptera	Rhynchitidae	*Involvulus caeruleus*	Apple Twig Cutter				x	
Insecta	Coleoptera	Rhynchitidae	*Neocoenorrhinus aequatus*	Apple Fruit Rhynchites				x	
Insecta	Coleoptera	Apionidae	*Ceratapion gibbirostre*				x	x	x
Insecta	Coleoptera	Apionidae	*Diplapion stolidum*		Nationally Scarce (Nb)	x			x
Insecta	Coleoptera	Apionidae	*Protapion assimile*			x			x
Insecta	Coleoptera	Apionidae	*Protapion fulvipes*	White Clover Seed Weevil			x		x
Insecta	Coleoptera	Apionidae	*Protapion trifolii*					x	

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Insecta	Coleoptera	Apionidae	*Apion frumentarium*				x		x
Insecta	Coleoptera	Apionidae	*Ischnopterapion loti*			x			x
Insecta	Coleoptera	Apionidae	*Oxystoma cerdo*		[Nationally Scarce (Nb)]		x		x
Insecta	Coleoptera	Apionidae	*Oxystoma pomonae*			x	x	x	x
Insecta	Coleoptera	Curculionidae	*Otiorhynchus ovatus*			x			x
Insecta	Coleoptera	Curculionidae	*Phyllobius roboretanus*	Small Green Nettle Weevil		x			x
Insecta	Coleoptera	Curculionidae	*Barypeithes pellucidus*			x			x
Insecta	Coleoptera	Curculionidae	*Sciaphilus asperatus*	Strawberry Root Weevil		x			x
Insecta	Coleoptera	Curculionidae	*Tanymecus palliatus*		Nationally Scarce (Nb)	x			x
Insecta	Coleoptera	Curculionidae	*Sitona lineatus*			x	x		x
Insecta	Coleoptera	Curculionidae	*Sitona suturalis*					x	
Insecta	Coleoptera	Curculionidae	*Larinus planus*		[Nationally Scarce (Nb)]	x	x		x
Insecta	Coleoptera	Curculionidae	*Hypera postica*	Clover Leaf Weevil				x	
Insecta	Coleoptera	Curculionidae	*Hypera zoilus*			x			x
Insecta	Coleoptera	Curculionidae	*Hypera rumicis*					x	
Insecta	Coleoptera	Curculionidae	*Euophryum confine*					x	
Insecta	Coleoptera	Curculionidae	*Microplontus rugulosus*					x	
Insecta	Coleoptera	Curculionidae	*Ceutorhynchus typhae*					x	
Insecta	Coleoptera	Curculionidae	*Anthonomus rubi*	Strawberry Blossom Weevil		x		x	x
Insecta	Coleoptera	Curculionidae	*Scolytus multistriatus*	Small Elm Bark Beetle				x	
Insecta	Coleoptera	Curculionidae	*Scolytus rugulosus*	Fruit Bark Beetle				x	
Insecta	Diptera	Tipulidae	*Nephrotoma quadrifaria*				x	x	x
Insecta	Diptera	Tipulidae	*Tipula fascipennis*				x	x	x
Insecta	Diptera	Tipulidae	*Tipula vernalis*					x	
Insecta	Diptera	Limoniidae	*Phylidorea ferruginea*			x	x		x
Insecta	Diptera	Bibionidae	*Dilophus febrilis*				x		x
Insecta	Diptera	Anisopodidae	*Sylvicola punctatus*			x	x	x	x
Insecta	Diptera	Ptychopteridae	*Ptychoptera contaminata*			x			x
Insecta	Diptera	Rhagionidae	*Chrysopilus cristatus*			x		x	x
Insecta	Diptera	Rhagionidae	*Rhagio scolopaceus*				x	x	x
Insecta	Diptera	Tabanidae	*Haematopota crassicornis*			x			x
Insecta	Diptera	Tabanidae	*Haematopota pluvialis*			x	x		x
Insecta	Diptera	Tabanidae	*Atylotus rusticus*		Nationally Rare		x	x	x
Insecta	Diptera	Xylomyidae	*Solva marginata*				x		x
Insecta	Diptera	Stratiomyidae	*Beris clavipes*		Nationally Scarce			x	
Insecta	Diptera	Stratiomyidae	*Nemotelus notatus*			x	x	x	x
Insecta	Diptera	Stratiomyidae	*Nemotelus pantherinus*				x	x	x

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Insecta	Diptera	Stratiomyidae	*Nemotelus uliginosus*			x			x
Insecta	Diptera	Stratiomyidae	*Pachygaster leachii*					x	
Insecta	Diptera	Stratiomyidae	*Chloromyia formosa*			x		x	x
Insecta	Diptera	Stratiomyidae	*Microchrysa flavicornis*					x	
Insecta	Diptera	Stratiomyidae	*Oplodontha viridula*					x	
Insecta	Diptera	Asilidae	*Leptogaster cylindrica*			x	x	x	x
Insecta	Diptera	Hybotidae	*Bicellaria vana*				x		x
Insecta	Diptera	Empididae	*Empis tessellata*					x	
Insecta	Diptera	Empididae	*Empis livida*			x	x		x
Insecta	Diptera	Empididae	*Empis opaca*					x	
Insecta	Diptera	Empididae	*Empis lutea*				x		x
Insecta	Diptera	Empididae	*Empis scutellata*					x	
Insecta	Diptera	Empididae	*Hilara anglodanica*					x	
Insecta	Diptera	Empididae	*Rhamphomyia crassirostris*					x	
Insecta	Diptera	Dolichopodidae	*Chrysotus gramineus*				x		x
Insecta	Diptera	Dolichopodidae	*Dolichopus festivus*			x	x	x	x
Insecta	Diptera	Dolichopodidae	*Dolichopus griseipennis*			x	x	x	x
Insecta	Diptera	Dolichopodidae	*Dolichopus trivialis*			x	x	x	x
Insecta	Diptera	Dolichopodidae	*Poecilobothrus nobilitatus*			x	x	x	x
Insecta	Diptera	Dolichopodidae	*Scellus notatus*					x	
Insecta	Diptera	Dolichopodidae	*Sciapus platypterus*				x		x
Insecta	Diptera	Syrphidae	*Melanostoma mellinum*	a hoverfly		x	x	x	x
Insecta	Diptera	Syrphidae	*Melanostoma scalare*	a hoverfly		x	x	x	x
Insecta	Diptera	Syrphidae	*Platycheirus albimanus*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Platycheirus angustatus*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Platycheirus clypeatus*	a hoverfly		x		x	x
Insecta	Diptera	Syrphidae	*Platycheirus fulviventris*	a hoverfly		x			x
Insecta	Diptera	Syrphidae	*Platycheirus occultus*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Platycheirus scutatus sens. lat.*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Paragus haemorrhous*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Chrysotoxum bicinctum*	a hoverfly		x		x	x
Insecta	Diptera	Syrphidae	*Episyrphus balteatus*	a hoverfly		x	x	x	x
Insecta	Diptera	Syrphidae	*Eupeodes corollae*	a hoverfly		x	x		x
Insecta	Diptera	Syrphidae	*Leucozona lucorum*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Scaeva pyrastri*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Sphaerophoria scripta*	a hoverfly			x	x	x
Insecta	Diptera	Syrphidae	*Sphaerophoria taeniata*	a hoverfly				x	

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Insecta	Diptera	Syrphidae	*Syrphus vitripennis*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Xanthogramma pedissequum*	a hoverfly			x	x	x
Insecta	Diptera	Syrphidae	*Cheilosia albitarsis sens. lat.*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Cheilosia illustrata*	a hoverfly		x			x
Insecta	Diptera	Syrphidae	*Cheilosia pagana*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Cheilosia proxima*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Cheilosia vernalis*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Ferdinandea cuprea*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Rhingia campestris*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Chrysogaster solstitialis*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Neoascia tenur*	a hoverfly		x			x
Insecta	Diptera	Syrphidae	*Eristalinus sepulchralis*	a hoverfly		x		x	x
Insecta	Diptera	Syrphidae	*Eristalis arbustorum*	a hoverfly		x	x	x	x
Insecta	Diptera	Syrphidae	*Eristalis horticola*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Eristalis nemorum*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Eristalis pertinax*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Eristalis tenax*	a hoverfly			x	x	x
Insecta	Diptera	Syrphidae	*Helophilus pendulus*	a hoverfly		x	x	x	x
Insecta	Diptera	Syrphidae	*Helophilus trivittatus*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Myathropa florea*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Parhelophilus frutetorum*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Pipiza noctiluca*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Pipizella viduata*	a hoverfly			x	x	x
Insecta	Diptera	Syrphidae	*Volucella bombylans*	a hoverfly		x			x
Insecta	Diptera	Syrphidae	*Volucella inanis*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Volucella pellucens*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Volucella zonaria*	a hoverfly				x	
Insecta	Diptera	Syrphidae	*Syritta pipiens*	a hoverfly		x	x	x	x
Insecta	Diptera	Syrphidae	*Tropidia scita*	a hoverfly			x		x
Insecta	Diptera	Syrphidae	*Xylota segnis*	a hoverfly			x		x
Insecta	Diptera	Pipunculidae	*Pipunculus campestris*				x		x
Insecta	Diptera	Conopidae	*Physocephala rufipes*				x		x
Insecta	Diptera	Conopidae	*Thecophora atra*				x		x
Insecta	Diptera	Ulidiidae	*Herina lugubris*	a picture-winged fly			x		x
Insecta	Diptera	Ulidiidae	*Physiphora alceae*	a picture-winged fly				x	
Insecta	Diptera	Tephritidae	*Tephritis neesii*				x		x
Insecta	Diptera	Tephritidae	*Xyphosia miliaria*					x	

Class	Order	Family	Species	Vernacular	National Status	LWS Network	ROF Bridgwater (Outwith LWS)	External Fields	ROF Bridgwater
Insecta	Diptera	Lauxaniidae	*Calliopum aeneum*				x		x
Insecta	Diptera	Lauxaniidae	*Sapromyza quadripunctata*			x		x	x
Insecta	Diptera	Sciomyzidae	*Pherbellia cinerella*			x	x		x
Insecta	Diptera	Sciomyzidae	*Coremacera marginata*					x	
Insecta	Diptera	Sciomyzidae	*Dichetophora obliterata*				x		x
Insecta	Diptera	Sciomyzidae	*Limnia unguicornis*					x	
Insecta	Diptera	Sciomyzidae	*Tetanocera elata*				x		x
Insecta	Diptera	Sepsidae	*Sepsis cynipsea*				x	x	x
Insecta	Diptera	Sepsidae	*Sepsis fulgens*			x		x	x
Insecta	Diptera	Sepsidae	*Sepsis punctum*			x			x
Insecta	Diptera	Sepsidae	*Sepsis violacea*				x		x
Insecta	Diptera	Opomyzidae	*Opomyza germinationis*				x	x	x
Insecta	Diptera	Opomyzidae	*Opomyza petrei*			x			x
Insecta	Diptera	Chloropidae	*Chlorops pumilionis*				x		x
Insecta	Diptera	Chloropidae	*Thaumatomyia glabra*				x		x
Insecta	Diptera	Heleomyzidae	*Suillia variegata*				x		x
Insecta	Diptera	Hippoboscidae	*Lipoptena cervi*				x		x
Insecta	Diptera	Scathophagidae	*Cordilura ciliata*				x		x
Insecta	Diptera	Scathophagidae	*Cordilura impudica*				x		x
Insecta	Diptera	Scathophagidae	*Cordilura albipes*				x		x
Insecta	Diptera	Scathophagidae	*Norellisoma spinimanum*				x		x
Insecta	Diptera	Scathophagidae	*Scathophaga stercoraria*			x	x	x	x
Insecta	Diptera	Anthomyiidae	*Anthomyia confusanea*			x	x		x
Insecta	Diptera	Anthomyiidae	*Anthomyia pluvialis*				x		x
Insecta	Diptera	Anthomyiidae	*Anthomyia procellaris*					x	
Insecta	Diptera	Anthomyiidae	*Botanophila fugax*					x	
Insecta	Diptera	Anthomyiidae	*Hylemya nigrimana*				x		x
Insecta	Diptera	Anthomyiidae	*Hylemya vagans*				x	x	x
Insecta	Diptera	Anthomyiidae	*Hylemya variata*				x	x	x
Insecta	Diptera	Anthomyiidae	*Hylemyza partita*				x	x	x
Insecta	Diptera	Anthomyiidae	*Adia cinerella*			x	x		x
Insecta	Diptera	Anthomyiidae	*Delia florilega*				x		x
Insecta	Diptera	Anthomyiidae	*Delia platura*			x	x		x
Insecta	Diptera	Anthomyiidae	*Eustalomyia festiva*					x	
Insecta	Diptera	Anthomyiidae	*Hydrophoria ruralis*					x	
Insecta	Diptera	Anthomyiidae	*Pegoplata aestiva*			x	x		x
Insecta	Diptera	Anthomyiidae	*Pegoplata infirma*			x	x	x	x

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Insecta	Diptera	Anthomyiidae	*Mycophaga testacea*					x	
Insecta	Diptera	Anthomyiidae	*Paradelia intersecta*				x		x
Insecta	Diptera	Fanniidae	*Fannia armata*					x	
Insecta	Diptera	Fanniidae	*Fannia canicularis*					x	
Insecta	Diptera	Fanniidae	*Fannia clara*		pNationally Scarce			x	
Insecta	Diptera	Fanniidae	*Fannia pallitibia*				x		x
Insecta	Diptera	Fanniidae	*Fannia serena*			x	x	x	x
Insecta	Diptera	Muscidae	*Coenosia pumila*			x			x
Insecta	Diptera	Muscidae	*Schoenomyza litorella*				x		x
Insecta	Diptera	Muscidae	*Azelia nebulosa*					x	
Insecta	Diptera	Muscidae	*Hydrotaea cyrtoneurina*				x		x
Insecta	Diptera	Muscidae	*Hydrotaea floccosa*					x	
Insecta	Diptera	Muscidae	*Hydrotaea pilipes*		pNationally Scarce				x
Insecta	Diptera	Muscidae	*Mesembrina meridiana*				x		x
Insecta	Diptera	Muscidae	*Morellia aenescens*			x		x	x
Insecta	Diptera	Muscidae	*Musca autumnalis*			x	x	x	x
Insecta	Diptera	Muscidae	*Neomyia cornicina*			x	x		x
Insecta	Diptera	Muscidae	*Polietes lardarius*			x			x
Insecta	Diptera	Muscidae	*Polietes meridionalis*				x	x	x
Insecta	Diptera	Muscidae	*Muscina levida*					x	
Insecta	Diptera	Muscidae	*Stomoxys calcitrans*			x	x		x
Insecta	Diptera	Muscidae	*Graphomya maculata*			x	x	x	x
Insecta	Diptera	Muscidae	*Hebecnema umbratica*			x			x
Insecta	Diptera	Muscidae	*Hebecnema vespertina*					x	
Insecta	Diptera	Muscidae	*Mydaea ancilla*				x		x
Insecta	Diptera	Muscidae	*Helina depuncta*					x	
Insecta	Diptera	Muscidae	*Helina evecta*			x	x		x
Insecta	Diptera	Muscidae	*Helina impuncta*				x	x	x
Insecta	Diptera	Muscidae	*Helina lasiophthalma*					x	
Insecta	Diptera	Muscidae	*Helina pertusa*					x	
Insecta	Diptera	Muscidae	*Helina pubiseta*				x		x
Insecta	Diptera	Muscidae	*Helina reversio*			x	x		x
Insecta	Diptera	Muscidae	*Phaonia errans*				x	x	x
Insecta	Diptera	Muscidae	*Phaonia perdita*					x	
Insecta	Diptera	Muscidae	*Phaonia subventa*				x		x
Insecta	Diptera	Muscidae	*Phaonia trimaculata*				x		x
Insecta	Diptera	Muscidae	*Phaonia tuguriorum*			x	x	x	x

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Insecta	Diptera	Muscidae	*Phaonia valida*					x	
Insecta	Diptera	Calliphoridae	*Calliphora vicina*				x	x	x
Insecta	Diptera	Calliphoridae	*Lucilia ampullacea*					x	
Insecta	Diptera	Calliphoridae	*Lucilia caesar*			x	x	x	x
Insecta	Diptera	Calliphoridae	*Lucilia sericata*				x		x
Insecta	Diptera	Polleniidae	*Pollenia angustigena*					x	
Insecta	Diptera	Polleniidae	*Pollenia pediculata*				x		x
Insecta	Diptera	Polleniidae	*Pollenia rudis*				x	x	x
Insecta	Diptera	Polleniidae	*Pollenia viatica*				x	x	x
Insecta	Diptera	Rhinophoridae	*Phyto discrepans*			x			x
Insecta	Diptera	Rhinophoridae	*Rhinophora lepida*				x		x
Insecta	Diptera	Rhinophoridae	*Tricogena rubricosa*			x		x	x
Insecta	Diptera	Sarcophagidae	*Brachicoma devia*				x		x
Insecta	Diptera	Sarcophagidae	*Ravinia pernix*				x		x
Insecta	Diptera	Sarcophagidae	*Sarcophaga pumila*				x		x
Insecta	Diptera	Sarcophagidae	*Sarcophaga crassimargo*				x		x
Insecta	Diptera	Sarcophagidae	*Sarcophaga rosellei*				x		x
Insecta	Diptera	Sarcophagidae	*Sarcophaga dissimilis*				x	x	x
Insecta	Diptera	Sarcophagidae	*Sarcophaga haemorrhoa*				x		x
Insecta	Diptera	Sarcophagidae	*Sarcophaga vagans*				x	x	x
Insecta	Diptera	Sarcophagidae	*Sarcophaga nigriventris*			x	x		x
Insecta	Diptera	Sarcophagidae	*Sarcophaga variegata*			x			x
Insecta	Diptera	Tachinidae	*Eriothrix rufomaculata*			x	x	x	x
Insecta	Diptera	Tachinidae	*Voria ruralis*				x		x
Insecta	Diptera	Tachinidae	*Phryxe vulgaris*					x	
Insecta	Diptera	Tachinidae	*Exorista rustica*				x		x
Insecta	Diptera	Tachinidae	*Phania funesta*				x		x
Insecta	Diptera	Tachinidae	*Phasia pusilla*				x		x
Insecta	Diptera	Tachinidae	*Phasia obesa*				x		x
Insecta	Diptera	Tephritidae	*Tephritis divisa*			x	x		x
Insecta	Hemiptera, Auchenorrhyncha	Aphrophoridae	*Aphrophora alni*				x		x
Insecta	Hemiptera, Auchenorrhyncha	Aphrophoridae	*Philaenus spumarius*			x	x	x	x
Insecta	Hemiptera, Auchenorrhyncha	Aphrophoridae	*Neophilaenus lineatus*			x	x	x	x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Cicadella viridis*				x		x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Idiocerus stigmaticalis*					x	
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Anaceratagallia ribauti*			x			x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Anoscopus albifrons*			x			x

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Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Arthaldeus pascuellus*			x	x		x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Allygus mixtus*				x	x	x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Conosanus obsoletus*					x	
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Euscelis incisus*			x	x	x	x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Streptanus sordidus*			x	x		x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Zyginidia scutellaris*			x		x	x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Conomelus anceps*			x	x		x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Criomorphus albomarginatus*			x			x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Hyledelphax elegantulus*			x			x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Javesella dubia*			x			x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Javesella pellucida*	Tortoise Shieldbug		x			x
Insecta	Hemiptera, Heteroptera	Scutelleridae	*Eurygaster testudinaria*	Bishop's Mitre Shieldbug			x		x
Insecta	Hemiptera, Heteroptera	Pentatomidae	*Aelia acuminata*	Common Green Shieldbug			x	x	x
Insecta	Hemiptera, Heteroptera	Pentatomidae	*Palomena prasina*	Dock Bug			x		x
Insecta	Hemiptera, Heteroptera	Coreidae	*Coreus marginatus*	Box Bug				x	
Insecta	Hemiptera, Heteroptera	Coreidae	*Gonocerus acuteangulatus*					x	
Insecta	Hemiptera, Heteroptera	Rhopalidae	*Rhopalus subrufus*				x	x	x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Cymus melanocephalus*				x		x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Drymus sylvaticus*			x			x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Scolopostethus decoratus*			x			x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Scolopostethus thomsoni*			x	x	x	x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Stygnocoris sabulosus*					x	
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Trapezonotus desertus*			x			x
Insecta	Hemiptera, Heteroptera	Tingidae	*Tingis ampliata*					x	
Insecta	Hemiptera, Heteroptera	Tingidae	*Tingis cardui*					x	
Insecta	Hemiptera, Heteroptera	Nabidae	*Nabis ferus*				x		x
Insecta	Hemiptera, Heteroptera	Nabidae	*Nabis flavomarginatus*				x		x
Insecta	Hemiptera, Heteroptera	Nabidae	*Nabis rugosus*				x		x
Insecta	Hemiptera, Heteroptera	Anthocoridae	*Cardiastethus fasciiventris*					x	
Insecta	Hemiptera, Heteroptera	Anthocoridae	*Orius niger*			x	x		x
Insecta	Hemiptera, Heteroptera	Anthocoridae	*Temnostethus gracilis*					x	
Insecta	Hemiptera, Heteroptera	Miridae	*Capsus ater*			x		x	x
Insecta	Hemiptera, Heteroptera	Miridae	*Closterotomus norwegicus*					x	
Insecta	Hemiptera, Heteroptera	Miridae	*Deraeocoris lutescens*					x	
Insecta	Hemiptera, Heteroptera	Miridae	*Heterotoma planicornis*				x	x	x
Insecta	Hemiptera, Heteroptera	Miridae	*Leptopterna dolabrata*			x		x	x
Insecta	Hemiptera, Heteroptera	Miridae	*Lygus rugulipennis*				x		x

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Insecta	Hemiptera, Heteroptera	Miridae	*Miridius quadrivirgatus*			x	x		x
Insecta	Hemiptera, Heteroptera	Miridae	*Notostira elongata*			x	x	x	x
Insecta	Hemiptera, Heteroptera	Miridae	*Orthops campestris*			x			x
Insecta	Hemiptera, Heteroptera	Miridae	*Orthops kalmii*				x		x
Insecta	Hemiptera, Heteroptera	Miridae	*Phytocoris varipes*				x		x
Insecta	Hemiptera, Heteroptera	Miridae	*Plagiognathus arbustorum*				x		x
Insecta	Hemiptera, Heteroptera	Miridae	*Stenodema calcarata*			x			x
Insecta	Hemiptera, Heteroptera	Miridae	*Stenodema laevigata*				x	x	x
Insecta	Hemiptera, Heteroptera	Miridae	*Stenotus binotatus*				x		x
Insecta	Hymenoptera	Cephidae	*Cephus spinipes*	a sawfly		x			x
Insecta	Hymenoptera	Tenthredinidae	*Athalia circularis*	a sawfly			x		x
Insecta	Hymenoptera	Tenthredinidae	*Athalia cordata*	a sawfly			x		x
Insecta	Hymenoptera	Tenthredinidae	*Athalia rosae*	a sawfly			x		x
Insecta	Hymenoptera	Tenthredinidae	*Cladius pectinicornis*	a sawfly		x	x	x	x
Insecta	Hymenoptera	Tenthredinidae	*Dolerus aericeps*	a sawfly			x		x
Insecta	Hymenoptera	Ichneumonidae	*Amblyteles armatorius*	an ichneumon			x		x
Insecta	Hymenoptera	Crabronidae	*Crossocerus megacephalus*	a digger wasp		x			x
Insecta	Hymenoptera	Crabronidae	*Crossocerus podagricus*	a digger wasp				x	
Insecta	Hymenoptera	Crabronidae	*Ectemnius cavifrons*	a digger wasp				x	
Insecta	Hymenoptera	Crabronidae	*Ectemnius cephalotes*	a digger wasp				x	
Insecta	Hymenoptera	Crabronidae	*Ectemnius continuus*	a digger wasp			x	x	x
Insecta	Hymenoptera	Crabronidae	*Ectemnius lapidarius*	a digger wasp				x	
Insecta	Hymenoptera	Crabronidae	*Ectemnius lituratus*	a digger wasp				x	
Insecta	Hymenoptera	Crabronidae	*Pemphredon lethifer agg.*	a digger wasp		x			x
Insecta	Hymenoptera	Crabronidae	*Pemphredon lugubris*	Mournful Wasp			x	x	x
Insecta	Hymenoptera	Crabronidae	*Psenulus pallipes sens. str.*	Pale Footed Black Wasp			x		x
Insecta	Hymenoptera	Crabronidae	*Psenulus concolor*					x	
Insecta	Hymenoptera	Crabronidae	*Stigmus solskyi*	a digger wasp			x		x
Insecta	Hymenoptera	Andrenidae	*Andrena bicolor*	Gwynne's Mining Bee		x			x
Insecta	Hymenoptera	Andrenidae	*Andrena chrysosceles*	a mining bee				x	
Insecta	Hymenoptera	Andrenidae	*Andrena dorsata*	a mining bee		x	x	x	x
Insecta	Hymenoptera	Andrenidae	*Andrena flavipes*	Yellow Legged Mining Bee			x	x	x
Insecta	Hymenoptera	Andrenidae	*Andrena haemorrhoa*	Early Mining Bee				x	
Insecta	Hymenoptera	Andrenidae	*Andrena labialis*	a mining bee				x	
Insecta	Hymenoptera	Andrenidae	*Andrena minutula*	a mining bee		x	x		x
Insecta	Hymenoptera	Andrenidae	*Andrena semilaevis*	a mining bee				x	
Insecta	Hymenoptera	Andrenidae	*Andrena synadelpha*	a mining bee				x	

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Insecta	Hymenoptera	Apidae	*Bombus hypnorum*	a bumblebee				x	
Insecta	Hymenoptera	Apidae	*Bombus lapidarius*	Large Red Tailed Bumble Bee		x	x	x	x
Insecta	Hymenoptera	Apidae	*Bombus pascuorum*	Common Carder Bee		x	x		x
Insecta	Hymenoptera	Apidae	*Bombus terrestris*	Buff-tailed Bumble Bee		x	x		x
Insecta	Hymenoptera	Apidae	*Nomada flava*	a cuckoo bee				x	
Insecta	Hymenoptera	Apidae	*Nomada flavoguttata*	a cuckoo bee			x		x
Insecta	Hymenoptera	Colletidae	*Colletes hederae*	a mining bee			x		x
Insecta	Hymenoptera	Colletidae	*Colletes similis*	a mining bee				x	
Insecta	Hymenoptera	Colletidae	*Hylaeus brevicornis*	Short Horned Yellow-face Bee		x			x
Insecta	Hymenoptera	Colletidae	*Hylaeus communis*	Common Yellow Face Bee		x	x	x	x
Insecta	Hymenoptera	Colletidae	*Hylaeus dilatatus*	a mining bee		x			x
Insecta	Hymenoptera	Halictidae	*Halictus tumulorum*	a mining bee			x		x
Insecta	Hymenoptera	Halictidae	*Lasioglossum calceatum*	Slender Mining Bee		x	x		x
Insecta	Hymenoptera	Halictidae	*Lasioglossum fulvicorne*	a mining bee			x		x
Insecta	Hymenoptera	Halictidae	*Lasioglossum lativentre*	a mining bee		x			x
Insecta	Hymenoptera	Halictidae	*Lasioglossum leucozonium*	a mining bee		x			x
Insecta	Hymenoptera	Halictidae	*Lasioglossum malachurum*	a mining bee	[Nationally Scarce (Nb)]	x		x	x
Insecta	Hymenoptera	Halictidae	*Lasioglossum morio*	Brassy Mining Bee		x	x		x
Insecta	Hymenoptera	Halictidae	*Lasioglossum pauxillum*	a mining bee	[Nationally Scarce (Na)]	x		x	x
Insecta	Hymenoptera	Halictidae	*Lasioglossum smeathmanellum*	a mining bee		x			x
Insecta	Hymenoptera	Halictidae	*Lasioglossum villosulum*	Shaggy Mining Bee		x	x	x	x
Insecta	Hymenoptera	Halictidae	*Sphecodes ephippius*	a cuckoo bee		x		x	x
Insecta	Hymenoptera	Halictidae	*Sphecodes puncticeps*	a cuckoo bee			x		x
Insecta	Hymenoptera	Megachilidae	*Osmia spinulosa*	a solitary bee		x	x		x
Insecta	Hymenoptera	Megachilidae	*Osmia bicornis*	Red Mason Bee			x		x
Insecta	Hymenoptera	Chrysididae	*Chrysis angustula*				x	x	x
Insecta	Hymenoptera	Tiphiidae	*Tiphia minuta*	The Small Tiphia	[Nationally Scarce (Nb)]		x		x
Insecta	Hymenoptera	Vespidae	*Ancistrocerus trifasciatus*	a mason wasp			x		x
Insecta	Hymenoptera	Vespidae	*Symmorphus gracilis*	a mason wasp		x			x
Insecta	Hymenoptera	Vespidae	*Vespa crabro*	The Hornet			x		x
Insecta	Hymenoptera	Vespidae	*Vespula germanica*	German Wasp		x	x	x	x
Insecta	Hymenoptera	Vespidae	*Vespula vulgaris*	Common Wasp			x	x	x
Insecta	Lepidoptera	Choreutidae	*Anthophila fabriciana*	a moth				x	
Insecta	Lepidoptera	Sesiidae	*Synanthedon myopaeformis*	Red-belted Clearwing				x	
Insecta	Lepidoptera	Zygaenidae	*Zygaena lonicerae*	Narrow-bordered Five-spot Burnet		x			x
Insecta	Lepidoptera	Hesperiidae	*Thymelicus lineola*	Essex Skipper			x		x
Insecta	Lepidoptera	Hesperiidae	*Thymelicus sylvestris*	Small Skipper				x	

Class	Order	Family	Species	Vernacular	National Status	LWS Network	ROF Bridgwater (Outwith LWS)	External Fields	ROF Bridgwater
Insecta	Lepidoptera	Hesperiidae	*Ochlodes sylvanus*	Large Skipper		x			x
Insecta	Lepidoptera	Pieridae	*Pieris brassicae*	Large White			x		x
Insecta	Lepidoptera	Pieridae	*Pieris rapae*	Small White		x	x	x	x
Insecta	Lepidoptera	Pieridae	*Pieris napi*	Green-veined White			x	x	x
Insecta	Lepidoptera	Nymphalidae	*Pararge aegeria*	Speckled Wood			x	x	x
Insecta	Lepidoptera	Nymphalidae	*Coenonympha pamphilus*	Small Heath	NT, SoPI	x			x
Insecta	Lepidoptera	Nymphalidae	*Aphantopus hyperantus*	Ringlet			x		x
Insecta	Lepidoptera	Nymphalidae	*Maniola jurtina*	Meadow Brown		x	x	x	x
Insecta	Lepidoptera	Nymphalidae	*Pyronia tithonus*	Gatekeeper			x	x	x
Insecta	Lepidoptera	Nymphalidae	*Melanargia galathea*	Marbled White			x		x
Insecta	Lepidoptera	Nymphalidae	*Vanessa atalanta*	Red Admiral		x	x	x	x
Insecta	Lepidoptera	Nymphalidae	*Aglais io*	Peacock			x		x
Insecta	Lepidoptera	Nymphalidae	*Aglais urticae*	Small Tortoiseshell		x		x	x
Insecta	Lepidoptera	Nymphalidae	*Polygonia c-album*	Comma			x	x	x
Insecta	Lepidoptera	Lycaenidae	*Lycaena phlaeas*	Small Copper			x		x
Insecta	Lepidoptera	Lycaenidae	*Celastrina argiolus*	Holly Blue			x		x
Insecta	Lepidoptera	Lycaenidae	*Aricia agestis*	Brown Argus			x		x
Insecta	Lepidoptera	Lycaenidae	*Polyommatus icarus*	Common Blue			x		x
Insecta	Lepidoptera	Crambidae	*Chrysoteuchia culmella*	Garden Grass-veneer			x		x
Insecta	Lepidoptera	Geometridae	*Camptogramma bilineata*	Yellow Shell				x	
Insecta	Lepidoptera	Geometridae	*Aplocera plagiata*	Treble-bar			x		x
Insecta	Lepidoptera	Erebidae	*Rivula sericealis*	Straw Dot			x		x
Insecta	Lepidoptera	Erebidae	*Callimorpha dominula*	Scarlet Tiger			x		x
Insecta	Lepidoptera	Erebidae	*Tyria jacobaeae*	Cinnabar	SoPI - Research		x	x	x
Insecta	Lepidoptera	Noctuidae	*Autographa gamma*	Silver Y			x		x
Insecta	Lepidoptera	Noctuidae	*Noctua pronuba*	Large Yellow Underwing			x		x
Insecta	Mecoptera	Panorpidae	*Panorpa communis*				x		x
Insecta	Odonata	Lestidae	*Lestes sponsa*	Emerald Damselfly			x		x
Insecta	Odonata	Platycnemididae	*Platycnemis pennipes*	White-legged Damselfly		x	x		x
Insecta	Odonata	Coenagriidae	*Coenagrion puella*	Azure Damselfly		x	x		x
Insecta	Odonata	Aeshnidae	*Aeshna cyanea*	Southern Hawker			x		x
Insecta	Odonata	Aeshnidae	*Aeshna mixta*	Migrant Hawker			x		x
Insecta	Odonata	Aeshnidae	*Anax imperator*	Emperor Dragonfly			x	x	x
Insecta	Odonata	Libellulidae	*Libellula quadrimaculata*	Four-spotted Chaser			x	x	x
Insecta	Odonata	Libellulidae	*Orthetrum cancellatum*	Black-tailed Skimmer				x	
Insecta	Odonata	Libellulidae	*Sympetrum striolatum*	Common Darter			x		x
Insecta	Orthoptera	Tettigoniidae	*Pholidoptera griseoaptera*	Dark Bush Cricket				x	

Class	Order	Family	Species	Vernacular	National Status	LWS Network	ROF Bridgwater (Outwith LWS)	External Fields	ROF Bridgwater
Insecta	Orthoptera	Tettigoniidae	*Metrioptera roeselii*	Roesel's Bush Cricket			x	x	x
Insecta	Orthoptera	Conocephalidae	*Conocephalus discolor*	Long-winged Conehead			x	x	x
Insecta	Orthoptera	Conocephalidae	*Conocephalus dorsalis*	Short-winged Conehead			x	x	x
Insecta	Orthoptera	Phaneropteridae	*Leptophyes punctatissima*	Speckled Bush Cricket				x	
Insecta	Orthoptera	Acrididae	*Omocestus viridulus*	Common Green Grasshopper		x		x	x
Insecta	Orthoptera	Acrididae	*Chorthippus brunneus*	Common Field Grasshopper			x	x	x
Insecta	Orthoptera	Acrididae	*Chorthippus parallelus*	Meadow Grasshopper		x	x	x	x
Insecta	Orthoptera	Acrididae	*Myrmeleotettix maculatus*	Mottled Grasshopper		x			x
Malacostraca	Isopoda	Philosciidae	*Philoscia muscorum*	Common Striped Woodlouse		x	x		x
Malacostraca	Isopoda	Oniscidae	*Oniscus asellus*	Common Shiny Woodlouse			x		x
Malacostraca	Isopoda	Armadillidiidae	*Armadillidium vulgare*	Common Pill Woodlouse		x			x
			565		20	241	289	253	432

Table 15: Stenotopic species recorded within the ROF Bridgwater (outwith LWS) compartment during 2020.

Order	Family	Species	Conservation status	Broad biotope	Habitat	SAT Code	SAT Name	Habitat score
Hymenoptera	Crabronidae	*Pemphredon lugubris*		tree-associated	decaying wood	A212	Bark & Sapwood decay	
Hymenoptera	Crabronidae	*Psenulus pallipes*		tree-associated	decaying wood	A212	Bark & Sapwood decay	
Diptera	Xylomyidae	*Solva marginata*		tree-associated	decaying wood	A212	Bark & Sapwood decay	
Hymenoptera	Crabronidae	*Ectemnius continuus*		open habitats; tree-associated	decaying wood	A212, F001	Bark & Sapwood decay; Scrub edge	
Hymenoptera	Crabronidae	*Stigmus solskyi*		open habitats; tree-associated	decaying wood	A212, F001	Bark & Sapwood decay; Scrub edge	
Hemiptera	Cicadellidae	*Allygus mixtus*		open habitats	tall sward & scrub	F001	Scrub edge	
Hymenoptera	Vespidae	*Ancistrocerus trifasciatus*		open habitats; tree-associated	decaying wood	F001	Scrub edge	
Lepidoptera	Nymphalidae	*Pararge aegeria*		open habitats	tall sward & scrub	F001	Scrub edge	
Lepidoptera	Nymphalidae	*Pyronia tithonus*		open habitats	tall sward & scrub	F001	Scrub edge	
Hemiptera	Rhopalidae	*Rhopalus (Rhopalus) subrufus*		open habitats	tall sward & scrub	F001	Scrub edge	
Hymenoptera	Andrenidae	*Andrena dorsata*		open habitats	short sward & bare ground	F002	Rich flower resource	soft rock cliff: 3
Hymenoptera	Andrenidae	*Andrena flavipes*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Andrenidae	*Andrena minutula*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Apidae	*Bombus lapidarius*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Apidae	*Bombus pascuorum*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Apidae	*Bombus terrestris*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Colletidae	*Colletes hederae*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Halictidae	*Halictus tumulorum*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Colletidae	*Hylaeus communis*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum calceatum*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum fulvicorne*		open habitats	short sward & bare ground	F002	Rich flower resource	calcareous grassland: High
Hymenoptera	Halictidae	*Lasioglossum morio*		open habitats	short sward & bare ground	F002	Rich flower resource	calcareous grassland: Moderate
Hymenoptera	Halictidae	*Lasioglossum villosulum*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Apidae	*Nomada flavoguttata*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Megachilidae	*Osmia bicornis*		open habitats; tree-associated	shaded woodland floor; tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Megachilidae	*Osmia spinulosa*		open habitats	short sward & bare ground	F002, F111	Rich flower resource; Open short sward	
Coleoptera	Carabidae	*Curtonotus aulicus*		open habitats	tall sward & scrub	F003	Scrub-heath & moorland	
Lepidoptera	Lycaenidae	*Aricia agestis*		open habitats	short sward & bare ground	F112	Short sward & bare ground	
Coleoptera	Malachiidae	*Cordylepherus viridis*		open habitats	short sward & bare ground	F112	Short sward & bare ground	
Coleoptera	Curculionidae	*Larinus planus*	[Nb]	open habitats	short sward & bare ground	F112	Short sward & bare ground	calcareous grassland: Low
Odonata	Platycnemididae	*Platycnemis pennipes*		wetland	running water	W125	Slow-flowing rivers	
Coleoptera	Carabidae	*Acupalpus exiguus*	NS	wetland	marshland	W221	Undisturbed fluctuating marsh	
Coleoptera	Staphylinidae	*Platystethus nitens*		tree-associated; wetland	marshland; shaded woodland floor; wet woodland	W221	Undisturbed fluctuating marsh	
Diptera	Tabanidae	*Atylotus rusticus*	NR	wetland	peatland	W314	Reed-fen & pools	

Table 16: Stenotopic species recorded within the LWS Network compartment during 2020.

Order	Family	Species	Conservation status	Broad biotope	Habitat	SAT	SAT Name	Habitat score
Hymenoptera	Crabronidae	*Crossocerus megacephalus*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub-edge	
Hymenoptera	Crabronidae	*Pemphredon lethifer*		open habitats; tree-associated	decaying wood; tall sward & scrub	A212, F001	Bark & sapwood decay; Scrub-edge	
Hymenoptera	Vespidae	*Symmorphus gracilis*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub-edge	
Coleoptera	Latridiidae	*Melanophthalma suturalis*		tree-associated	decaying wood	A213	Fungal fruiting bodies	
Coleoptera	Curculionidae	*Anthonomus rubi*		open habitats	tall sward & scrub	F001	Scrub-edge	
Araneae	Salticidae	*Heliophanus flavipes*		open habitats	tall sward & scrub	F001	Scrub-edge	calcareous grassland: Low
Hymenoptera	Colletidae	*Hylaeus brevicornis*		open habitats	tall sward & scrub	F001, F002	Scrub-edge; Rich flower resource	
Coleoptera	Chrysomelidae	*Cryptocephalus bipunctatus*	NS	open habitats; tree-associated	arboreal; short sward & bare ground	F001, F112	Scrub-edge; Open short sward	calcareous grassland: Moderate
Hymenoptera	Andrenidae	*Andrena bicolor*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Andrenidae	*Andrena dorsata*		open habitats	short sward & bare ground	F002	Rich flower resource	soft rock cliff: 3
Hymenoptera	Andrenidae	*Andrena minutula*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Apidae	*Bombus lapidarius*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Apidae	*Bombus terrestris*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Colletidae	*Hylaeus communis*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Colletidae	*Hylaeus dilatatus [Genus inferred]*		open habitats	short sward & bare ground; tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum calceatum*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum lativentre*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum leucozonium*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum malachurum*		open habitats	short sward & bare ground	F002	Rich flower resource	soft rock cliff: 3
Hymenoptera	Halictidae	*Lasioglossum morio*		open habitats	short sward & bare ground	F002	Rich flower resource	calcareous grassland: Moderate
Hymenoptera	Halictidae	*Lasioglossum pauxillum*		open habitats	short sward & bare ground	F002	Rich flower resource	calcareous grassland: Low
Hymenoptera	Halictidae	*Lasioglossum smeathmanellum*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum villosulum*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Megachilidae	*Osmia spinulosa*		open habitats	short sward & bare ground	F002, F111	Rich flower resource; Bare sand & chalk	
Coleoptera	Carabidae	*Harpalus rufipes*		open habitats	tall sward & scrub	F003	Scrub-heath & moor	
Hemiptera	Lygaeidae	*Scolopostethus decoratus*		open habitats		F003	Scrub-heath & moor	
Araneae	Dictynidae	*Argenna subnigra*	NS	open habitats	short sward & bare ground	F111	Bare sand & chalk	
Coleoptera	Apionidae	*Diplapion stolidum*	Nb	open habitats	short sward & bare ground	F111	Bare sand & chalk	calcareous grassland: Moderate
Coleoptera	Chrysomelidae	*Longitarsus dorsalis*		open habitats	short sward & bare ground	F111	Bare sand & chalk	calcareous grassland: Moderate
Araneae	Thomisidae	*Ozyptila simplex*		open habitats	short sward & bare ground	F111	Bare sand & chalk	
Araneae	Lycosidae	*Pardosa palustris*		open habitats	short sward & bare ground	F111	Bare sand & chalk	
Araneae	Salticidae	*Talavera aequipes*		open habitats	short sward & bare ground	F111	Bare sand & chalk	calcareous grassland: Low
Coleoptera	Elateridae	*Agrypnus murinus*		open habitats	short sward & bare ground	F112	Open short sward	calcareous grassland: Moderate
Lepidoptera	Nymphalidae	*Coenonympha pamphilus*	NT; SoPI	open habitats	short sward & bare ground	F112	Open short sward	
Coleoptera	Curculionidae	*Larinus planus*	[Nb]	open habitats	short sward & bare ground	F112	Open short sward	calcareous grassland: Low
Odonata	Platycnemididae	*Platycnemis pennipes*		wetland	running water	W125	Slow-flowing rivers	
Coleoptera	Staphylinidae	*Stenus palustris*		wetland	peatland	W313	Moss & tussock fen	

Order	Family	Species	Conservation status	Broad biotope	Habitat	SAT	SAT Name	Habitat score
Coleoptera	Staphylinidae	*Paederus riparius*		wetland	peatland	W314	Reed-fen & pools	

Table 17: Species recorded in individual LWSs during 2020.

Class	Order	Family	Species	Status	Stenotopic Assemblage	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Arachnida	Araneae	Theridiidae	*Neottiura bimaculata*			x			x
Arachnida	Araneae	Theridiidae	*Enoplognatha latimana*						x
Arachnida	Araneae	Theridiidae	*Enoplognatha thoracica*			x			
Arachnida	Araneae	Linyphiidae	*Pocadicnemis pumila sens. str.*			x			x
Arachnida	Araneae	Linyphiidae	*Pocadicnemis juncea*			x	x		x
Arachnida	Araneae	Linyphiidae	*Oedothorax retusus*						x
Arachnida	Araneae	Linyphiidae	*Cnephalocotes obscurus*			x	x		x
Arachnida	Araneae	Linyphiidae	*Styloctetor compar*	Nationally Scarce		x			
Arachnida	Araneae	Linyphiidae	*Micrargus subaequalis*			x			x
Arachnida	Araneae	Linyphiidae	*Erigone dentipalpis*			x			x
Arachnida	Araneae	Linyphiidae	*Agyneta saxatilis sens. str.*			x			
Arachnida	Araneae	Linyphiidae	*Agyneta affinis*			x			x
Arachnida	Araneae	Linyphiidae	*Bathyphantes gracilis*						x
Arachnida	Araneae	Linyphiidae	*Bathyphantes parvulus*						x
Arachnida	Araneae	Linyphiidae	*Tenuiphantes tenuis*						x
Arachnida	Araneae	Linyphiidae	*Microlinyphia pusilla*				x		x
Arachnida	Araneae	Tetragnathidae	*Pachygnatha degeeri*			x	x		x
Arachnida	Araneae	Lycosidae	*Pardosa monticola*			x			
Arachnida	Araneae	Lycosidae	*Pardosa palustris*		F111	x			x
Arachnida	Araneae	Lycosidae	*Pardosa pullata*			x	x		x
Arachnida	Araneae	Lycosidae	*Pardosa prativaga*						x
Arachnida	Araneae	Lycosidae	*Pardosa tenuipes*						x
Arachnida	Araneae	Lycosidae	*Alopecosa pulverulenta*			x			
Arachnida	Araneae	Hahniidae	*Hahnia nava*			x	x		
Arachnida	Araneae	Dictynidae	*Dictyna arundinacea*						x
Arachnida	Araneae	Dictynidae	*Argenna subnigra*	Nationally Scarce	F111		x		
Arachnida	Araneae	Phrurolithidae	*Phrurolithus festivus*			x	x		
Arachnida	Araneae	Clubionidae	*Clubiona neglecta sens. str.*			x			
Arachnida	Araneae	Gnaphosidae	*Zelotes latreillei*			x			
Arachnida	Araneae	Thomisidae	*Xysticus cristatus*				x		
Arachnida	Araneae	Thomisidae	*Ozyptila simplex*		F111	x			
Arachnida	Araneae	Salticidae	*Heliophanus flavipes*		F001	x			x
Arachnida	Araneae	Salticidae	*Euophrys frontalis*			x	x		
Arachnida	Araneae	Salticidae	*Talavera aequipes*		F111	x			
Insecta	Coleoptera	Carabidae	*Nebria brevicollis*			x			
Insecta	Coleoptera	Carabidae	*Bembidion guttula*						x

Class	Order	Family	Species	Status	Stenotopic Assemblage	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Insecta	Coleoptera	Carabidae	*Pterostichus madidus*			x			
Insecta	Coleoptera	Carabidae	*Calathus fuscipes*			x			
Insecta	Coleoptera	Carabidae	*Oxypselaphus obscurus*						x
Insecta	Coleoptera	Carabidae	*Amara aenea*			x			
Insecta	Coleoptera	Carabidae	*Amara communis*			x			
Insecta	Coleoptera	Carabidae	*Amara convexior*			x			
Insecta	Coleoptera	Carabidae	*Amara lunicollis*			x			
Insecta	Coleoptera	Carabidae	*Amara ovata*			x			
Insecta	Coleoptera	Carabidae	*Amara tibialis*			x			
Insecta	Coleoptera	Carabidae	*Harpalus affinis*			x			
Insecta	Coleoptera	Carabidae	*Harpalus rufipes*		F003	x			
Insecta	Coleoptera	Carabidae	*Badister bullatus*			x			
Insecta	Coleoptera	Carabidae	*Demetrias atricapillus*						x
Insecta	Coleoptera	Carabidae	*Paradromius linearis*						x
Insecta	Coleoptera	Carabidae	*Philorhizus melanocephalus*						x
Insecta	Coleoptera	Carabidae	*Syntomus foveatus*			x			
Insecta	Coleoptera	Carabidae	*Syntomus obscuroguttatus*						x
Insecta	Coleoptera	Carabidae	*Microlestes minutulus*						x
Insecta	Coleoptera	Staphylinidae	*Tachyporus dispar*				x		x
Insecta	Coleoptera	Staphylinidae	*Tachyporus hypnorum*						x
Insecta	Coleoptera	Staphylinidae	*Tachyporus nitidulus*						x
Insecta	Coleoptera	Staphylinidae	*Tachyporus solutus*						x
Insecta	Coleoptera	Staphylinidae	*Tachinus rufipes*			x			
Insecta	Coleoptera	Staphylinidae	*Mocyta fungi*						x
Insecta	Coleoptera	Staphylinidae	*Aleochara bipustulata*			x			
Insecta	Coleoptera	Staphylinidae	*Drusilla canaliculata*			x			x
Insecta	Coleoptera	Staphylinidae	*Cypha longicornis*						x
Insecta	Coleoptera	Staphylinidae	*Stenus fulvicornis*						x
Insecta	Coleoptera	Staphylinidae	*Stenus latifrons*						x
Insecta	Coleoptera	Staphylinidae	*Stenus similis*						x
Insecta	Coleoptera	Staphylinidae	*Stenus aceris*				x		x
Insecta	Coleoptera	Staphylinidae	*Stenus ossium*			x			
Insecta	Coleoptera	Staphylinidae	*Stenus palustris*	Nationally Scarce (Nb)	W313				x
Insecta	Coleoptera	Staphylinidae	*Paederus littoralis*			x	x		
Insecta	Coleoptera	Staphylinidae	*Paederus riparius*		W314				x
Insecta	Coleoptera	Staphylinidae	*Ocypus aeneocephalus*			x			
Insecta	Coleoptera	Staphylinidae	*Tasgius globulifer*			x			

Class	Order	Family	Species	Status	Stenotopic Assemblage	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Insecta	Coleoptera	Staphylinidae	*Quedius schatzmayri*				x		
Insecta	Coleoptera	Staphylinidae	*Xantholinus linearis*			x			
Insecta	Coleoptera	Scarabaeidae	*Onthophagus joannae*			x		x	
Insecta	Coleoptera	Scirtidae	*Microcara testacea*						x
Insecta	Coleoptera	Scirtidae	*Cyphon coarctatus*						x
Insecta	Coleoptera	Elateridae	*Agrypnus murinus*		F112	x			
Insecta	Coleoptera	Elateridae	*Athous bicolor*						x
Insecta	Coleoptera	Elateridae	*Agriotes sputator*				x		x
Insecta	Coleoptera	Cantharidae	*Cantharis nigra*						x
Insecta	Coleoptera	Cantharidae	*Cantharis lateralis*						x
Insecta	Coleoptera	Cantharidae	*Cantharis rufa*						x
Insecta	Coleoptera	Cantharidae	*Rhagonycha fulva*						x
Insecta	Coleoptera	Kateretidae	*Brachypterus glaber*						x
Insecta	Coleoptera	Kateretidae	*Brachypterus urticae*						x
Insecta	Coleoptera	Silvanidae	*Psammoecus bipunctatus*						x
Insecta	Coleoptera	Cryptophagidae	*Atomaria gutta*						x
Insecta	Coleoptera	Cryptophagidae	*Atomaria rubella*						x
Insecta	Coleoptera	Coccinellidae	*Rhyzobius litura*						x
Insecta	Coleoptera	Coccinellidae	*Coccinella septempunctata*					x	
Insecta	Coleoptera	Coccinellidae	*Tytthaspis sedecimpunctata*						x
Insecta	Coleoptera	Coccinellidae	*Subcoccinella vigintiquattuorpunctata*						x
Insecta	Coleoptera	Latridiidae	*Enicmus transversus*						x
Insecta	Coleoptera	Latridiidae	*Corticaria impressa*						x
Insecta	Coleoptera	Latridiidae	*Melanophthalma suturalis*		A213				x
Insecta	Coleoptera	Oedemeridae	*Oedemera nobilis*			x		x	x
Insecta	Coleoptera	Oedemeridae	*Oedemera lurida*				x		
Insecta	Coleoptera	Chrysomelidae	*Longitarsus dorsalis*		F111	x			
Insecta	Coleoptera	Chrysomelidae	*Neocrepidodera ferruginea*						x
Insecta	Coleoptera	Chrysomelidae	*Neocrepidodera transversa*						x
Insecta	Coleoptera	Chrysomelidae	*Chaetocnema arida*						x
Insecta	Coleoptera	Chrysomelidae	*Chaetocnema hortensis*			x			
Insecta	Coleoptera	Chrysomelidae	*Cryptocephalus bipunctatus*	Nationally Scarce	F001, F112	x			
Insecta	Coleoptera	Apionidae	*Diplapion stolidum*	Nationally Scarce (Nb)	F111		x		
Insecta	Coleoptera	Apionidae	*Protapion assimile*				x		
Insecta	Coleoptera	Apionidae	*Ischnopterapion loti*				x		
Insecta	Coleoptera	Apionidae	*Oxystoma pomonae*						x
Insecta	Coleoptera	Curculionidae	*Otiorhynchus ovatus*			x			

Class	Order	Family	Species	Status	Stenotopic Assemblage	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Insecta	Coleoptera	Curculionidae	*Phyllobius roboretanus*						x
Insecta	Coleoptera	Curculionidae	*Barypeithes pellucidus*			x	x		
Insecta	Coleoptera	Curculionidae	*Sciaphilus asperatus*			x			
Insecta	Coleoptera	Curculionidae	*Tanymecus palliatus*	Nationally Scarce (Nb)					x
Insecta	Coleoptera	Curculionidae	*Sitona lineatus*			x			x
Insecta	Coleoptera	Curculionidae	*Larinus planus*	[Nationally Scarce (Nb)]	F112	x			
Insecta	Coleoptera	Curculionidae	*Hypera zoilus*			x			
Insecta	Coleoptera	Curculionidae	*Anthonomus rubi*		F001	x	x		x
Insecta	Diptera	Limoniidae	*Phylidorea ferruginea*						x
Insecta	Diptera	Anisopodidae	*Sylvicola punctatus*					x	
Insecta	Diptera	Ptychopteridae	*Ptychoptera contaminata*						x
Insecta	Diptera	Rhagionidae	*Chrysopilus cristatus*						x
Insecta	Diptera	Tabanidae	*Haematopota crassicornis*					x	
Insecta	Diptera	Tabanidae	*Haematopota pluvialis*			x			
Insecta	Diptera	Stratiomyidae	*Nemotelus notatus*					x	x
Insecta	Diptera	Stratiomyidae	*Nemotelus uliginosus*			x			
Insecta	Diptera	Stratiomyidae	*Chloromyia formosa*					x	x
Insecta	Diptera	Asilidae	*Leptogaster cylindrica*					x	x
Insecta	Diptera	Empididae	*Empis livida*			x			
Insecta	Diptera	Dolichopodidae	*Dolichopus festivus*			x			
Insecta	Diptera	Dolichopodidae	*Dolichopus griseipennis*					x	
Insecta	Diptera	Dolichopodidae	*Dolichopus trivialis*						x
Insecta	Diptera	Dolichopodidae	*Poecilobothrus nobilitatus*					x	
Insecta	Diptera	Syrphidae	*Melanostoma mellinum*					x	x
Insecta	Diptera	Syrphidae	*Melanostoma scalare*			x			
Insecta	Diptera	Syrphidae	*Platycheirus clypeatus*						x
Insecta	Diptera	Syrphidae	*Platycheirus fulviventris*					x	
Insecta	Diptera	Syrphidae	*Chrysotoxum bicinctum*			x			
Insecta	Diptera	Syrphidae	*Episyrphus balteatus*					x	
Insecta	Diptera	Syrphidae	*Eupeodes corollae*			x			
Insecta	Diptera	Syrphidae	*Cheilosia illustrata*					x	
Insecta	Diptera	Syrphidae	*Neoascia tenur*						x
Insecta	Diptera	Syrphidae	*Eristalinus sepulchralis*					x	x
Insecta	Diptera	Syrphidae	*Eristalis arbustorum*					x	
Insecta	Diptera	Syrphidae	*Helophilus pendulus*					x	
Insecta	Diptera	Syrphidae	*Volucella bombylans*					x	
Insecta	Diptera	Syrphidae	*Syritta pipiens*					x	

Class	Order	Family	Species	Status	Stenotopic Assemblage	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Insecta	Diptera	Lauxaniidae	*Sapromyza quadripunctata*					x	
Insecta	Diptera	Sciomyzidae	*Pherbellia cinerella*			x			
Insecta	Diptera	Sepsidae	*Sepsis fulgens*					x	
Insecta	Diptera	Sepsidae	*Sepsis punctum*					x	
Insecta	Diptera	Opomyzidae	*Opomyza petrei*					x	
Insecta	Diptera	Scathophagidae	*Scathophaga stercoraria*					x	
Insecta	Diptera	Anthomyiidae	*Anthomyia confusanea*					x	
Insecta	Diptera	Anthomyiidae	*Adia cinerella*					x	
Insecta	Diptera	Anthomyiidae	*Delia platura*			x		x	
Insecta	Diptera	Anthomyiidae	*Pegoplata aestiva*					x	x
Insecta	Diptera	Anthomyiidae	*Pegoplata infirma*					x	
Insecta	Diptera	Fanniidae	*Fannia serena*					x	
Insecta	Diptera	Muscidae	*Coenosia pumila*						x
Insecta	Diptera	Muscidae	*Hydrotaea pilipes*	pNationally Scarce				x	
Insecta	Diptera	Muscidae	*Morellia aenescens*					x	x
Insecta	Diptera	Muscidae	*Musca autumnalis*					x	x
Insecta	Diptera	Muscidae	*Neomyia cornicina*					x	x
Insecta	Diptera	Muscidae	*Polietes lardarius*					x	
Insecta	Diptera	Muscidae	*Stomoxys calcitrans*					x	
Insecta	Diptera	Muscidae	*Graphomya maculata*						x
Insecta	Diptera	Muscidae	*Hebecnema umbratica*					x	
Insecta	Diptera	Muscidae	*Helina evecta*					x	
Insecta	Diptera	Muscidae	*Helina reversio*			x		x	
Insecta	Diptera	Muscidae	*Phaonia tuguriorum*			x			
Insecta	Diptera	Calliphoridae	*Lucilia caesar*			x			
Insecta	Diptera	Rhinophoridae	*Phyto discrepans*			x			
Insecta	Diptera	Rhinophoridae	*Tricogena rubricosa*			x			
Insecta	Diptera	Sarcophagidae	*Sarcophaga nigriventris*			x			
Insecta	Diptera	Sarcophagidae	*Sarcophaga variegata*			x			
Insecta	Diptera	Tachinidae	*Eriothrix rufomaculata*			x			x
Insecta	Diptera	Tephritidae	*Tephritis divisa*					x	
Insecta	Hemiptera, Auchenorrhyncha	Aphrophoridae	*Philaenus spumarius*						x
Insecta	Hemiptera, Auchenorrhyncha	Aphrophoridae	*Neophilaenus lineatus*						x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Anaceratagallia ribauti*			x			
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Anoscopus albifrons*						x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Arthaldeus pascuellus*						x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Euscelis incisus*						x

Class	Order	Family	Species	Status	Stenotopic Assemblage	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Streptanus sordidus*						x
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	*Zyginidia scutellaris*						x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Conomelus anceps*						x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Criomorphus albomarginatus*						x
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Hyledelphax elegantulus*				x		
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Javesella dubia*				x		
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	*Javesella pellucida*						x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Drymus sylvaticus*						x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Scolopostethus decoratus*		F003	x			
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Scolopostethus thomsoni*						x
Insecta	Hemiptera, Heteroptera	Lygaeidae	*Trapezonotus desertus*			x			
Insecta	Hemiptera, Heteroptera	Anthocoridae	*Orius niger*			x			
Insecta	Hemiptera, Heteroptera	Miridae	*Capsus ater*					x	x
Insecta	Hemiptera, Heteroptera	Miridae	*Leptopterna dolabrata*					x	
Insecta	Hemiptera, Heteroptera	Miridae	*Miridius quadrivirgatus*						x
Insecta	Hemiptera, Heteroptera	Miridae	*Notostira elongata*						x
Insecta	Hemiptera, Heteroptera	Miridae	*Orthops campestris*						x
Insecta	Hemiptera, Heteroptera	Miridae	*Stenodema calcarata*						x
Insecta	Hymenoptera	Cephidae	*Cephus spinipes*						x
Insecta	Hymenoptera	Tenthredinidae	*Cladius pectinicornis*					x	
Insecta	Hymenoptera	Crabronidae	*Crossocerus megacephalus*		A212, F001	x			
Insecta	Hymenoptera	Crabronidae	*Pemphredon lethifer agg.*		A212, F001				x
Insecta	Hymenoptera	Andrenidae	*Andrena bicolor*		F002	x			
Insecta	Hymenoptera	Andrenidae	*Andrena dorsata*		F002	x			
Insecta	Hymenoptera	Andrenidae	*Andrena minutula*		F002	x			
Insecta	Hymenoptera	Apidae	*Bombus lapidarius*		F002			x	
Insecta	Hymenoptera	Apidae	*Bombus pascuorum*					x	
Insecta	Hymenoptera	Apidae	*Bombus terrestris*		F002	x			
Insecta	Hymenoptera	Colletidae	*Hylaeus brevicornis*		F001, F002	x			
Insecta	Hymenoptera	Colletidae	*Hylaeus communis*		F002	x		x	
Insecta	Hymenoptera	Colletidae	*Hylaeus dilatatus*		F002			x	x
Insecta	Hymenoptera	Halictidae	*Lasioglossum calceatum*		F002			x	
Insecta	Hymenoptera	Halictidae	*Lasioglossum lativentre*		F002				x
Insecta	Hymenoptera	Halictidae	*Lasioglossum leucozonium*		F002	x			
Insecta	Hymenoptera	Halictidae	*Lasioglossum malachurum*	[Nationally Scarce (Nb)]	F002	x			
Insecta	Hymenoptera	Halictidae	*Lasioglossum morio*		F002	x		x	
Insecta	Hymenoptera	Halictidae	*Lasioglossum pauxillum*	[Nationally Scarce (Na)]	F002	x		x	

Class	Order	Family	Species	Status	Stenotopic Assemblage	Puriton Ash Ground LWS	Puriton Cowslip Field LWS	Puriton Meadows & Rail Spur LWS	Puriton Rhynes & Ponds LWS
Insecta	Hymenoptera	Halictidae	*Lasioglossum smeathmanellum*		F002	x			
Insecta	Hymenoptera	Halictidae	*Lasioglossum villosulum*		F002	x		x	
Insecta	Hymenoptera	Halictidae	*Sphecodes ephippius*			x			
Insecta	Hymenoptera	Megachilidae	*Osmia spinulosa*		F002, F111			x	
Insecta	Hymenoptera	Vespidae	*Symmorphus gracilis*		A212, F001	x			
Insecta	Hymenoptera	Vespidae	*Vespula germanica*			x			
Insecta	Lepidoptera	Zygaenidae	*Zygaena lonicerae*					x	
Insecta	Lepidoptera	Hesperiidae	*Ochlodes sylvanus*					x	
Insecta	Lepidoptera	Pieridae	*Pieris rapae*					x	x
Insecta	Lepidoptera	Nymphalidae	*Coenonympha pamphilus*	NT, SoPI	F112			x	
Insecta	Lepidoptera	Nymphalidae	*Maniola jurtina*					x	x
Insecta	Lepidoptera	Nymphalidae	*Vanessa atalanta*					x	
Insecta	Lepidoptera	Nymphalidae	*Aglais urticae*					x	
Insecta	Odonata	Platycnemididae	*Platycnemis pennipes*		W125			x	
Insecta	Odonata	Coenagriidae	*Coenagrion puella*					x	
Insecta	Orthoptera	Acrididae	*Omocestus viridulus*					x	
Insecta	Orthoptera	Acrididae	*Chorthippus parallelus*						x
Insecta	Orthoptera	Acrididae	*Myrmeleotettix maculatus*			x			
Malacostraca	Isopoda	Philosciidae	*Philoscia muscorum*						x
Malacostraca	Isopoda	Armadillidiidae	*Armadillidium vulgare*			x			

241	11	38	96	23	62	111

Table 18: Stenotopic species recorded on External Fields during 2020.

Order	Family	Species	Conservation status	Broad biotope	Habitat	SAT	SAT Name	Habitat score
Coleoptera	Staphylinidae	*Hypnogyra angularis*	Nationally Scarce (Na)	tree-associated	decaying wood	A211	Heartwood decay	IEC (older version): 1, IEC: 2
Diptera	Syrphidae	*Myathropa florea*		tree-associated	decaying wood	A211	Heartwood decay	
Coleoptera	Anobiidae	*Ptilinus pectinicornis*		tree-associated	decaying wood	A211	Heartwood decay	
Coleoptera	Scraptiidae	*Anaspis garneysi*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Scraptiidae	*Anaspis maculata*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Anobiidae	*Anobium punctatum*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Cerambycidae	*Grammoptera ruficornis*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Hymenoptera	Crabronidae	*Pemphredon lugubris*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Cerambycidae	*Pogonocherus hispidulus*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Cerambycidae	*Pogonocherus hispidus*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Hymenoptera	Crabronidae	*Psenulus concolor*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Curculionidae	*Scolytus multistriatus*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Curculionidae	*Scolytus rugulosus*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Lepidoptera	Sesiidae	*Synanthedon myopaeformis*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Coleoptera	Cerambycidae	*Tetrops praeustus*		tree-associated	decaying wood	A212	Bark & sapwood decay	
Hymenoptera	Crabronidae	*Crossocerus podagricus*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub edge	
Hymenoptera	Crabronidae	*Ectemnius cavifrons*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub edge	
Hymenoptera	Crabronidae	*Ectemnius cephalotes*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub edge	
Hymenoptera	Crabronidae	*Ectemnius continuus*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub edge	
Hymenoptera	Crabronidae	*Ectemnius lapidarius*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub edge	
Hymenoptera	Crabronidae	*Ectemnius lituratus*		open habitats; tree-associated	decaying wood	A212, F001	Bark & sapwood decay; Scrub edge	
Coleoptera	Erotylidae	*Triplax russica*		tree-associated	decaying wood	A213	Fungal fruitig bodies	IEC (older version): 1, IEC: 1
Hemiptera	Anthocoridae	*Cardiastethus fasciiventris*		tree-associated	arboreal; decaying wood	A215	Epiphyte fauna	
Araneae	Agelenidae	*Agelena labyrinthica*		open habitats	tall sward & scrub	F001	Scrub edge	
Hemiptera	Cicadellidae	*Allygus mixtus*		open habitats	tall sward & scrub	F001	Scrub edge	
Coleoptera	Curculionidae	*Anthonomus rubi*		open habitats	tall sward & scrub	F001	Scrub edge	
Orthoptera	Phaneropteridae	*Leptophyes punctatissima*		open habitats	tall sward & scrub	F001	Scrub edge	
Lepidoptera	Nymphalidae	*Pararge aegeria*		open habitats	tall sward & scrub	F001	Scrub edge	
Orthoptera	Tettigoniidae	*Pholidoptera griseoaptera*		open habitats	tall sward & scrub	F001	Scrub edge	
Lepidoptera	Nymphalidae	*Pyronia tithonus*		open habitats	tall sward & scrub	F001	Scrub edge	
Hemiptera	Rhopalidae	*Rhopalus (Rhopalus) subrufus*		open habitats	tall sward & scrub	F001	Scrub edge	
Hymenoptera	Andrenidae	*Andrena chrysosceles*		open habitats	short sward & bare ground	F001, F002	Scrub edge, Rich flower resource	
Hymenoptera	Andrenidae	*Andrena synadelpha*		open habitats	short sward & bare ground	F001, F002	Scrub edge, Rich flower resource	
Hymenoptera	Andrenidae	*Andrena dorsata*		open habitats	short sward & bare ground	F002	Rich flower resource	soft rock cliff: 3
Hymenoptera	Andrenidae	*Andrena flavipes*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Andrenidae	*Andrena haemorrhoa*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Andrenidae	*Andrena labialis*		open habitats	short sward & bare ground	F002	Rich flower resource	

Order	Family	Species	Conservation status	Broad biotope	Habitat	SAT	SAT Name	Habitat score
Hymenoptera	Andrenidae	*Andrena semilaevis*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Apidae	*Bombus hypnorum*		open habitats; tree-associated	shaded woodland floor; tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Apidae	*Bombus lapidarius*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Colletidae	*Colletes similis*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Colletidae	*Hylaeus communis*		open habitats	tall sward & scrub	F002	Rich flower resource	
Hymenoptera	Halictidae	*Lasioglossum malachurum*		open habitats	short sward & bare ground	F002	Rich flower resource	soft rock cliff: 3
Hymenoptera	Halictidae	*Lasioglossum pauxillum*		open habitats	short sward & bare ground	F002	Rich flower resource	calcareous grassland: Low
Hymenoptera	Halictidae	*Lasioglossum villosulum*		open habitats	short sward & bare ground	F002	Rich flower resource	
Hymenoptera	Apidae	*Nomada flava*		open habitats	short sward & bare ground	F002	Rich flower resource	
Coleoptera	Elateridae	*Agrypnus murinus*		open habitats	short sward & bare ground	F112	Open short sward	calcareous grassland: Moderate
Coleoptera	Chrysomelidae	*Longitarsus lycopi*	Nationally Scarce	open habitats	short sward & bare ground	F112	Open short sward	calcareous grassland: Moderate
Diptera	Tabanidae	*Atylotus rusticus*	Nationally Rare	wetland	peatland	W314	Reed-fen & pools	
Diptera	Stratiomyidae	*Oplodontha viridula*		wetland	marshland; peatland	W314	Reed-fen & pools	grazing marsh - salinity: 0, grazing marsh - status: 2, seepage (calcareous): B

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Gravity

Smart Campus

Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.10

SSSI Unit Condition Summary

SSSI Unit Condition Summary

Below is a summary of the unit conditions for all SSSIs underpinning relevant European sites. The information provided includes all underpinning SSSIs, the number of units present and the current condition of any units.

Condition assessments are undertaken of each unit as part of regular monitoring by Natural England. Units are assessed to be one of the following criteria:

- Favourable;
- Unfavourable – recovering;
- Unfavourable - no change;
- Unfavourable – declining; or
- Partially destroyed.

Severn Estuary SPA and Ramsar

Aust Cliff SSSI

- 2 units favourable

Blue Anchor and Lilstock Coast SSSI

- 8 units favourable

Bridgewater Bay SSSI

- 14 units favourable
- 15 units unfavourable – recovering
- 1 unit unfavourable – no change

Clevedon Shore SSSI

- 1 unit favourable

Lydney Cliff SSSI

- 2 units favourable

Middle Hope SSSI

- 5 units favourable
- 1 unit unfavourable – recovering

Portishead to Black Nore SSSI

- 5 units favourable

Purton Passage SSSI

- 1 unit favourable

Severn Estuary SSSI

- 63 units favourable
- 1 unit unfavourable - recovering
- 13 units unfavourable -no change
- 5 units unfavourable – declining

Spring Cove Cliffs SSSI

- 1 unit favourable

Steep Holm SSSI

- 1 unit favourable

Upper Severn Estuary SSSI

- 7 units favourable
- 2 units unfavourable – recovering
- 2 units unfavourable – declining

Severn Estuary SAC

Bridgewater Bay SSSI

- 14 units favourable
- 15 units unfavourable – recovering
- 1 unit unfavourable – no change

Severn Estuary SSSI

- 63 units favourable
- 1 unit unfavourable – recovering
- 13 units unfavourable -no change
- 5 units unfavourable – declining

Upper Severn Estuary SSSI

- 7 units favourable
- 2 units unfavourable – recovering
- 2 units unfavourable – declining

Somerset Levels & Moors SPA and Ramsar

Catcott Edington and Chilton Moors SSSI

- 36 units unfavourable – declining
- 1 unit partially destroyed

Curry and Hay Moors SSSI

- 24 units unfavourable – declining

Kings Sedgemoor SSSI

- 21 units unfavourable – declining

Moorlinch SSSI

- 11 units unfavourable – declining

Shapwick Heath SSSI

- 16 units favourable
- 6 units unfavourable – declining

Southlake Moor SSSI

- 3 units unfavourable – declining

Tealham and Tadham Moors SSSI

- 22 units unfavourable – declining

West Moor SSSI

- 10 units unfavourable – declining

West Sedgemoor SSSI

- 7 units unfavourable – declining

Westhay Heath SSSI

- 8 units favourable

Westhay Moor SSSI

- 5 units favourable
- 3 units unfavourable -no change
- 15 units unfavourable – declining
- 2 units partially destroyed

West Moor SSSI

- 20 units unfavourable – declining

North Somerset and Mendip Bats SAC

Banwell Caves SSSI

- 3 units favourable

Banwell Ochre Caves SSSI

- 1 unit favourable
- 1 unit unfavourable -no change

Brockley Hall Stables SSSI

- 1 unit favourable

Compton Martin Ochre Mine SSSI

- 1 unit unfavourable -no change

Kings wood and Urchin Wood SSSI

- 8 units unfavourable - recovering
- 5 units unfavourable – declining

The Cheddar Complex SSSI

- 12 units favourable
- 7 units unfavourable - recovering

Wookey Hole SSSI

- 5 units favourable

Exmoor & Quantock Oakwoods SAC

Barle Valley SSSI

- 5 units favourable
- 29 units unfavourable - recovering
- 1 unit unfavourable -no change

North Exmoor SSSI

- 13 units favourable
- 74 units unfavourable - recovering
- 7 units unfavourable -no change
- 1 unit unfavourable – declining

The Quantocks SSSI

- 11 units favourable
- 18 units unfavourable - recovering
- 7 units unfavourable -no change
- 6 units unfavourable – declining
- 1 unit NOT RECORDED

Watersmeet SSSI

- 1 unit favourable
- 10 units unfavourable - recovering
- 5 units unfavourable -no change

West Exmoor Coast and Woods SSSI

- 6 units favourable
- 11 units unfavourable - recovering
- 2 units unfavourable -no change
- 1 unit unfavourable – declining

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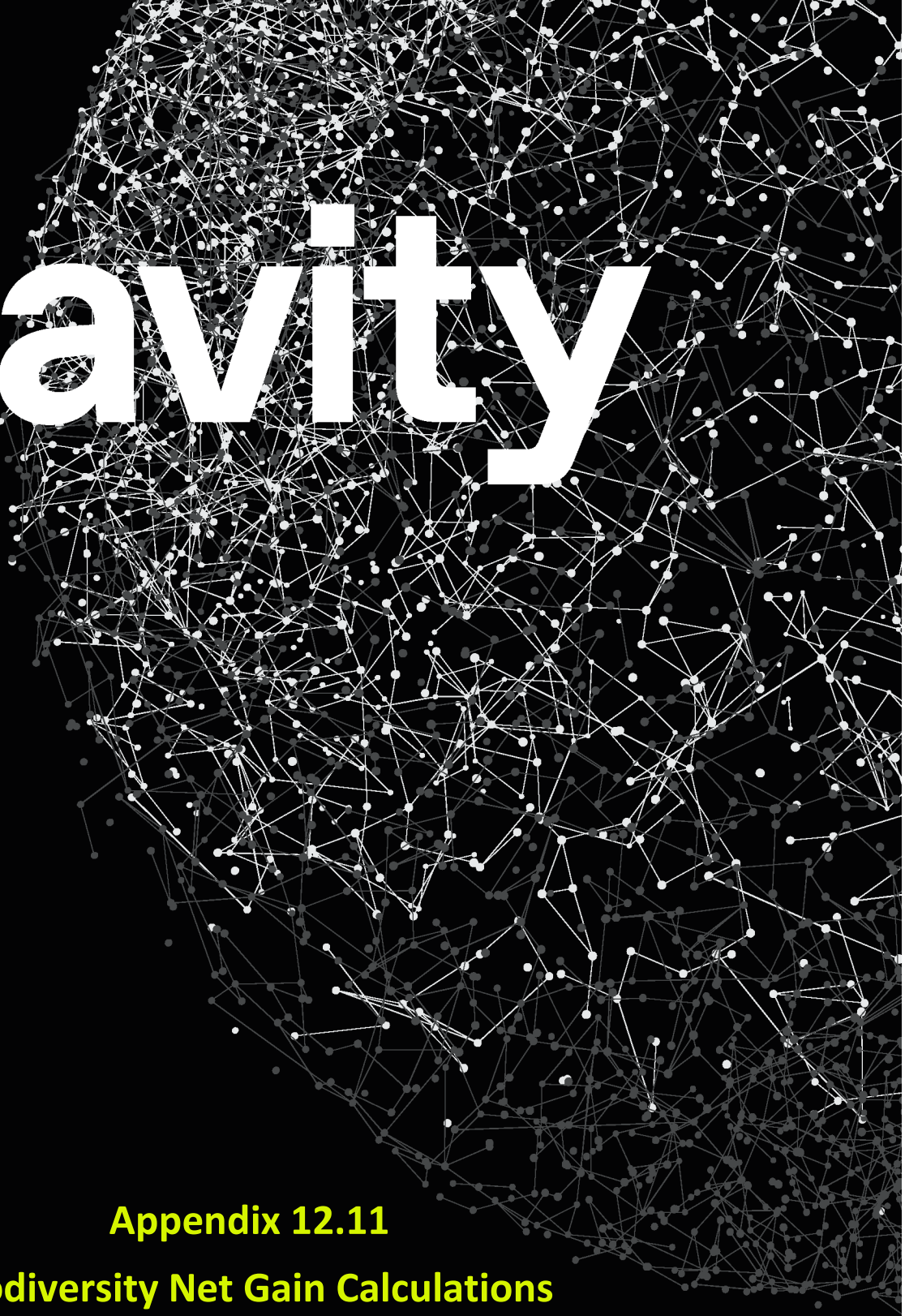

Appendix 12.11

Biodiversity Net Gain Calculations

CONTENTS

APPENDICES

1. INTRODUCTION

1.1. Background

1.1.1. This document describes the results of the Biodiversity Impact Assessment undertaken. The assessment uses standardised methodologies where appropriate in order to qualify the biodiversity impact. It is also fully recognised within this assessment that a very precautionary approach to assessment has been adopted given the nature of the Local Development Order proposals.

1.2. Biodiversity Net Gain Assessment Methodology

1.2.1. A Biodiversity Net Gain (BNG) Assessment is a tool used to assess whether a project is capable of delivering measurable contributions to local biodiversity.

1.2.2. In order to undertake a BNG assessment, the most recent version of the Defra Biodiversity Metric V3 (hereafter, referred to as the 'Metric') has been applied to the Site.

1.2.3. The methodology for undertaking the BNG is based on the guidance provided within the Technical Supplement and User Guide published by Defra, in addition to the application of professional judgement where appropriate.

1.2.4. The process involves undertaking a quantitative review of the biodiversity value of the Site in its baseline condition, which in this instance is the 2032 Baseline scenario where the extant 2017 Consent has been delivered. This baseline is compared to what will be delivered, post development, once the Proposed Development has been implemented.

1.2.5. In this instance, the strategic landscape parameters plan (included at Appendix 3.1f of the ES) has been used to inform the post development scenario. In light of the detail presented as part of the parameter plan, the proposals have been interpreted on the basis of the very worst case scenario, where biodiversity impacts are considered to be at their potential maximum. For example, where the parameter plan allocates an area of land for development (i.e. the rail corridor), the existing habitats and ecological features are considered to be lost in full, with no habitat delivery as part of the proposals. That scenario is considered the most appropriate to inform the BNG assessment using the Defra Biodiversity Metric because there exists greater certainty with the values used.

1.2.6. It must however, be fully recognised that the assessed worst-case scenario would be highly unlikely to be representative of the final developed scheme.

1.2.7. Net gain can either be achieved directly through site-based measures (i.e. included within the planning boundary), or delivered as an off-site measure through bespoke off-site habitat creation or in certain cases, the purchasing of biodiversity credits through an approved credit broker.

1.3. The DEFRA Metric

1.4. The Metric works by assigning credits to the habitats located within the Development Site (both baseline and post-development). These credits are then used as a proxy to determine the ecological value of the site.

1.5. The respective credit score of each habitat is gauged by calculating key parameters that influence the habitats reported value. These are as follow:

- Habitat type / distinctiveness;
- Habitat area;
- Habitat condition; and,
- Strategic significance.

1.6. For either created or enhanced habitats, the additional main following parameters are applied;

- Habitat target type / distinctiveness;
- Habitat target condition;
- Time until target condition is reached; and,
- Difficulty of creation / enhancement.

1.7. The value for linear habitats are calculated separately, however follow a similar working methodology as those described for area based habitats above.

1.8. Both the 2032 baseline and Proposed Development for the Site have been assessed against the above identified parameters. The 2032 Baseline scenario is set out in detail within the biodiversity chapter (Chapter 12) and the post-development proposals for the Site shown graphically within the strategic landscape parameters plan (included at Appendix 3.1f of the ES).

1.9. In order to account for the use of UK Habitat Classification system (UKHab) within the Metric, a 'best fit' approach has been taken in order to ensure the most representative Phase-1 habitat type is being utilised for each of the baseline and post-development habitats within the Metric. This has been determined using the technical supplements provided within the Metric in addition to guidance published by the UK Habitat Classification Working Group.

Limitations

1.10. Biodiversity Metrics provide a way of measuring the biodiversity value of a site pre-development, and comparing it to what it will be, post-development. Due the nature of this process, whilst undoubtedly a helpful tool in many instances, Metric analysis alone runs the risk of being prejudicial, being limited by the pre-assigned data input categories and algorithms, leaving very little room for professional judgement or for the application of a more nuanced and qualitative approach.

1.11. This is most obviously highlighted by the fact that Metrics do not currently take into consideration measures directly relating to protected or notable species. It only considers proposals from a purely mathematical perspective which is limited to habitat type and composition / quality. For instance, the provision of a bespoke mitigation strategy that would, for example, see the inclusion of a variety of amphibian habitats to aid population success, will not necessarily be reflected within the post development scenario as this will simply assess the habitats in

isolation and not the broader (potentially more valuable) ecological benefits. A further example of this would be that there is no mechanism currently in place that would reward schemes for installing specific features, such as bat and bird boxes or hibernacula that are considered to offer ecological betterment in tandem with habitat enhancement / creation.

1.12. It should be noted that Biodiversity Metrics favour certain habitat types such as those that are typically 'easier' to create and in shorter time frames. This can very often lead to a situation where project design is stifled, with more ambitious projects running the risk of being penalised under the inherent scoring system, due to the timescales involved in a habitat (such as broadleaved woodland) reaching its full ecological potential.

2. BIODIVERSTIY NET GAIN ASSESSMENT RESULTS

2.1. A BIA using the most recent version of the DEFRA Metric (Version 3) has been undertaken for the Proposed Development.

2.2. The approach adopted uses the 2032 Baseline and a worst-case scenario associated with the outcome of the Proposed Development. The completed Metric is included at Appendix 12.11A of this report. It should be noted that as part of the Metric, those habitat areas which feature in the post development calculations are as follows:

- Retained habitat in the northeast: reedbed / grassland and wetland habitat associated with the Puriton Rhynes and Ponds LWS; Borrow Pit LWS (fishing lakes);
- Vegetated linear planning corridor linking Gravity Park and Puriton Rhynes and Ponds LWS;
- Proposed Gravity Park;
- Retained hedgerow along Woolavington Road;
- Retained section of Puriton Ash Ground LWS and associated land west of the rail corridor; and
- Retained parts of North Mead Drove Fields LWS (outside of rail corridor);
- Landscape planting along the northern boundary (between North Mead Drove Fields LWS and the reedbed).

Output

2.3. The Biodiversity Metric returns the following headline results:

- Existing habitat area score: **956.34 credits**
- Existing hedgerow linear score: **140.60 credits**
- Existing river linear score[1]**: 96.4 credits**

1.1 When considering the proposed on-site landscaping measures, the following scores are calculated:

- Post-development habitat area score: **354.11 credits**
- Post-development hedgerow linear score: **94.44 credits**
- Post-development river linear score: **65.40 credits**

2.4. The Metric indicates that when considered solely within the confines the Site boundary, the proposals will result in a 602.23 loss of credits for habitat area, a 46.16 loss for hedgerow linear habitat and a 31.00 loss of credits for river linear habitat.

2.5. Therefore, when applying the Metric, in order to off-set the above losses and additionally provide a 10% gain, 697.864 credits for habitat area will be required. Additional considerations, including further mitigation and compensation to be delivered, are discussed in the following section.

[1] "River Linear score" relates to the rhynes.

3. FURTHER CONSIDERATIONS

3.1. Whilst the Metric approach demonstrates a loss of credits, as highlighted previously, a worst-case scenario was used in the assessment. This has, therefore, generated the maximum biodiversity impact likely to be delivered by the Proposed Development, only recognising mitigation and betterment in strategic landscape / ecology areas at the periphery of the Site (including retained Local Wildlife Site habitat and the proposed Gravity Park), and excluding all planting / habitat creation (green and blue infrastructure) which may be delivered within the development zones. No account has taken of any habitat provision within the rail corridor, a significant area which will almost certainly deliver elements of screen planting as well as sparsely vegetated / ephemeral habitat of significant value to invertebrates.

3.2. A more reasonable scenario is one which is reflective of the wider development aspirations for the Site and what would be delivered as part of a comprehensive package of ecological mitigation and betterment, both onsite and off-site, with reference to the Design Guide and Mitigation Checklist.

Onsite Ecological Mitigation and Betterment

3.3. The Development Proposals include for the significant provision of landscaping, which will include areas of publicly accessible open space available to new residents / workers / visitors, and the delivery of habitats of both intrinsic ecological value, and value to faunal species.

3.4. The Design Guide has a strong focus on delivering well designed, integrated, inclusive and attractive public settings with both pedestrian and cycle routes. The link between placemaking / aesthetics and ecological benefits is fully recognised and as such significant opportunities arise for habitat creation (including extensive tree planting) within the Site.

3.5. New housing provision would trigger requirements to deliver accessible open space for recreation purposes and this would provide an opportunity to further increase the quantum of grassland and tree / scrub / hedgerow planting. Placemaking nodes and localised greenspace will provide focal points within areas of build form. This will provide opportunities for further habitat provision of biodiversity value not currently reflected within the Metric.

3.6. Requirements for blue infrastructure also offer opportunities to provide well designed, connected aquatic habitats and associated species rich bankside habitat.

3.7. There is also the potential for further habitat creation, potentially linked with public access, to be delivered within the "Wellbeing and Arrival Zone" in the south-east of the Site. The Proposed Development seeks to provide green edges to reflect its campus feel as well as provide wellbeing areas at arrival points. Whilst these areas will be multipurpose, one of these purposes will be to deliver habitats of biodiversity value.

3.8. Habitat betterment will also arise across the frontage of the Site, along Woolavington Road. This would be a low energy zone with a range of specific mitigation measures delivered in respect of bats, which would also be of general

biodiversity benefit, with bolster planting comprising new shrub, tree and meadow grassland planting all features of the pallet of measures for this area. This linear corridor will connect into the proposed Gravity Park that will include orchard, scrub, hedgerows and grassland.

3.9. Linear planting in the east will connect Gravity Park with the retained fishing ponds and further north and west, to the mix of grasslands, trees and scrub, rhynes and water attenuation features. Additional betterment may also be provided, through the strengthening of vegetated linear features.

3.10. Habitat delivery associated with the western boundary adds further opportunities to increase the both the matrix of habitats present and connectivity through the site. As previously discussed, the rail corridor has been excluded in its entirety from the Metric calculations, but opportunities exist for new tree / shrub planting and sparse / ephemeral habitats which will link with wider habitat delivery in the west.

Off Site Species Mitigation Provisions

3.11. As part of the wider ecological mitigation strategy for the Site, specific off-site measures for Great Crested Newt (GCN) and Water Vole will be delivered. This will include the provision of new aquatic and terrestrial habitat of good quality and of high biodiversity value. These measures are also not considered within the Metric approach.

3.12. A Great Crested Newt District Level Licence (GCNDLL) will be obtained. This process involves the allocation of funds, calculated on the basis of the level of impact (i.e. number of ponds to be lost and area of terrestrial habitat loss), towards a strategic project designed for the purpose of creating, enhancing and managing habitat for GCN in areas of particular significance for the species (core population areas). This approach will provide greater benefits to the species overall, as the compensation strategies are designed on the landscape level. It is axiomatic that the provision of new ponds and long-term future management of supporting terrestrial habitat of particular value to GCN, will also deliver wider biodiversity gains.

3.13. At least 30 bespoke new ponds will be created as part of this approach to GCN mitigation. In the light of the landscape led approach to GCN mitigation delivered through the GCNDLL scheme, the proposed mitigation scheme is considered to be of ‘strategic’ significance. Schemes of strategic significance are afforded a greater weighting within the metric calculations and as such the value of any habitats delivered would be increased as part of a Metric (with a multiplier of 1.5). At this stage, it is not possible to determine the quantum (in area terms) of aquatic and terrestrial habitat or the increase in quality associated with any terrestrial habitat to be delivered. However, it is clear that such provisions will have ecological benefits, including benefits which extend beyond GCN considerations.

3.14. Similarly, the mitigation associated with Water Voles will include the relocation of the voles to a location (under licence) which will comprise retained / improved or newly created optimal aquatic and marginal / terrestrial habitat of increased biodiversity value. This again is not reflected within the Metric. It is estimated that approximately 1.5km (or equivalent) of new / enhanced, aquatic / bankside

habitat will be delivered. Again, it is axiomatic that this will deliver biodiversity benefits beyond simply considerations relating to Water Vole.

Avalon Marshes

3.15. Avalon Marshes is located close to the site and is within the Somerset Levels, one of the largest lowland wetlands in Britain. It is a landscape consisting of nature reserves (including designated sites), agricultural fields and pastures, drained by a network of rhynes. The area has a long history of peat cutting. It is strategically important for wildlife, especially the large flocks of migrating birds and other wetland animals, as reflect by various nature conservation designations.

3.16. The proposals can facilitate funding towards initiatives at the nearby Avalon Marshes, through the investment plan, with such funding directed towards land acquisition and habitat rehabilitation with the aim of buffering and connecting existing sensitive habitats and restoring natural processes across the Avalon Marshes landscape. These measures will deliver wetland and grassland habitats of significant ecological value, compensating for biodiversity losses at the Site.

3.17. In the absence of any additional betterment delivered at the Site itself or as part of species mitigation strategies (discussed above), based solely on the Metric results and considering likely scenarios at the Avalon Marshes; habitat improvements would need to be delivered across an area of between 70ha (assuming modified grassland in ‘poor condition’ is enhanced to lowland meadow of ‘good condition’) and 110ha (assuming modified grassland in ‘moderate condition’ is enhanced into floodplain grazing meadow of good condition). However, with reference to the foregoing, it is considered that off-site betterment would need to be delivered across a significantly lower hectarage of land.

Appendices

Appendix 12.11A

BNG Calculations
Results

Headline Results

Return to results menu

On-site baseline	*Habitat units*	956.34
	Hedgerow units	140.60
	River units	96.40
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	354.11
	Hedgerow units	94.44
	River units	65.40
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	-62.97%
	Hedgerow units	-32.83%
	River units	-32.16%
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	-602.23
	Hedgerow units	-46.16
	River units	-31.00
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	-62.97%
	Hedgerow units	-32.83%
	River units	-32.16%
Trading rules Satisfied?		No - Check Trading Summary

Gravity

Smart Campus

Gravity LDO Environmental Statement

Volume 2 – Appendices

Appendix 12.12 Shadow Habitat Regulations Assessment

THIS IS GRAVITY

ECOLOGYSOLUTIONS

Part of the ES Group

GRAVITY
LOCAL DEVELOPMENT ORDER

SHADOW HABITATS REGULATIONS ASSESSMENT

Pursuant to Regulation 63 of The Conservation of Habitats and Species Regulations 2017 (as amended)

October 2021
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ecology solutions for planners and developers

CONTENTS

PLANS

ANNEXES

1. INTRODUCTION

1.1. Background

1.1.1. This Shadow Habitats Regulations Assessment (sHRA) report has been prepared to provide sufficient information for the local planning authority in relation to the undertaking of an assessment of the effects of development proposals associated with the This is Gravity Ltd ("Gravity") enterprise zone site in Sedgemoor, Somerset (hereinafter, "the Gravity Site") on designated sites of nature conservation importance protected under The Conservation of Habitats and Species Regulations 2017 (as amended) (hereinafter, "the Habitats Regulations") and sites that are given the same protection in accordance with advice in the National Planning Policy Framework (NPPF[1]).

Site Characteristics

1.1.2. The Gravity Site is located within an rural setting, between the villages of Puriton (to the west) and Woolavington (to the east). The main component of the Gravity Site is located to the north east of the village of Puriton, and north-west of the village of Woolavington. In addition, the Gravity Site includes a railway spur to the north-west, a road connection from Junction 23 of the M5 motorway to the south-west and a reedbed system that connects to the River Huntspill situated to the north.

1.1.3. Broadly, the Gravity Site is a former Royal Ordnance Facility, previously occupied by a single manufacturing use, and closed in 2008. The former use comprised multiple buildings and compounds and bunds across the majority of the site. Currently the site is fully remediated and is being prepared through materials reclamation and constitutes a largely brownfield site. Parts of the site comprise grasslands, woodland, scrub, hedgerows, tall ruderal and ephemeral vegetation along with standing water, reed bed, wet and dry ditches (Rhynes) as well as buildings and hardstanding. There are also areas of disturbed / bare ground.

1.2. Gravity Proposals

1.2.1. The Gravity proposals can be summarised as the development of a smart campus including commercial building or buildings (current Use Classes E (a)-(g), B2, B8) and sui generis floorspace uses together with a range of buildings within Use Classes C1, C2, E (a) – (g) and F, including restaurants / cafes, shops, leisure, education and sui generis uses. Additionally the development of up to 750 homes (Use Class C3, together with associated infrastructure including restoration of the railway line for passenger and freight services, rail infrastructure including terminals, sidings and operational infrastructure and change of use of land to operational rail land, multi-modal transport interchange, energy generation, energy distribution and management infrastructure, utilities and associated buildings and infrastructure,

[1] Paragraph 181 of the NPPF (2021)

digital infrastructure, car parking, a site wide sustainable water management system and associated green infrastructure, access roads and landscaping.

1.3. Purpose of this Report

1.3.1. This report specifically assesses the potential significant effects of the development proposals on international / European designated sites (now commonly referred to as Habitats Sites). Within this document specific regard is had to the tests under Regulation 63 of the Habitats Regulations. Regulation 63 is described and considered further in Section 2 of this document.

1.3.2. Assessment under Regulation 63 of the Habitats Regulations is required in this instance, since the Gravity Site lies in relatively close proximity to a number of European / internationally designated sites. The following relevant designated sites are located within a 20km radius of the Gravity site:

- Somerset Levels and Moors SPA / Ramsar;
- Severn Estuary SPA / SAC / Ramsar;
- Mendip Limestone Grasslands SAC;
- Hestercombe House SAC;
- North Somerset & Mendip Bats SAC;
- Exmoor & Quantock Oakwoods SAC; and
- Mendip Woodlands SAC.

1.3.3. The proximity of the Gravity Site to these sites is described in detail at Section 3 of this report and is also shown (as applicable) on Plan ECO1 and at Annex 1.

1.3.4. As part of this assessment, professional judgement has necessarily been applied in some instances in order to interpret information.

1.3.5. In line with relevant jurisprudence, this report assesses the likely significant effects of the development proposals as a whole, both alone and in combination with other plans / projects. It then goes on to consider whether the development proposals will give rise to an adverse effect on the integrity of the relevant designated sites.

1.3.6. By way of headline summary, it is the opinion of Ecology Solutions, following detailed assessment, that the development proposals would not result in a likely significant adverse effect on the integrity of any international / European designated sites, either alone or in combination with any other plans or projects, and that as such the test contained at Regulation 63 of the Habitats Regulations would be passed.

2. LEGISLATIVE AND PLANNING POLICY BACKGROUND

2.1. This section of the document outlines further details regarding the legislation and planning policy of particular relevance to the development proposals.

2.2. Legislation and relevant case law

2.2.1. The Conservation of Habitats and Species Regulations 2017 (as amended) and preceding regulations (together "the Habitats Regulations") give effect to Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna ("Habitats Directive") and Council Directive 2009/147/EC on the conservation of wild birds in England and Wales ("Wild Birds Directive". In accordance with the EU-UK Withdrawal Agreement and the European Union (Withdrawal Agreement) Act 2020, the transitional provisions under which European law such as the Habitats Directive and the Wild Birds Directive had effect in Great Britain ended on 31 December 2020 (EU exit day).

2.2.2. To ensure that habitat and species protection and standards continue to be implemented in England and Wales in the same way or in an equivalent way after EU exit day, the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019/579 made necessary amendments to the Habitats Regulations. The changes are explained in the Policy paper "Changes to the Habitats Regulations 2017", published on 1 January 2021 ("Policy paper"). Most changes are concerned with the transfer of functions from the European Commission to appropriate authorities in England and Wales. There are no changes to the substance of the HRA process or that affect the conclusions reached in this HRA Report, which identifies amendments that are relevant in the process of determining the DCO.

2.2.3. On 24 February 2021 the Department for Environment, Food & Rural Affairs (Defra), NE, Welsh Government, and Natural Resources Wales published two guidance notes on Habitats Regulation Assessment and a derogation notice form:

- Guidance: Habitats regulations assessments: protecting a European site: How a competent authority must decide if a plan or project proposal that affects a European site can go ahead ("the HRA Guidance");

- Guidance: Duty to protect, conserve and restore European sites: Competent authorities must take action to help protect, conserve and restore the protected habitats and species of European sites ("Duty to conserve Guidance")

- Form: Habitats regulations assessment: derogation notice to be used by competent authorities when giving notice under regulation 64(5) of a decision to allow a plan or project that has an adverse effect on a European site to go ahead ("Derogation notice form").

2.2.4. Article 4 of the Habitats Directive required the United Kingdom to contribute to the creation of the Natura 2000 network, a coherent European ecological network of special areas of conservation that shall enable the natural habitat types and species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range. Article 1 (e) defines "conservation status" of a natural habitat as "the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species" within the European Union ("EU"). Conservation status will be "favourable" when:

"- its natural range and areas it covers within that range are stable or increasing, and

- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and

- the conservation status of its typical species is favourable…".

2.2.5. For the purposes of the Habitats Regulations, all references to Natura 2000 are now to be construed as references to the national site network, which is defined in amended regulation 3 to mean "*the network of sites in the United Kingdom's territory consisting of such sites as—*

a) immediately before exit day formed part of Natura 2000; or
b) *at any time on or after exit day are European sites, European marine sites and European offshore marine sites for the purposes of any of the retained transposing regulations"*

2.2.6. The location of the Gravity Site in proximity to international / European designated sites means that the Habitats Regulations are relevant. The Gravity Site is not directly connected with or necessary to the management of a site forming part of the national site network. Therefore, it is necessary to consider whether it is likely to have a significant effect on any such site, either individually or in combination with other plans or projects.

2.2.7. The Gravity Site also lies in relatively close proximity to two Ramsar sites; specifically, the Severn Estuary and Somerset Levels and Moors Ramsar sites. The UK is a signatory to the Convention on Wetlands of International Importance Especially as Wildfowl Habitat 1971, commonly known as the Ramsar Convention after the town in which it was signed. Parties to the Ramsar Convention are obliged to designate particular sites as Wetlands of International Importance.

2.2.8. The obligations imposed by the Convention are in themselves not particularly strong, in that they require the promotion and encouragement of the stated aims, rather than any specific action. However, as a matter of policy[2], Ramsar sites receive the same

[2] As noted at paragraph 181 (b) of the National Planning Policy Framework (July 2021)

protection as designated SPAs and SACs. The procedures applicable to European sites are therefore to be applied to Ramsar sites, even though these are not protected by the Habitats Regulations as a matter of law.

2.2.9. The relevant legal and policy framework is discussed below.

Habitats and Birds Directives

2.2.10. Although neither the Habitats or Birds Directives now have the force of law in England, they will remain relevant in the interpretation and application of the Habitats Regulations 2017 unless and until Parliament otherwise modifies those Regulations. This is because the Habitats Regulations have the status of "retained EU law" for the purposes of the Withdrawal Agreement, which provides at Section 6(3) that, so far as retained EU law remains unmodified by UK legislation, it shall be interpreted in accordance with retained domestic case law, retained EU case law and retained general principles of EU law. This section therefore describes relevant aspects of the Habitats and Birds Directives and case law.

2.2.11. Under the EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna, commonly referred to as the Habitats Directive (Council Directive 92/43/EEC), Member States are required to take special measures to maintain the distribution and abundance of certain priority habitats and species (listed in Annexes I and II of the Directive).

2.2.12. Each Member State is required to designate the most suitable sites as Special Areas of Conservation (SACs). All such SACs will form part of the Natura 2000 network under Article 3(1) of the Habitats Directive.

2.2.13. Article 2(3) sets out that member states have a duty, in exercising their obligations under the Habitats Directive to:

> *".. take account of economic, social and cultural requirements and local characteristics."*

2.2.14. Under the EC Directive on Wild Birds (the Birds Directive) (Council Directive 2009/147/EC, formerly 79/409/EEC), Member States are required to take special measures to conserve the habitats of certain rare species of birds (listed in Annex I of the Directive) and regularly occurring migratory birds.

2.2.15. Each Member State is required to classify the most suitable areas of such habitats as SPAs. This is designed to protect wild birds, and to provide sufficient diversity of habitats for all species so as to maintain populations at an ecologically sound level. All Bird Directive SPAs are part of the Natura 2000 network under article 3(1) of the Habitats Directive.

2.2.16. Thus, there is an obligation under the Habitats Directive and the Birds Directive for member states to designate sites before turning to measures for their protection.

2.2.17. The protection afforded to SPAs and SACs is delivered through Article 6 of the Habitats Directive.

2.2.18. Article 6(2) requires member states to take appropriate steps to avoid the deterioration of natural habitats and disturbance of species for which the sites have been designated, in so far as the disturbance could be significant in relation to the objectives of the Directive. Article 6(3) and Article 6(4) together set out a process known as Habitat Regulations Assessment (HRA) that comprises between one and five stages, depending on the outcome of assessments for each project. The five stages require the decision-maker to:

- assess whether there would be a Likely Significant Effect ("LSE") on any European site (Stage 1); and, if such an effect cannot be excluded,
- determine whether there would be an adverse effect on the integrity of any European site (Stage 2); and, if so,
- consider whether there are any feasible alternative solutions that would be less damaging or avoid damage to the site (Stage 3); and, if not,
- determine whether there are imperative reasons of overriding public interest ("IROPI") why the development should proceed (Stage 4); and, if so,
- consider whether all necessary compensatory measures have been secured to fully compensate for the negative effects of the proposal. The compensatory measures must not have a negative effect on the national network of European sites as a whole (Stage 5).

2.2.19. The HRA Guidance (February 2021) presents the HRA process as having up to three stages: 1. Screening; 2. Appropriate Assessment and 3. Derogation. Stage 3: Derogation comprises stages 3 – 5 above. If an appropriate assessment is undertaken and a proposed development fails to meet the integrity test then permission can only be granted for a development it if it passes all three of the legal tests that are required to qualify for a derogation: i.e. no feasible alternative solutions, IROPI and necessary compensatory measures.

<u>The Conservation of Habitats and Species Regulations 2017 (as amended)</u>

2.2.20. The Conservation of Species and Habitats Regulations 2017, (Habitats Regulations), transposed the requirements of the Habitats Directive and Birds Directive into UK legislation.

2.2.21. As noted above, SACs and SPAs in the UK no longer form part of the European Union's Natura ecological network. Instead, from 31 December 2020 these sites form part of the national site network ('NSN'), which also includes any further SACs and SPAs designated under the Habitats Regulations.

2.2.22. The Habitats Regulations, regulation 16A sets out the management objectives for the NSN, places management obligations on appropriate

authorities and sets out the considerations to which such authorities must have regard in the discharge of their obligations.

2.2.23. The process to be followed where a competent authority proposes to undertake or to give any consent, permission or other authorisation for a plan or project that is likely to have a significant effect on a European site and is not directly connected with or necessary to the management of that site is set out in regulation 63 of the Habitats Regulations:

> *"63(1) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for a plan or project, which:-*
>
> *(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects) and*
>
> *(b) is not directly connected with or necessary to the management of the site,*
>
> *must make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives.*
>
> *63(3) The competent authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.*
>
> *63(5) In the light of the conclusions of the assessment, and subject to regulation 64, the authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).*
>
> *63(6) In considering whether a plan or project will adversely affect the integrity of the site, the authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given."*

2.2.24. Regulation 63 of the Habitats Regulations therefore sets out an assessment process that will comprise one or two stages, depending on the outcome of the first stage. The first stage is to determine whether the plan / project is likely to have a significant effect on the European site. If that possibility cannot be excluded then the second stage is to undertake an appropriate assessment of the implications of the plan or project for the European site in view of the site's conservation objectives.

2.2.25. Some key concepts of the Habitats Directive and Habitats Regulations have been clarified through case law. The most pertinent cases in relation to the development proposals are: the *Waddenzee*

Judgement; the *Sweetman* Case; the *People over Wind* Judgement; and the *Holohan* Judgement. These are considered in chronological order below to illustrate recent changes to case law, and are discussed below.

Case Law

Waddenzee Judgement

2.2.26. In the *Waddenzee* case (C-127/02) [2004] the European Court of Justice decided that an appropriate assessment is required for a plan or project where there is a probability or a risk that it will have a significant effect on the SPA. The Judgement states (at paragraph 3(a)) that:

> *"…any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects."*

2.2.27. Hence, the need for an Appropriate Assessment should be determined on a precautionary basis.

2.2.28. The Judgement gives clarity that the test of 'likely significant effect' should also be undertaken in view of the European site's Conservation Objectives. It is stated at paragraph 3(b) that:

> *"where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site."*

2.2.29. Paragraph 4 of the Judgement emphasises the requirement for the appropriate assessment to rely on objective scientific information:

> *"…an appropriate assessment…implies that, prior to its approval, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site's conservation objectives must be identified in the light of the best scientific knowledge in the field. The competent national authorities, taking account of the appropriate assessment of the implications…for the site concerned in the light of the site's conservation objectives, are to authorise such an activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects."*

Sweetman Case

2.2.30. Further guidance in relation to the consideration of impacts in the light of the Habitats Regulations is provided in the *Sweetman* case (*Sweetman v An Bord Pleanala* (C-258/11) [2014]). The case as set out by the Advocate General considered in detail the test for likely significant effect in paragraphs 50 and 51:

> *"50. The test which that expert assessment must determine is whether the plan or project in question has 'an adverse effect on the integrity of the site', since that is the basis on which the competent national authorities must reach their decision. The threshold at this (the second) stage is noticeably higher than that laid down at the first stage. That is because the question (to use more simple terminology) is not 'should we bother to check' (the question at the first stage) but rather 'what will happen to the site if this plan or project goes ahead; and is that consistent with "maintaining or restoring the favourable conservation status" of the habitat or species concerned'…*
>
> *51. It is plain, however, that the threshold laid down at this stage of Article 6(3) may not be set too high, since the assessment must be undertaken having rigorous regard to the precautionary principle. That principle applies where there is uncertainty as to the existence or extent of risks. The competent national authorities may grant authorisation to a plan or project only if they are convinced that it will not adversely affect the integrity of the site concerned. If doubt remains as to the absence of adverse effects, they must refuse authorisation."*

2.2.31. The Court of Justice of the European Union (CJEU) agreed with the Advocate General's conclusions, and held:

> *"40. Authorisation for a plan or project, as referred to in Article 6(3) of the Habitats Directive, may therefore be given only on condition that the competent authorities – once all aspects of the plan or project have been identified which can, by themselves or in combination with other plans or projects, affect the conservation objectives of the site concerned, and in the light of the best scientific knowledge in the field – are certain that the plan or project will not have lasting adverse effects on the integrity of that site. That is so where no reasonable scientific doubt remains as to the absence of such effects."*

2.2.32. Hence a plan or project may be authorised only if no reasonable scientific doubt remains as to the absence of effects. Reasonable scientific doubt will exist if the evidence is not sufficiently conclusive, or if there are gaps in the information.

Dilly Lane Case

2.2.33. Reference to this case is made on the basis that it aids in understanding the importance (in assessment terms) of the People Over Wind case discussed below.

2.2.34. The Secretary of State's decision to allow an appeal in relation to applications for a total of 170 new homes on a greenfield site off Dilly Lane, Hartley Wintney was challenged in High Court by Hart District Council. The legal challenge was made on the grounds that the Secretary of State had erred in departing from her Inspector's conclusions as to the effects on the Thames Basin Heaths SPA.

2.2.35. A key issue for the case was whether mitigation measures should be disregarded when assessing whether the project would have a likely significant effect on the SPA. Mr Justice Sullivan (now Lord Justice Sullivan) ruled in favour of the Secretary of State after concluding that there was no absolute legal rule that mitigation measures should be disregarded during the first stage – 'the likely significant test':

> *"55. The competent authority is not considering the likely effect of some hypothetical project in the abstract. The exercise is a practical one which requires the competent authority to consider the likely effect of the particular project for which permission is being sought. If certain features (to use a neutral term) have been incorporated into that project, there is no sensible reason why those features should be ignored at the initial, screening, stage merely because they have been incorporated into the project in order to avoid, or mitigate, any likely effect on the SPA."*

People over Wind Case

2.2.36. The CJEU in *People over Wind and Sweetman v Coillte Teoranta* (C-323/17) [2018] has reversed the position adopted under the *Dilly Lane* Decision, with the CJEU ruling that:

> *"Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site."*

2.2.37. In accordance with this ruling, avoidance or mitigation measures cannot be considered at the first stage of the test (the 'Likely Significant Effect' stage) and can only be considered at the Appropriate Assessment stage. The *People over Wind* ruling therefore overrules previous domestic case law in this regard.

ESB Wind Developments (Sweetman III) [Case C-164/17]

2.2.38. In this case a request for a preliminary ruling was made to the CJEU concerning the interpretation of Articles 6(3) and 6(4) of Council Directive 92/43/EEC (the Habitats Directive). The request was made in relation to proceedings brought by Mr Peter Sweetman and Edel Grace against the decision of An Bord Pleanála (National Planning

Appeals Board, Ireland) concerning the latter's decision to grant ESB Wind Developments Ltd and Coillte permission for a wind farm project within an SPA. The ruling was handed down on 25th July 2018.

2.2.39. This ruling distinguishes between, for the purpose of the application of Articles 6(3) and 6(4) of the Directive, 'mitigation' that consists of measures intended to avoid or reduce harm to the protected site, and measures intended to compensate for any harm (Compensatory measures). It is stated:

> *"Article 6 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, where it is intended to carry out a project on a site designated for the protection and conservation of certain species, of which the area suitable for providing for the needs of a protected species fluctuates over time, and the temporary or permanent effect of that project will be that some parts of the site will no longer be able to provide a suitable habitat for the species in question, the fact that the project includes measures to ensure that, after an appropriate assessment of the implications of the project has been carried out and throughout the lifetime of the project, the part of the site that is in fact likely to provide a suitable habitat will not be reduced and indeed may be enhanced may not be taken into account for the purpose of the assessment that must be carried out in accordance with Article 6(3) of the directive to ensure that the project in question will not adversely affect the integrity of the site concerned; that fact falls to be considered, if need be, under Article 6(4) of the directive."*

Holohan Judgement

2.2.40. In the case of *Holohan v. An Board Pleanala* (C-461-17) [2018], the CJEU considered further the assessment process to be adopted when considering potential impacts on a European designated site.

2.2.41. In considering this case, the CJEU clarified the need for a thorough assessment and certainty in the conclusions reached. The judgement also identified that the scope of an Appropriate Assessment may have to extend beyond the designated habitats and the species for which the habitat has been listed.

2.2.42. The Advocate General's Opinion stated that "*the assessment must therefore unequivocally demonstrate why the protected habitat types and species are not adversely affected"*, and notes that "*mere silence in respect of certain habitat types or species… will not generally amount to complete, precise and definitive findings capable of removing all reasonable scientific doubt as to the effects of the work under assessment*".

2.2.43. Drawing the case law together, as a result of the CJEU interpretations of Article 6(3) and (4) of the Habitats Directive, a distinction is now drawn between the following:

- Conservation measures for special areas of conservation that correspond to the ecological requirements of the natural habitats and species and maintain or restore natural habitats at a favourable conservation status. These should be distinguished from measures proposed as part of a proposed development.
- Measures that are integral parts of a proposed development that are not intended to avoid or reduce direct adverse effects. Provided these are not avoidance or mitigation measures they may be taken into account in Stage 1 (screening).
- Protective measures forming part of a proposed development that are intended to avoid or reduce any direct adverse effects to ensure that the LDO Scheme does not adversely affect the integrity of a European site. These may not be taken into account in Stage 1 but can be taken into account in Stage 2.
- Measures that are aimed at compensating for the negative effects of a proposed development on a European site and that cannot be taken into account in the assessment of the implications of the project (Habitats Directive Article 6(4); Habitats Regulations Regulation 64) but are relevant to an evaluation at Stage 5.

2.3. Guidance and other Relevant Documents

2.3.1. Guidance on the interpretation of key terms and concepts contained within the European and UK legislation of relevance to European designated sites is provided through several documents issued by the European Commission and national organisations such as the Joint Nature Conservation Committee (JNCC) and Natural England. This guidance is discussed below (taken in chronological order).

Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC

2.3.2. The document entitled "Managing Natura 2000 Sites the provisions of article 6 of the 'Habitats' Directive 92/43/CEE", was published by the European Commission in 2000 Its purpose was to provide guidelines to the Member States on the interpretation of certain key concepts used in Article 6 of the Habitats Directive.

2.3.3. In January 2019 the European Commission published updated guidance in relation to managing Natura 2000 sites, following that initial guidance published in 2000.

2.3.4. The primary purpose of the revision was to incorporate relevant rulings of the Court of Justice of the European Union (EU) which have been issued since the initial guidance was published in 2000. It also integrates, into a single document, other relevant European Commission notes / guidance documents. Those key rulings (of the Court of Justice of the EU) and other relevant European Commission notes / guidance are discussed above in this report. The revised guidance provides clarifications of key concepts to Member State, authorities and stakeholders involved in the management of Natura 2000 sites (e.g. SPAs and SACs).

2.3.5. This document advises at Section 2.3.3 that conservation measures must correspond to the ecological requirements of the habitats and species present for which the site is designated and that these requirements "involve all the ecological needs which are deemed necessary to ensure the conservation of the habitat types and species, including their relations with the physical environment (air, water, soil, vegetation, etc.)".

2.3.6. At section 3.5 the guidance states, in relation to deterioration and disturbance of habitats or species:

> *"Deterioration and disturbance should be assessed against the conservation objectives of the site and the conservation condition of the species and habitat types present in the site using the same criteria as for the Article 6(3) procedure. This notion should be interpreted in a dynamic way, according to the evolution of the conservation condition of the habitat or of the species in that site."*

2.3.7. Section 4.5.2 sets out that in determining what may constitute a likely 'significant' effect one should take into account the conservation objectives for the site and other relevant baseline information. In the second paragraph of this section of the document it is stated:

> *"In this regard, the conservation objectives of a site as well as prior or baseline information about it can be very important in more precisely identifying conservation sensitivities."*

2.3.8. With regard to an assessment of the effects of a plan / project on the integrity of a site, the 'integrity of the site' is defined at Section 4.6.4 as:

> *"…* the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the *habitats*, complex of habitats and/or populations of species for which the site is designated*."*

2.3.9. The guidance is clear, within the text box on page 58, that an assessment as to the implications of the plan / project on the integrity of the site should be limited to an assessment against the site's conservation objectives:

> *"The integrity of the site involves its constitutive characteristics and ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the habitats and species for which the site has been designated and the site's conservation objectives."*

2.3.10. Section 5 of the document deals with Article 6(4) of the Habitats Directive.

Assessment of Plans and Projects Significantly Affecting Natura 2000 sites - Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2001)

2.3.11. This document, published by the European Commission in 2001, gives guidance on carrying out and reviewing those assessments required under Article 6(3) and (4) of the Habitats Directive. It is provided as supplementary guidance and does not over-ride or replace any of that set out within '*Managing Natura 2000*' (European Commission, 2000) which as stated at page 6 of the document, "*is the starting point for the interpretation of the key terms and phrases contained in the Habitats Directive*". The guidance provided is not mandatory and it is clearly set out that its use is "*optional and flexible*" and that it is for "*Member States to determine the procedural requirements deriving from the directive*".

2.3.12. The guidance sets out the key stages in following the tests contained within the Habitats Directive. Pertinent to an assessment under Regulation 63, stages one and two are relevant. Stage one is the screening stage assessing the likelihood of a plan / project resulting in a significant effect upon the European site. The second comprises the Appropriate Assessment.

2.3.13. Section 3.2.4 is concerned with Appropriate Assessment and specifically, the assessment against the Conservation Objectives of the European site. Box 9 provides a list of five example Conservation Objectives for differing broad habitat types. One such example, that for a coastal site, taken from Box 9 is provided below:

> *"to maintain the status of the European features of this coastal site in favourable condition, allowing for natural change. Features include coastal shingle vegetation and lagoons (within a candidate special area of conservation (SAC), which is also an SPA)."*

Internal Guidance to decisions on 'Site Integrity': A framework for provision of advice to competent authorities (English Nature, 2004)

2.3.14. Natural England (English Nature at the time) produced an internal guidance document on the provision of advice to competent authorities regarding the concept of 'site integrity' in undertaking an Appropriate Assessment.

2.3.15. This guidance sets out a definition for integrity. It states that integrity is considered at the site level and gives the following definition (taken from PPG9):

> *"The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or levels of populations of the species for which it was classified".*

2.3.16. Integrity is further defined within section 3.0 where it is stated that:

"In a dynamic context 'integrity' can be considered as a site having a sense of resilience and ability to evolve in ways that are favourable to conservation."

2.3.17. The need to maintain or restore the designated site to favourable conservation status is dealt with in the final paragraph of section 3.0. Natural England quotes guidance issued jointly by the Environment Agency, English Nature and Countryside Council for Wales.

2.3.18. The guidance provides a checklist within section 4.1, for assessing the likelihood of an adverse effect on integrity occurring as a result of the proposed plan / project. It is stated that if the answer to all of the questions posed within the checklist is "yes" then it is reasonable to conclude that there will be no adverse effect upon integrity. In the event that one or more of the answers is no, then the guidance suggests a series of further site-specific factors, listed at 4.2 – 4.7.

Common Standards Monitoring (JNCC, 2004)

2.3.19. Common Standards Monitoring (CSM) is a means by which condition objectives for habitats, species, or other features of designated sites (e.g. SSSIs and SPAs) are set based on key attributes of the features.

2.3.20. JNCC and the country Conservation Agencies (e.g. Natural England) developed guidance on the setting and assessing of condition objectives, as required under the Birds and Habitats Directives and set out a framework for this in 1999. This framework is provided in the form of CSM guidance which comprises a suite of documents including an '*Introduction to the Guidance Manual on Common Standards Monitoring*' and several species / habitat specific documents. The Guidance Manual covers various relevant concepts and terms. It also provides a background to the setting of conservation objectives and sets out the desired approach to setting targets, monitoring, management and reporting on conservation measures in designated sites.

2.3.21. The Guidance Manual and CSM guidance for individual site attributes (e.g. its bird or reptile interest) set out specific criteria regarding the identification of interest features, targets and methods of assessment. There is in-built flexibility and allowances for 'judgements to be made' when assessing, for example, favourable condition.

2.3.22. It is understood that Natural England applies the CSM approach to European designated sites through an assessment of the SSSI unit condition. This is undertaken on a cycle of approximately six years. The assessment does not relate to the Conservation Objectives of the European site but provides a tool for tailoring future management of the SSSI such that favourable condition of the interest features can be maintained or restored as appropriate.

Guidance document on Article 6(4) of the 'Habitats Directive' (European Commission, 2007)

2.3.23. This document, published by the European Commission in 2007, is intended to provide clarification on key terms / concepts as referred to within '*Managing Natura 2000 Sites*' and replaces the section on Article 6(4) within that earlier document.

2.3.24. The document covers the concepts of 'Alternative Solutions', 'Imperative Reasons of Overriding Public Interest', 'Compensation Measures', 'Overall Coherence' and the 'Opinion of the Commission'.

2.3.25. With regard to ensuring the quality of an Appropriate Assessment, and to define exactly what needs to be compensated, it is stated at Section 1.3 that:

> *"Assessment procedures of plans or projects likely to affect Natura 2000 sites should guarantee full consideration of all elements contributing to the site integrity and to the overall coherence of the network, both in the definition of the baseline conditions and in the stages leading to identification of potential impacts, mitigation measures and residual impacts. These determine what has to be compensated, both in quality and quantity."*

2.3.26. The need to use information contained within the Natura 2000 Standard Data Form, in tandem with the site's Conservation Objectives when undertaking an Appropriate Assessment is specifically referred to (under the second hyphenated point at Section 1.3 on page 5).

2.3.27. Section 1.3.2 gives guidance on the application of Article 6(4) in respect of reasons of overriding public importance and Section 1.4.1 gives guidance on the application of Article 6(4) in respect of compensatory measures.

Habitats regulations assessments: protecting a European site: How a competent authority must decide if a plan or project proposal that affects a European site can go ahead

2.3.28. The most up-to-date guidance on HRA (for England and Wales) is provided by the updated HRA guidance titled "*Habitats regulations assessments: protecting a European site: How a competent authority must decide if a plan or project proposal that affects a European site can go ahead*" (hereinafter "HRA Guidance 2021")[3]. This guidance is available on the GOV.UK website and was published in February 2021.

2.3.29. This HRA Guidance 2021 describes the following stages of the assessment process.

[3] https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site#follow-hra-principles

1) "*Screening - to check if the proposal is likely to have a significant effect on the site's conservation objectives. If not, you do not need to go through the appropriate assessment or derogation stages.*

2) *Appropriate assessment - to assess the likely significant effects of the proposal in more detail and identify ways to avoid or minimise any effects.*

3) *Derogation - to consider if proposals that would have an adverse effect on a European site qualify for an exemption."*

2.3.30. In accordance with the HRA Guidance 2021, the Local Planning Authority (acting as Competent Authority under the Habitats Regulations) will need to:

- understand the conservation objectives for the relevant European site affected - these describe the ecological reasons for its protection (see Section 5 and Annex 6 of this sHRA).
- use these databases to find out about existing threats or pressures on the site - this can include the effects of any unregulated activities or the effects of permissions given in the past (see Section 6 and Annexes 6 and 7 of this sHRA).
- consider all possible effects of the proposal, at every phase, on the designated features of the site - include impacts that are direct and indirect, temporary and permanent (see Section 6 of this sHRA)
- consider possible combined effects on the site with other plans and projects (see Section 6 of this sHRA).
- make judgements based on the facts of the individual situation and the ecological condition of the site's features (see Section 6 of this sHRA).
- use the best available objective and scientific information to make confident decisions.
- work with the proposer to find a way to allow projects or adopt plans while still protecting sites, if possible.
- ask for information from the proposer that's proportionate, for example only ask for the information or evidence you need to meet the regulations.
- consider the advice of the relevant SNCB.
- keep a detailed written record of the HRA and give clear reasons and evidence for your decisions.
- make sure the assessment is thorough and complete with clear and precise conclusions.

2.3.31. The HRA Guidance 2021 confirms that a precautionary approach to decisions should be taken at each stage of the HRA process. It is stated that, for example:

- *"If the risk of a proposal having a significant effect on the conservation objectives of a European site at stage 1: screening cannot be ruled out then an appropriate assessment must be carried out;*
- *If all reasonable scientific doubt of an adverse effect on a site's integrity at stage 2: appropriate assessment cannot be ruled out*

then the proposal must be refused unless an exemption (stage 3: derogation) is justified."

2.4. Planning Policy

National Planning Policy Framework (NPPF) and ODPM / DEFRA Circular (ODPM / DEFRA, 2005)

2.4.1. Paragraphs 174 and 181 of the National Planning Policy Framework (July 2021) are of direct relevance. Paragraph 174 makes reference to protecting and enhancing sites of biodiversity value "*in a manner commensurate with their statutory status or identified quality in the development plan*". Paragraph 181 asserts that potential SPAs, possible SACs, listed or proposed Ramsar sites and sites providing compensatory measures for adverse effects should be afforded the same level of protection as classified SPAs and designated SACs (referred to in the NPPF as 'habitats sites').

2.4.2. Guidance on the determination of whether an effect on a European designated site is likely to be significant, together with the scope of Appropriate Assessments and ascertaining the effect on the integrity, was previously provided within Circular 06/2005 "*Biodiversity and geographical conservation – statutory obligations and their impact within the planning system*" (DEFRA). The Circular originally accompanied Planning Policy Statement 9 (PPS9) and is referenced in the NPPF at footnote 61. Whilst Circular 06/2005 provides guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system, the most up-to-date guidance on HRA (for England and Wales) is provided by the updated HRA Guidance of Feb 2021 (discussed above).

2.4.3. Paragraph 182 of the updated NPPF (July 2021) states that:

"*The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site*".

3. KEY TERMS AND CONCEPTS RELEVENT TO THE TESTS CONTAINED WITHIN THE HABITATS REGULATIONS

3.1. The application of the Habitats Regulations when deciding to grant a consent/permission for a plan or project has several individual steps but two main stages.

3.2. The first main stage of the process is, in accordance with Regulation 63(1), to ascertain whether, either alone or in combination, the plan/project is likely to give rise to any significant effects on the European site ("the likely significance test"). This is essentially a broad sieving stage, whereby if it can be shown that no significant effects are likely, then a consent can safely be granted without the need to move to the second main stage. If conversely the plan or project is likely to have a significant effect or it cannot be determined with the required level of certainty whether an effect would arise then the second main stage is triggered and an appropriate assessment should be undertaken. In line with the HRA Guidance 2021, the test at the sieving stage should be undertaken in view of the conservation objectives of the European site, on the basis that a plan or project which is likely to undermine a site's conservation objectives, must be likely to have a significant effect upon it.

3.3. The second main stage (Regulation 63(5), where necessary, is to assess the implications of the plan/project on the integrity of the European site, again in view of a site's conservation objectives. This second main stage of the process (appropriate assessment or "the integrity test") is a more detailed and thorough examination of the proposals and the impacts on the European site.

3.4. In the event that in undertaking the appropriate assessment the competent authority (in this instance the Local Planning Authority) cannot conclude that the plan/project will not have an adverse effect on the integrity of a European site, the plan/project may still be consented where the competent authority is satisfied that, there being no alternative solutions, the plan/project must be carried out for imperative reasons of over-riding public interest. This is set out at Regulation 64 of the Habitats Regulations.

3.5. Regulation 68 provides that where a project is agreed to, notwithstanding a negative assessment, the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of the NSN is protected.

Defining "Integrity"

3.6. The HRA Guidance 2021 states that:

"The integrity of the site will be adversely affected if a proposal could, for example:

- *destroy, damage or significantly change all or part of a designated habitat*
- *significantly disturb the population of a designated species, for example, its breeding birds or hibernating bats*

- *harm the site's ecological connectivity with the wider landscape, for example, harm a woodland that helps to support the designated species from a nearby European site*
- *harm the site's ecological function, or its ability to survive damage, and reduce its ability to support a designated species*
- *change the site's physical environment, for example, by changing the chemical makeup of its soil, increasing the risk of pollution or changing the site's hydrology*
- *restrict access to resources outside the site that are important to a designated species, for example, food sources or breeding grounds*
- *prevent or disrupt restoration work, or the potential for future restoration, if it undermines the site's conservation objectives"*

3.7. Further useful guidance is provided within the "Managing Natura 2000 guidance document[4] which contains guidance as to the meaning of "integrity" for the purpose of addressing the provision of Article 6 of the Habitats Directive. It states at section 4.6.4 that:

> *"The 'integrity of the site' can be usefully defined as the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and / or populations of the species for which the site is designated."*

3.8. The text box at the foot of page 47 of the Managing Natura 2000 guidance document goes on to state:

> *"The integrity of the site involves its constitutive characteristics and ecological functions. The decision as to whether it is* adversely *affected should focus on and be limited to the habitats and species for which the site has been designated and the site's conservation objectives."*

The term 'Conservation Objectives'

3.9. Amended regulation 3A of the Habitats Regulations states that in the Habitats Regulations, any reference to "the requirements of the Directives" is to be construed as if the objective of the Directives included the "management objectives" for the national site network. The management objectives for the national site network are set out in Amended Regulation 16A.

3.10. Amended Regulation 16A of the Habitats Regulations states:

> *1)* "*The appropriate authority must, in co-operation with any other authority having a corresponding responsibility, manage, and where necessary adapt, the national site network, so far as it consists of European sites, with a view to contributing to the achievement of the management objectives of the national site network.*
>
> *2) The management objectives of the national site network are—*

[4] Managing Natura 2000 Sites – The provisions of Article 6 of the habitats Directive 92/43/EEC (2019)

a) to maintain at, or where appropriate restore to, a favourable conservation status in their natural range (so far as it lies in the United Kingdom's territory, and so far as is proportionate)—

i. the natural habitat types listed in Annex I to the Habitats Directive;

ii. the species listed in Annex II to that Directive whose natural range includes any part of the United Kingdom's territory;

b) to contribute, in their area of distribution, to ensuring the survival and reproduction of—

i. the species of birds listed in Annex I to the new Wild Birds Directive which naturally occur in the United Kingdom's territory;

ii. regularly occurring migratory species of birds not listed in that Annex which naturally occur in the United Kingdom's territory;

c) to contribute, to securing compliance with the requirements of Article 2 of the new Wild Birds Directive for the purposes of the duty in regulation 9(1) in relation to the species of birds in paragraph (b) within their area of distribution.

3) In complying with the obligation in paragraph (1), the appropriate authority must have regard—

a) in relation to any European sites which are not of a kind mentioned in regulation 8(1)(d), to the considerations mentioned in paragraph (4);
b) in relation to European sites of a kind mentioned in regulation 8(1)(d), to the considerations mentioned in paragraph (5).

4) The considerations mentioned in paragraph (3)(a) are—

a) the importance of the sites for meeting the objective in paragraph (2)(a);
b) the importance of the sites for the coherence of national site network;
c) the threats of degradation or destruction (including deterioration and disturbance of protected features) to which the sites are exposed.

5) The considerations mentioned in paragraph (3)(b) are—

a) the importance of the sites for meeting the objectives in paragraph 2(b) and (c);
b) in the case of migratory species, the importance of their breeding, moulting and wintering areas and staging points along their migration routes;
c) the importance of the sites for the coherence of national site network;
d) the threats of degradation or destruction (including deterioration and disturbance of protected features) to which the sites are exposed."

3.10.1. The formal European Site Conservation Objectives for SPAs and SACs in England are produced by Natural England. A copy of the

European Site Conservation Objectives (and where available, Supplementary Advice) for the relevant designated sites are included as annexes to this sHRA.

Assemblages

3.11. "Assemblage" is not a term or a concept used in the Directive. Section 14 of the Introduction to the CSM describes what may constitute an assemblage, with specific reference to SSSIs, SPAs and Ramsar sites. Under the title, "What is an assemblage?", the following information is given:

"ASSIs/SSSIs, SPAs and Ramsar sites may each be notified because of the presence of important assemblages of species. This might seem straightforward, but in the context of species features two situations can be envisaged:

1. *A colony of different species all occurring / living together, where the total number of individuals is the key aspect of the interest on the site (e.g. more than 20,000 seabirds on a SPA site).*

2. *A number of characteristic species which together form the feature and usually share similar ecological or habitat requirements (e.g. the co-occurrence of woodland or upland bird species, or heathland invertebrates).*

The term 'assemblage' can also be used in a third, functional, way; when there are a number of features which co-exist, yet are individually notified (i.e. they are features in their own right). While it may be possible to assess them using the same or very similar attributes, these species must be assessed as individual features independently of any assemblage of which they may also form a part (e.g. under scenario 1)."

3.12. Thus the quality of the 'assemblage' can be defined by the mix of species (assemblage) or the total number of characteristic species (aggregation).

European Marine sites

3.13. European Marine Sites are not statutorily designated sites in their own right. They are composite sites, comprising the marine elements of SACs, SPAs and Ramsar sites. EMSs are commonly described as 'management units' for those (European / Ramsar) sites which extend beyond the underpinning SSSI / Area of Special Scientific Interest (ASSI – in Northern Ireland) designation boundaries, which typically extend only to the mean low water mark. In other words, an EMS designation confers no additional protection to a site nor does it change the legal tests to be applied in relation to areas which are separately protected.

Application of the "Precautionary Principle"

3.14. Relevant case law makes it clear that in applying the relevant tests of the Habitats Regulations, there is a need for certainty (or the absence of reasonable scientific doubt), both regarding the nature and extent of predicted effects on integrity and in relation to the effectiveness of any preventative measures relied upon. As discussed previously, The HRA Guidance 2021 confirms that a precautionary approach to decisions should be taken at each stage of the HRA process.

3.15. The document titled "Communication from the Commission on the Precautionary Principle" (2000) provides useful guidance in relation to the application of the Precautionary Principle in relation to European sites issues. A copy of this guidance is included at Annex 2. Paragraph 6, sets out the six key matters for consideration when applying the Precautionary Principle. Paragraph 6 states:

"Where action is deemed necessary, measures based on the precautionary principle should be, inter alia:

- *proportional to the chosen level of protection,*
- *non-discriminatory in their application,*
- *consistent with similar measures already taken,*
- *based on an examination of the potential benefits and costs of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis),*
- *subject to review, in the light of new scientific data, and*
- *capable of assigning responsibility for producing the scientific evidence necessary for a more comprehensive risk assessment."*

3.16. Under these bulleted points, the guidance gives specific definitions in relation to each of the above at pages 4 and 5, with further detail provided within section 6.

3.17. In accordance with the Communication from the Commission it is clear that when they are deemed necessary, risk reduction measures should be proportionate and must not aim at zero risk. It is stated at section 6.3.1 of the Communication from the Commission that:

> *"The measures envisaged must make it possible to achieve the appropriate level of protection. Measures based on the precautionary principle must not be disproportionate to the desired level of protection and must not aim at zero risk, something which rarely exists. However, in certain cases, an incomplete assessment of the risk may considerably limit the number of options available to the risk managers."*

3.18. With reference to not aiming "at zero risk" the judgement of the Appeal Court in the case of Morge vs Hampshire County Council [2010] EWCA Civ 608 is relevant. Lord Justice Ward considered what the level of disturbance was required in addressing Article 12(1)(b) and at paragraph 35 he described the level or risk of threatened habitat and species stating that:

> *"… It must be certain, that is to say, identifiable. It must be real, not fanciful."*

3.19. This is understood to mean that for the level of risk to be real and identifiable, it must be based upon objective evidence to substantiate the risk.

3.20. The judgment in the case of Boggis v Natural England[5] also assists in determining when it would be appropriate to invoke the precautionary principle and conclude that the objective information needed, is simply not available.

3.21. At paragraph 37 of the judgment, it is stated:

> "…*a claimant who alleges that there was a risk which should have been considered by the authorising authority so that it could decide whether that risk could be "excluded on the basis of objective information", must produce credible evidence that there was a real, rather than a hypothetical, risk which should have been considered.*"

3.22. Also of relevance is the case of R (Champion) v. North Norfolk District Council[6], where at paragraph 41, Lord Carnwath makes it clear that Article 6(3) does not require absolute certainty of no adverse effect and it is ultimately an issue of judgment for the decision maker. It is stated:

> *"As the court itself indicated in Waddenzee the context implies a high standard of investigation. However, as Advocate General Kokott said in Waddenzee [2005] All ER (EC) 353, para 107:*
>
> > *"The necessary certainty cannot be construed as meaning absolute certainty since that is almost impossible to attain. Instead, it is clear from the second sentence of article 6(3) of the Habitats Directive that the competent authorities must take a decision having assessed all the relevant information which is set out in particular in the appropriate assessment. The conclusion of this assessment is, of necessity, subjective in nature. Therefore, the competent authorities can, from their point of view, be certain that there will be no adverse effects even though, from an objective point of view, there is no absolute certainty"*
>
> *In short, no special procedure is prescribed, and, while a high standard of investigation is demanded, the issue ultimately rests on the judgment of the authority."*

Summary conclusions

3.23. Having regard to the relevant legislation and supporting guidance it is clear that the assessment at Regulation 63 of the Habitats Regulations, is a two

[5] [2009] EWCA Civ 1061
[6] [2015] UKSC 52, [2015] 1 WLR 3710,

stage process, the first being the 'likely significance' test stage, the second being the 'integrity' test.

3.24. The Competent Authority should not grant a consent or other permission unless it can be ascertained that the plan / project will not adversely affect the integrity of relevant European Sites. The decision taker must be certain of this, i.e. reach a judgment beyond reasonable scientific doubt in line with the precautionary principle. This test must be applied in light of the Conservation Objectives which have formally been adopted for each of the European Sites.

3.25. It is also necessary to note the Holohan judgment. That judgment emphasises that it may be necessary to look wider than the listed interest features when assessing against integrity. In that case the ECJ stated:

> *"Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that an 'appropriate assessment' must, on the one hand, catalogue the entirety of habitat types and species for which a site is protected, and, on the other, identify and examine both the implications of the proposed project for the species present on that site, and for which that site has not been listed, and the implications for habitat types and species to be found outside the boundaries of that site, provided that those implications are liable to affect the conservation objectives of the site."*

3.26. This judgment underlines the importance of the assessment and ultimate judgment being related to the conservation objectives of the site.

3.27. It is important to recognise that the species for which sites are protected (at any level) do not recognise arbitrary boundaries and for many species / groups they will be reliant on different habitats or areas, in parts of their natural range for different stages of their life cycle, or at different times of year (e.g. as a response to seasonal climatic changes). A protected site may serve a 'protective function' for only part, or all of a species life cycle.

3.28. Regarding European designated sites, Article 4.1 of the Habitats Directive is of direct relevance on this point. It states:

> *"For animal species ranging over wide areas these sites shall correspond to the places within the natural range of such species which present the physical or biological factors essential to their life and reproduction. For aquatic species which range over wide areas, such sites will be proposed only where there is a clearly identifiable area representing the physical and biological factors essential to their life and reproduction."*

3.29. The presence of a species within a site and the population number at a point in time is an important consideration in determining the quality and importance of the site to the species in question. However, in real terms, value judgments on site quality are made in relation to the contribution the site (e.g. SPA) makes to the favourable conservation status of the species generally. A reduction in numbers of a qualifying or other (e.g. typical)

species within a designated site may not jeopardise the contribution the site makes to the sustainability of the species more generally and in this respect, site integrity continues to be maintained.

3.30. Similarly, when considering bird assemblage features, the total loss of a species from an assemblage would be considered as harm in assessment terms, however so long as the ongoing viability of that species (as a contributing facet of the assemblage) was maintained, then a level of loss would not have an adverse effect on integrity, since the coherence of the site's ecological structure, function and ecological processes would still be maintained.

4. LOCATION OF THE GRAVITY SITE IN RELATION TO RELEVANT DESIGNATED SITES

4.1. In undertaking this assessment, regard has first been had to all those European / International designated sites located within 20km of the Gravity Site (by straight line distance). These include:

- Severn Estuary SPA / SAC / Ramsar (approximately 2.2km west),
- Somerset Levels and Moors SPA / Ramsar (approximately 3.2km east);
- Mendip Limestone Grasslands SAC (approximately 13km northeast);
- Exmoor and Quantock Oakwoods SAC (approximately 14.3km west);
- Hestercombe House SAC (approximately 14.7 km southwest);
- Mendip Woodlands SAC (approximately 15.2km northeast);
- North Somerset and Mendip Bats SAC (approximately 16km northeast);

4.2. Additionally, The Severn Estuary SPA/SAC/Ramsar site is classified as a European Marine Site (EMS). EMSs are defined as any part of a European site covered (either continuously or intermittently) by tidal waters or any part of the sea. They include SPAs, SACs and Ramsar sites. In many instances these designations coincide.

4.3. The relationship between the Site and relevant designated sites is shown on Plan ECO1 and on the series of maps produced at Annex 1.

5. CONSERVATION STATUS OF RELEVANT DESIGNATED SITES

5.1. This section of the assessment describes the reasons for designation of the international / European designated sites, together with supporting information and the Conservation Objectives (noting that these are not produced for Ramsar sites).

Severn Estuary SPA

5.2. The Natura 2000 Data Form (dated 22nd December 2015 – see Annex 3) states that the Severn Estuary SPA qualifies under:

- Article 4.1 of the Birds Directive (79/409/EEC) for wintering populations of Bewick's Swan *Cygnus columbianus bewickii* (3,9% of the GB population);
- Article 4.2 of the Birds Directive (79/409/EEC) for regularly supporting in winter internationally important numbers of Gadwall *Anas strepera*, Greater White-fronted Goose *Anas albifrons*, Dunlin *Calidris apina*, Shelduck *Tadorna tadorna*, and Redshank *Tringa totanus*,
- Article 4.2 of the Birds Directive (79/409/EEC) for supporting an internationally important assemblage of birds in winter (84,317 waterfowl) including Bewick's Swan, Shelduck, Gadwall, Dunlin, and Redshank.

5.3. Regulation 33 Advice has been jointly published by Natural England, the Countryside Council for Wales and the Welsh Assembly Government (see Annex 4). This advice summarises information taken from the original citation (1993), the 2001 SPA review and the Natura 2000 data form dated 2006. It clearly states at section 2.2 (dealing with qualifying features of the SPA) that at present the legally protected species remain those in the original 1995 citation. Since publication of the Regulation 33 Advice, further information has been published including the revised Natura 2000 data form (2015) (see Annex 3) and information made available by the JNCC. The Natura 2000 data form of 2015 has been discussed above. Current information available on the JNCC website relating to qualifying features of the SPA (see Annex 5) lists Bewick's Swan, Gadwall, Greater White-fronted Goose, Dunlin Shelduck and Redshank as individual qualifying features along with a waterbird assemblage figure of 84,317 individuals (no species are specifically cited in relation to the assemblage).

Severn Estuary Ramsar

5.4. The Severn Estuary Ramsar site qualifies under:

- Criterion 1 of the Ramsar convention due to its immense tidal range (second largest in the world) which affects the physical environment and biological communities (including the Annex I communities' sandbanks, estuaries, mudflats and sandflats, and Atlantic salt meadows);
- Criterion 3 due to its unusual estuarine communities, reduced diversity and high productivity;
- Criterion 4 for its importance for the run of migratory fish between the sea and the river via the estuary, including for Salmon *Salmo*

salar, Sea Trout *Salmo trutta*, Sea Lamprey, River Lamprey *Lampetra fluviatilis*, Allis Shad *Alosa alosa*, Twaite Shad *Alosa fallax*, and Eel *Anguilla anguilla*. It is also of particular importance for migratory birds during spring and autumn;

- Criterion 5 as it supports an assemblage of international importance - 1998/99-2002/2003 5 year peak mean of 70,919 waterfowl;
- Criterion 6 as it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird. Species with peak counts in winter (at designation) are: Bewick's Swan, Greater White-fronted Goose, Shelduck, Gadwall, Dunlin and Redshank. Populations identified subsequent to designation are: Ringed Plover *Charadrius hiaticula* (spring/autumn), Eurasian Teal *Anas crecca* (winter), Northern Pintail *Anas acuta* (winter) and Lesser Black-backed Gull *Larus fuscus graellsii* (breeding); and
- Criterion 8 due to the fish of the whole estuarine and river system being one of the most diverse in Britain, with over 110 species recorded, including those listed under Criterion 4, and for its importance as a feeding and nursery ground for many fish species, particularly Allis Shad and Twaite Shad which feed on mysid shrimps in the salt wedge.

5.5. The relevant Ramsar Information Sheet is included at Annex 3.

Severn Estuary SAC

5.6. The Severn Estuary SAC is designated for the following features of interest:

- Mudflats and sandflats not covered by seawater at low tide;
- Estuarine and intertidal habitats;
- Anadromus fish (River Lamprey *Lampetra fluviatilis,* Twaite Shad *Alosa fallax,* Allis Shad *Alosa alosa* and Sea Lamprey *Petromyzon marinus);* and
- Reefs on the shore line as well as subtidal habitat.

5.7. The SAC Natura 2000 data sheet is included at Annex 3.

Somerset Levels and Moors SPA

5.8. The Natura 2000 Data Form (dated 22nd December 2015 – see Annex 3) states that the Severn Estuary SPA qualifies under:

- Article 4.1 of the Birds Directive (79/409/EEC) for wintering Bewick's Swan and breeding Golden Plover *Pluvialis apricaria*;
- Article 4.2 of the Birds Directive (79/409/EEC) for wintering Eurasian Teal *Anas crecca* and breeding Northern Lapwing *Vanellus vanellus;*
- Article 4.2 of the Birds Directive (79/409/EEC) for an Internationally Important Assemblage of birds, regularly supporting 73014 waterfowl (5 year peak mean 1991/92-1995/96).

Somerset Levels and Moors Ramsar

5.9. The Somerset Levels and Moors Ramsar site qualifies under:

- Criterion 2 of the Ramsar convention on account of it supporting 17 species of British Red Data Book invertebrates;
- Criterion 5 as it supports an assemblage of international importance - 97155 waterfowl (5 year peak mean 1998/99-2002/2003) during the winter;
- Criterion 6 as it regularly supports species or populations occurring at levels of international importance. Species listed with peak counts in winter (at designation) are, Bewick's Swan and Eurasian Teal *Anas crecca*. Northern Lapwing are listed as a breeding qualifying interest feature.

5.10. Mute Swan *Cygnus olor*, Eurasian Wigeon *Anas Penelope,* Northern Pintail *Anas acuta* and Northern Shoveler *Anas clypeata* are all listed as species identified subsequent to designation for possible future consideration under criterion 6.

5.11. A copy of the relevant Ramsar Information Sheet is included at Annex 3.

Mendip Limestone Grasslands SAC

5.12. This SAC is designated for the following features of interest:

- European dry heaths for which the area is considered to support a significant presence.
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) for which this is considered to be one of the best areas in the United Kingdom.
- Caves not open to the public for which the area is considered to support a significant presence.
- Tilio-Acerion forests of slopes, screes and ravines for which the area is considered to support a significant presence.
- Greater Horseshoe Bat *Rhinolophus ferrumequinum* for which the area is considered to support a significant presence.

5.13. The SAC Natura 2000 data sheet is included at Annex 3.

Hestercombe House SAC

5.14. This SAC is designated for the following features of interest:

- Lesser Horseshoe Bat *Rhinolophus hipposideros* for which this is considered to be one of the best areas in the United Kingdom.

5.15. The SAC Natura 2000 data sheet is included at Annex 3.

Exmoor and Quantock Oakwoods SAC

5.16. This SAC is designated for the following features of interest:

- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles for which this is considered to be one of the best areas in the United Kingdom.
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) for which the area is considered to support a significant presence.
- Bechstein's bat *Myotis bechsteini* for which the area is considered to support a significant presence.
- Barbastelle bat *Barbastella barbastellus* for which this is considered to be one of the best areas in the United Kingdom.
- Otter *Lutra lutra* for which the area is considered to support a significant presence.

5.17. The SAC Natura 2000 data sheet is included at Annex 3.

Mendip Woodlands SAC

5.18. This SAC is designated for the following features of interest:

- Tilio-Acerion forests of slopes, screes and ravines for which this is considered to be one of the best areas in the United Kingdom.

5.19. The SAC Natura 2000 data sheet is included at Annex 3.

North Somerset and Mendip Bats SAC

5.20. This SAC is designated for the following features of interest:

- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) for which this is considered to be one of the best areas in the United Kingdom.
- Caves not open to the public for which the area is considered to support a significant presence.
- Tilio-Acerion forests of slopes, screes and ravines for which this is considered to be one of the best areas in the United Kingdom.
- Greater Horseshoe Bat for which this is considered to be one of the best areas in the United Kingdom.
- Lesser Horseshoe Bat for which this is considered to be one of the best areas in the United Kingdom.

5.21. The SAC Natura 2000 data sheet is included at Annex 3.

Conservation Objectives

5.22. Natural England produce Conservation Objectives for all SPAs and SACs in England.

5.23. Copies of the formal Conservation Objectives for all of the above SPAs and SACs are included at Annex 6.

5.24. Consideration has been afforded to all of the above cited information in producing this assessment.

6. ASSESSMENT OF THE IMPLICATIONS OF THE PROPOSALS FOR THE CONSERVATION OBJECTIVES OF THE INTERNATIONAL / EUROPEAN DESIGNATED SITES

6.1. Section 2 of this document sets out the legislation, guidance and case law of relevance to an assessment of the implications of a plan / project on a European site. Section 3 discusses key terms and themes associated with Habitats Regulations assessments. Having regard to this legislation and supporting guidance, it is clear that the assessment is a two-stage process, the first being the 'likely significant effect', and the second being the 'integrity test'.

6.2. It is clear that the Conservation Objectives of a European site are the most important consideration in determining whether the plan / project will have an adverse effect on the site, including any effects on its integrity.

6.3. It is evident that there is a clear hierarchical approach to assessing effects on European sites in line with the Habitats Regulations. The primary test is that against the Conservation Objectives with other considerations following these. Such other considerations would include:

- Other features of interest associated with the site; and
- Other relevant baseline information for the site.

6.4. In line with the above, whilst the qualifying interest features of the site and other baseline information have informed this assessment, the greatest weight has been placed upon the formal Conservation Objectives for the European sites, as set out by Natural England. Consideration has also been afforded to the Supplementary Advice such as that produced by Natural England, where relevant.

6.5. With reference to the relevant designated sites, this section includes a description of the potentially significant effects arising from the plan / project. The potential effects are assessed within this section in order to address the test under Regulation 63 (1) in the first instance (the 'likely significant effect' stage).

6.6. In undertaking this assessment, consideration has been had to the best available scientific knowledge. Further consideration under the Habitats Regulations can therefore be undertaken consistent with the HRA Guidance 2021, which requires the use of the best scientific knowledge to inform a decision where no reasonable scientific doubt remains as to the presence and / or absence of effects that would adversely affect the integrity of the designated site (see Section 2 above).

6.7. Furthermore, consideration is given to the *People over Wind* Judgement (C-323/17), which confirmed the view of the CJEU that avoidance or mitigation measures can only be taken into consideration at the Appropriate Assessment stage.

Potential significant effects in the absence of mitigation

6.8. The qualifying interest features of the relevant designated sites are described in detail within Section 5 of this assessment and the Conservation Objectives are included at Annex 6. Section 4 describes the location of the Application Site in the context of the various designations.

6.9. In view of the nature of the Development Proposals and their location, the site specific Conservation Objectives, qualifying interest features and the distances involved, it has been concluded that no source / receptor pathway exists which could give rise to a likely significant effect for the following sites:

- Somerset Levels and Moors SPA / Ramsar (approximately 3.2km east);
- Mendip Limestone Grasslands SAC (approximately 13km northeast);
- Exmoor and Quantock Oakwoods SAC (approximately 14.3km west);
- Hestercombe House SAC (approximately 14.7 km southwest);
- Mendip Woodlands SAC (approximately 15.2km northeast);
- North Somerset and Mendip Bats SAC (approximately 16km northeast).

6.10. By way of qualification, the following information is given in support of the above conclusion.

Somerset Levels and Moors SPA / Ramsar

6.11. Cited pressures relating to the conservation status of this designated site relate to nutrient enrichment through elevated phosphate levels. An advice letter relating to this issue is included at Annex 7.

6.12. Whilst the Application Site is located in relatively close proximity to the Somerset Levels and Moors SPA / Ramsar site and it is understood to be within the same surface water catchment, the site actually drains away from the SPA / Ramsar site. Any nutrient enrichment (or other water quality issue) associated with water discharges into the Huntspill could not therefore have an adverse effect on water quality at the designated site.

6.13. Notwithstanding the above, a treatment chain for discharged water is proposed and this includes attenuation, water treatment (sewerage and grey water) at a bespoke treatment works and additional filtration through a rehabilitated existing reedbed system with significant capacity. Discharged water would most likely be at or around nutrient neutral at the point of discharge.

6.14. It is possible that increased water abstraction could have an adverse effect on the SPA / Ramsar site through the lowering of the water table. However, abstraction licences already exist for the Application Site and it is envisaged that the existing volume limits would be adhered to, as already consented. In the event that abstraction limits need to be increased in the future, then new licences would be applied for and the Environment Agency (acting as

Competent Authority) would need to assess that application on its own merits, in view of any relevant advice sought from Natural England.

6.15. No other pathways for potential significant effects have been identified.

Mendip Limestone Grasslands SAC

6.16. This SAC is located at a significant distance (13km) from the Application Site. At such distances direct and indirect adverse effects are not likely and simple screening based on distance is considered appropriate.

Mendip Woodlands SAC

6.17. Again this SAC is located at a significant distance from the Application Site (15.2km) and at such distances direct and indirect adverse effects are not likely and simple screening based on distance is considered appropriate.

Exmoor and Quantock Oakwoods SAC, Hestercombe House SAC and North Somerset and Mendip Bats SAC

6.18. Each of these SACs are designated on account of their important bat populations.

6.19. Regarding Hestercombe House SAC and North Somerset and Mendip Bats SAC, these sites are designated on account of their importance for Horseshoe bat species. Guidance has been prepared specifically in relation to development control considerations in relation to plans / projects which may have an adverse effect on the relevant bat populations associated with these sites. This guidance was published by Somerset Ecology Services (Somerset County Council) in 2019 and was prepared in consultation with a range of experts, including Natural England. Copies of the guidance documents are included at Annex 8. Specific regard has been had to the above cited guidance in undertaking this assessment.

6.20. In each case, the guidance defines ‘consultation zones’ within which it is considered that an adverse effect could arise, and where screening of the plan / project is stated as being required. These zones include the areas of habitat considered to be important in maintaining the bat populations at a favourable conservation status. Advice is also given on survey requirements and measures which may form part of a suitable mitigation strategy.

6.21. The Application Site falls well outside all of these consultation zones and any of the habitat areas highlighted as being of conservation importance for the relevant bat populations.

6.22. In this light it is considered that likely significant effects can be screened out in relation to Hestercombe House SAC and North Somerset and Mendip Bats SAC.

6.23. Regarding Exmoor and Quantock Oakwoods SAC, this site is designated for its important populations of Bechstein's bat and Barbastelle bat, in addition to Otter and its woodlands (dominated by Sessile Oak, Holly, Ash and Alder).

6.24. Both Bechstein's bat and Barbastelle bat are closely associated with mature woodland habitats (although not solely reliant upon them), typically being tree roosting species. Neither species tends to range far from their roosts to forage, with Bechstein's bat generally foraging up to a maximum distance of 1k to 2.5km (usually closer to 1km). Barbastelle bats are known to typically forage up to 5km from maternity roosts, however where less favourable habitat exists around the roost site, they will travel further to reach more optimal feeding grounds.

6.25. As stated previously, the Application Site is located approximately 14.3km to the west of the SAC boundary (straight line distance).

6.26. As with the other SACs discussed above, guidance has been prepared specifically in relation to development control considerations in relation to plans / projects which may have an adverse effect on the relevant bat populations associated with this site. Again the guidance (April 2018) was published by Somerset Ecology Services (Somerset County Council) and was prepared in consultation with a range of experts, including Natural England. Copies of the guidance document is included at Annex 8. Specific regard has been had to the above cited guidance in undertaking this assessment.

6.27. The guidance defines ‘consultation zones’ within which it is considered that an adverse effect could arise, and where screening of the plan / project is stated as being required. These zones include the areas of habitat considered to be important in maintaining the bat populations at a favourable conservation status. Two consultation zones are defined and discussed, one relating to the Quantocks roosts and one relating to the Exmoor roosts, with each having regard to defined zones relating to behaviour, including foraging (“sustenance zones”).

6.28. The Quantocks roosts consultation zone is the closest to the Application site, however the Application Site still falls outside of the zone, which does not extend east of the M5 corridor. It should be noted that whilst the consultation zones include land out to 15.5km, this zone relates to the known roost areas and not the boundary of the SAC. The SAC boundary includes significant areas of habitat overall, but the known roosting areas are very localised and well removed from the Application Site.

6.29. In the light of the above, and in consideration of there being no other identified pathways for significant effect to arise, it is concluded that likely significant effects can be screened out in relation to Exmoor and Quantock Oakwoods SAC.

Consideration of the Severn Estuary SPA / SAC / Ramsar site

6.30. This designated site is located approximately 2.2km west of the Application Site at its closest point (straight line distance). Hydrological connectivity exists between the Application Site and the SPA / SAC / Ramsar site, via the Huntspill River (National Nature Reserve NNR) which discharges into the Bridgwater Bay SSSI / NNR, further designated as part of the Severn Estuary SPA / SAC / Ramsar site.

6.31. Regarding water quality issues, it is noted that surface water flows would be towards Bridgwater Bay. Whilst the proposed water treatment chain (including the rehabilitated reedbed system and water treatment plant), together with construction stage environmental mitigation, are considered integral to the project proposals, this sHRA has proceeded on the basis of considering such measures only as part of the appropriate assessment stage (see further below)

6.32. Insofar as abstraction effects are concerned, given the tidal nature of the Severn Estuary and the reasons for designation, any effects would be nugatory. It is however also relevant to consider that, as already discussed, abstraction licences already exist for the Application Site and it is envisaged that the existing volume limits would continue to be adhered to. In the event that abstraction limits do need to be increased in the future, then new licences would be applied for and the Environment Agency (acting as Competent Authority) would need to assess that application on its own merits, in view of any relevant advice sought from Natural England.

6.33. It is concluded that no likely significant effect arises in relation to water abstraction.

6.34. With the exception of water quality issues and increased recreational pressure, a matter discussed further below, it is concluded that in view of the Development Proposals, the distances involved and the qualifying interest features associated with the SPA / SAC Ramsar site (and the formal Conservation Objectives), that no pathways exist by which likely significant effects could arise.

6.35. Insofar as increased recreational pressure is concerned, this is an issue which has been cited as requiring consideration for some years in relation to the Severn Estuary SPA and Ramsar designations, principally focussed on implications for bird interest features from disturbance (breeding and wintering). The available evidence base relating to this issue is far more developed for the upper reaches of the Severn Estuary. By way of example, Stroud District Council having adopted a strategic approach to mitigation / avoidance measures on the basis of an evidence base and assessment work specifically focussed on disturbance effects on qualifying interest features. Such an evidence base is not available for those parts of the SPA / SAC and Ramsar of direct relevance to this sHRA. A precautionary approach to assessment has therefore been undertaken.

6.36. Insofar as this screening assessment is concerned, given the distances involved (straight line) and the fact that new residents and workers / visitors could potentially access parts of the SPA / SAC / Ramsar site for recreation, it is considered that a likely significant effect cannot be ruled out with sufficient certainty. In this light it is considered necessary to consider the issue in greater detail and assess whether, in view of any required mitigation / avoidance measures a firm conclusion as to the absence of an adverse effect on integrity can be reached.

Consideration of the Integrity test at Regulation 63(5)

6.37. As discussed previously, surface water flows would be towards Bridgwater Bay SSSI (a constituent part of the Severn Estuary SPA / SAC / Ramsar site). Given the hydrological connectivity, it is possible that construction phase run-off, including silts or pollutants could reach the SPA / SAC / Ramsar site. It is also possible that nutrient enrichment (e.g. increased phosphate or nitrate levels), derived from water discharged from the Application Site could occur at the SPA / SAC / Ramsar site. These impact pathways could give rise to direct adverse effects on qualifying habitat interest features of the SAC and Ramsar site and, that they could also give rise to indirect adverse effects on faunal qualifying interest features associated with the SPA / SAC / Ramsar site.

6.38. It is considered that some comfort can be taken from the dilution effects that would occur in the Huntspill River. However, in the absence of any specific mitigation relating to potential water quality impacts, it is considered that it is not possible to conclude with the required level of certainty that no adverse effect on the integrity of the SPA / SAC / Ramsar site would arise. The proposed mitigation / avoidance measures which will negate any such potential adverse effects are discussed in the following section of this sHRA.

Disturbance effects

6.39. On a precautionary basis, it is considered that disturbance effects could arise from increased recreational pressure. Such effects are considered to be focussed upon visual/physical disturbance arising from walkers and cyclists. Dog walking is an often cited contributing factor to disturbance effects on birds, mainly because dogs will often initiate a predator / prey flight response especially when ran off the lead. When off the lead they will often stray from paths (which otherwise act to manage visitor movements especially in a coastal or wetland environment), and they may actively chase birds.

6.40. During winter, birds are particularly susceptible to adverse effects through disturbance due to food sources being generally scarcer and efficient use of energy being of heightened importance to survival. As such, increased disturbance could give rise to an adverse effect on the birds during these harsher periods. The SPA bird qualifying interest features relate to wintering populations of birds, which are also a qualifying interest feature of the Ramsar designation.

6.41. During the breeding season, disturbance can give rise to avoidance of otherwise suitable nesting or foraging habitat. Dogs in particular can also flush birds from nests resulting in nest / egg abandonment and chick predation. Breeding populations are not relevant to the SPA. Insofar as the Ramsar site is concerned, breeding Lesser Black Backed Gull are listed as a qualifying feature under criterion 6.

Quantifying the potential effect of the proposals

6.42. In terms of the number of potential additional visitors to the SPA / SAC / Ramsar site, the following information is considered relevant.

6.43. The Development Proposals will deliver up to 750 new homes. Using information available from the 2011 census, for Sedgemoor district the average house occupancy rate is 2.3 persons per house. On this basis the proposals could result in an additional 1725 new residents. In addition, the proposals would give rise to visitors and workers at the site.

6.44. It is to be expected that these new residents will seek recreational spaces and a proportion will require areas to walk dogs. Information available from the Pet Food Manufacturers Association[7] shows that for 2021 it is estimated that in the UK 33% of households own a dog/s.

6.45. In relation to dog walking therefore, it would be expected that 248 new households would own at least one dog[8]. On the basis that dogs are often walked twice a day, taking a precautionary approach it can be assumed that the proposals associated with the residential element of the scheme would generate up to an additional 496 dog walks a day. This can be viewed as a precautionary estimate on the basis that the detailed proposals may not deliver the full 750 units, some of these units may be flats which are less suited to dog ownership and not all dogs will be walked more than once a day.

6.46. The most direct route on foot from the Application Site to the SPA / SAC / Ramsar site (should this be made available) would entail a walk well in excess of 5km starting from the southern end of the reedbed, with the route following the permissive footpath along the southern bank of the Huntspill River to the west. Access from the southern part of the Site, where housing is more likely to be delivered, would add approximately 1 kilometre to the route.

6.47. An alternative walking route would be available via a combination of footpaths and roads, heading west through Puriton, crossing the M5 (bridge) and picking up the England Coast Path at the banks of the River Parrett then heading north to meet the SPA / SAC / Ramsar boundary at Brickyard Farm. Again, this would entail a walk of around 5km to reach the SPA / SAC / Ramsar boundary from the development zone, within which housing could be delivered.

6.48. It follows that any walk, where sections footpath within adjacent to the SPA / SAC / Ramsar are walked (having arrived on foot), would be well over 10km. This is far longer than would be expected for daily dog walks and indeed longer than most people would walk as part of regular exercise or other form of recreation. It is considered highly unlikely that either of these routes would be walked (or otherwise used) to their full extent, on anything other than a very irregular basis.

6.49. It is of course possible that residents and to an extent workers or visitors would travel by car to access coastal locations associated with the SPA / SAC / Ramsar site, for recreation including dog walking.

[7] https://www.pfma.org.uk/pet-population-2021
[8] 33/100 x 750 = 247.5

6.50. Public car parking is available in locations adjacent to, or close to, the SPA / SAC / Ramsar site, in many locations with some relatively close (in context) to the Application Site. Such parking is for example available at Burnham on Sea (circa 10km by road) and at Combwich (northwest of Bridgwater), a journey of around 16km. Beyond Combwich is parking at Stockland Bristol (circa 18.km journey) and Steart (circa 22km journey). Other incidental parking areas, including at the side of lanes or residential streets will exist in various locations, from where access to the SPA / SAC / Ramsar site will be possible along public rights of way.

6.51. Given the above, it is not possible to rule out new residents or workers / visitors accessing the SPA / SAC / Ramsar site or immediately adjacent footpaths for recreational purposes, however it is considered highly unlikely that any such access would be on anything other than an infrequent basis.

6.52. It is however also necessary to consider matters concerning functional linkage and implications for qualifying interest features of the SPA / SAC / Ramsar site which utilise other habitat outside of the designated site boundary, where that other habitat is important to the maintenance of the qualifying population. In this regard, the Application Site itself is not important (does not support populations of the relevant species). Given that new occupiers of the Application Site may access the footpath associated with the Huntspill River NNR, consideration has also been given to the NNR in relation to this pathway for a potential effect, and the likely significance of any such effect.

6.53. The habitats associated with the Huntspill River NNR can be broadly described as comprising linear open water, grassland and scrub. Agricultural grasslands surround it. Given these habitats, the NNR is not likely to be used as an important foraging, shelter or loafing resource for any of the wintering bird interest features.

6.54. It is however noted that Bewick's Swan (Severn Estuary SPA / Ramsar qualifying feature and also an interest feature of the Somerset Levels and Moors SPA) are known to use agricultural land surrounding the SPA / Ramsar for foraging purposes during daylight. With regard to walkers accessing the footpath along the Huntspill River and potentially disturbing foraging / loafing Bewick's Swan, the following points are relevant:

1) The very open nature of the landscape would mean that walkers (including dog walkers) would be very unlikely to startle the birds, causing them to expend energy in moving away;
2) The linear nature of the footpath will act to manage / control visitors such that any effect would be highly localised and birds would not avoid using large areas of otherwise suitable and potentially important habitat; and
3) The fact that the NNR is actively marketed for recreational use (including walking, canoeing and angling) would imply that disturbance effects are not considered to be a significant issue and certainly not one which could undermine a designated site's conservation objectives;
4) Noting the above, a level of habituation by the birds to walkers and other users would be expected, such that they no longer perceive walkers as a threat at anything but very close range.

6.55. It is considered that indirect effects relating to functional linkage would not be significant and that no adverse effect on integrity would arise in relation to this pathway.

6.56. In view of the above, it is considered that it is possible to conclude that it would be very unlikely that the Development Proposals would lead to an adverse effect on the integrity of the SPA / SAC / Ramsar site through increased recreational pressure. However, Ecology Solutions is mindful that it remains possible that new residents and workers / visitors could (albeit infrequently) visit the SPA / SAC / Ramsar site and that it is necessary to view any effects in combination with effects arising from other sources of increased recreational pressure (e.g. other new housing).

6.57. Regarding in combination effects of new housing provision, Ecology Solutions is mindful that the HRA of the Sedgemoor Core Strategy required proposals for large (20+ units) housing developments within 5km of a Natura 2000 site to meet the Accessible Natural Greenspace (ANG) Standard ANG standard in order to reduce recreational pressure. Policy D30 of the Sedgemoor Local Plan states that in the interest of reducing recreational pressure on sensitive Natura 2000 sites all residential development should be ANG compliant or otherwise appropriately contribute to improving access to natural greenspace. In this light, further consideration of measures to mitigate / avoid increased recreational pressure at relevant designated sites is considered in the following section.

7. MITIGATION / AVOIDANCE MEASURES AND OVERALL CONCLUSION

7.1. Following from the conclusions reached in the above assessment section, those mitigation and avoidance measures which are to be brought forward are described below.

Water Quality

7.2. The proposed water treatment chain associated with the proposals includes a water treatment plant which will in turn discharge into a large, rehabilitated reedbed system which will deliver additional 'polishing' before final discharge into the Huntspill River. It is anticipated that nutrient neutrality would be achieved at the point of discharge into the Huntspill River and in these terms no in combination effects could occur.

7.3. In the event that nutrient neutrality was not in fact reached by the point of discharge into the Huntspill River, given the treatment chain it can be expected that nutrient levels would be only marginally elevated (above neutral) and could be considered nugatory in assessment terms. It then falls to consider the dilution effects of the Huntspill River which gives additional comfort.

7.4. A Framework Demolition and Construction Environmental Management Plan (FDCEMP) has been produced and is included at Appendix 4.1 of the ES. The aim of the FDCEMP is to avoid adverse environmental effects during the demolition and construction phase, including pollution prevention associated with aquatic habitats.

7.5. In view of the reedbed system, the securing of construction stage environmental mitigation (through the FDCEMP) and the aforementioned dilution effects of the Huntspill River, it can also be concluded that construction and demolition phase effects relating to water quality can be considered nugatory.

7.6. The mitigation avoidance measures described above, allow for the conclusion that when considered both alone and in combination with other plan and projects, no adverse effect will arise on any relevant designated site in relation to water quality issues.

Increased Recreation

7.7. A key principle guiding mitigation / avoidance strategies associated with avoiding recreational impacts at European (and other) designated sites is the delivery of good quality recreational resources on the door-step of new residents. Such resources are of particular value in facilitating easy access to areas for regular (daily) dog walking. Indeed, this approach is reflected in the relevant development plan, as previously discussed.

7.8. A copy of the document titled "An analysis of Accessible Natural Greenspace provision in Sedgemoor" (2017) published by Sedgemoor District Council is included at Annex 9. ANG standards are defined at page two of that document as follows:

"To meet the standard there should be a qualifying ANG site:

- *of at least 2 hectares in size, no more than 300 metres (5 minute walk) from home;*
- *of at least 20 hectares in size within two kilometres of home;*
- *of at least 100 hectares in size within five kilometres of home; and*
- *of at least 500 hectares in size within ten kilometres of home; plus*
- *a minimum of one hectare of statutory Local Nature Reserve per thousand population."*

7.9. The Development Proposals include significant provision of landscaping, which will include areas of accessible open space available to new residents.

7.10. New housing provision would in any event trigger requirements to deliver accessible open space for recreation purposes and this would provide immediately accessible recreation space close to new homes.

7.11. In addition, "Gravity Park" in the southeast of the Proposed Development will be approximately 8ha in size and this would be accessible to new residents and other members of the public. This large open space area would be mixed use delivering ecological as well as amenity benefits, with a range of habitat features including grassland, orchard, hedgerows and scrub.

7.12. There is also the potential for further public access to additional open space areas for recreation created within the "Wellbeing and Arrival Zone" in the south-east of the development and potentially other landscape features at the periphery of the site.

7.13. In addition, the Design Guide has a strong focus on delivering well designed, integrated, inclusive and attractive public settings with both pedestrian and cycle routes. These measures will encourage walking and 'green' transport choices in the local vicinity, which ultimately will assist in ensuring a quality recreation experience locally, limiting visitor pressures elsewhere.

7.14. Further, the Development Proposals will deliver benefits to the Avalon Marshes regeneration project through the investment plan. Funding can be facilitated towards land acquisition, habitat restoration and ecological and visitor management. Several areas of the Avalon Marshes are designated as an NNR where public recreational use is encouraged. A key aim of the Avalon Marshes project is to buffer some of the more sensitive habitats (such as those designated as part of the Somerset Levels and Moors SPA/Ramsar), significantly increasing the ecological value of the landscape unit, whilst also increasing the quality of the experience for visitors.

7.15. Turning back to the ANG standards, the Development Proposals would more than meet the requirements to deliver at least 2ha of ANG within 300m of new dwellings. Further, the local NNR site network, including Huntspill River NNR (which would remain accessible to new residents, even where direct access beside the reedbed was not provided), Somerset Levels NNR and those associated with the Avalon Marshes including

Shapwick Heath NNR, Streat Heath NNR, Ham Wall NNR all deliver large accessible natural open space in relatively close proximity.

7.16. Whilst there may be deficiencies identified in the application of the ANG standards, the ability of the Development Proposals to contribute significantly to the level of accessible greenspace available (at the Application Site) not just to new residents but to existing residents of Puriton and Woolavington is important. This is because in addressing matters concerning increased recreational pressure at designated sites, it is the net effect on the site which is important. You would not expect all of the new residents to only ever use open space delivered on site as part of the scheme. They may, visit the SPA / SAC / Ramsar site for example. The open space may however, equally act to draw other pre-existing residents of the local area who would otherwise have visited the SPA / SAC / Ramsar site.

7.17. The investment plan also lists the Parrett Barrier scheme as a potential scheme to assist with funding and delivery. This scheme also has strategic environmental benefits and is a key asset in terms of investment and economic transformation.

7.18. In these terms, it can be concluded that, in line with Policy D30 of the Sedgemoor Local Plan, the Development Proposals appropriately contribute to improving access to natural greenspace. The mitigation avoidance measures allow for the conclusion that when considered both alone and in combination with other plan and projects, no adverse effect will arise on any relevant designated site through increased recreational pressure.

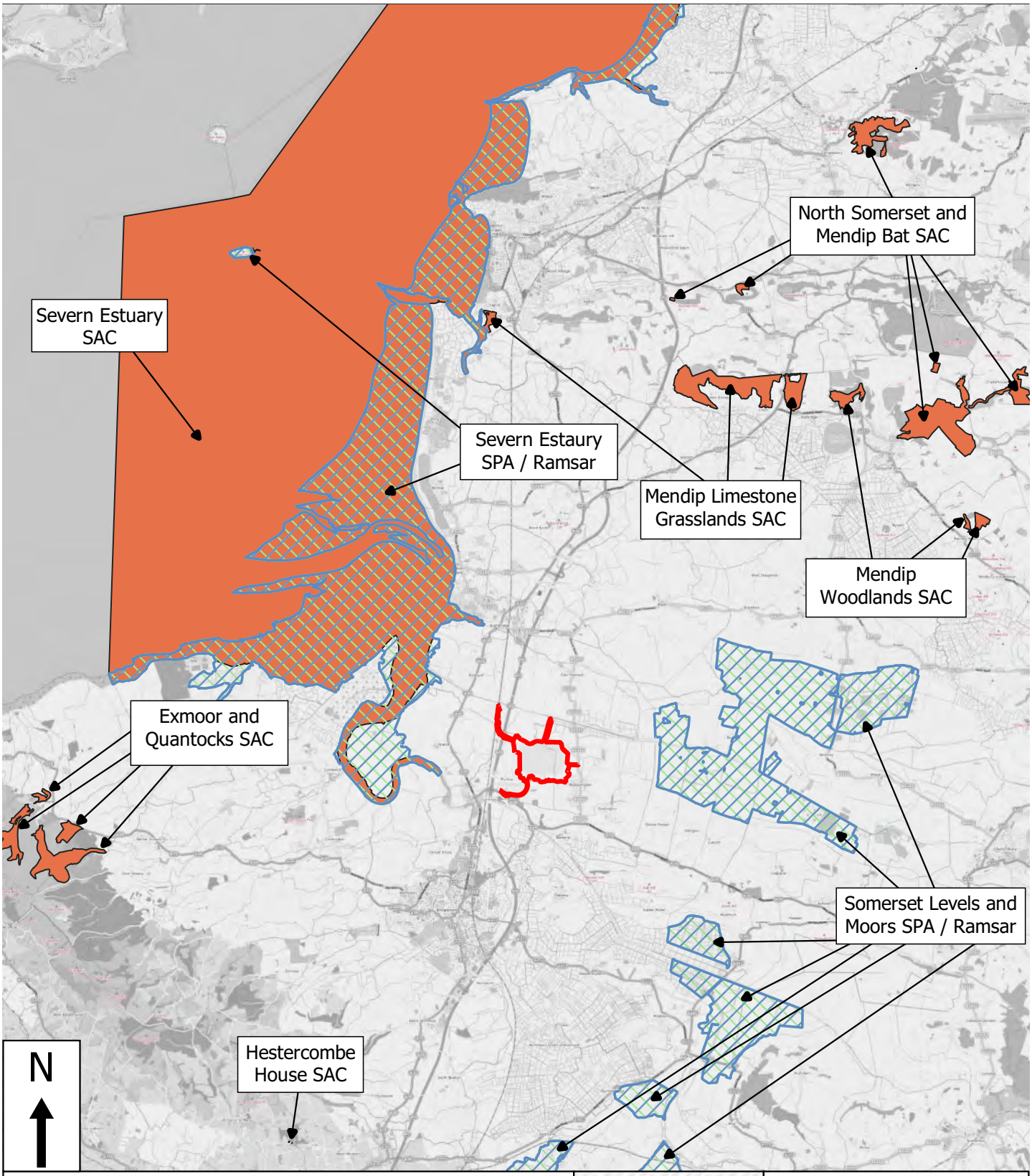
Overall Assessment Conclusion

7.19. No adverse effect on the Integrity of any relevant designated site has been identified when the plan project is considered both alone and in combination with other plans or projects.

PLANS

PLAN ECO1

Designated Site Locations



Key:

- Red Line Boundary
- Ramsar Site
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)

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7761: THIS IS GRAVITY

PLAN ECO1: DESIGNATED SITE LOCATIONS

Rev: A

Sep 2021

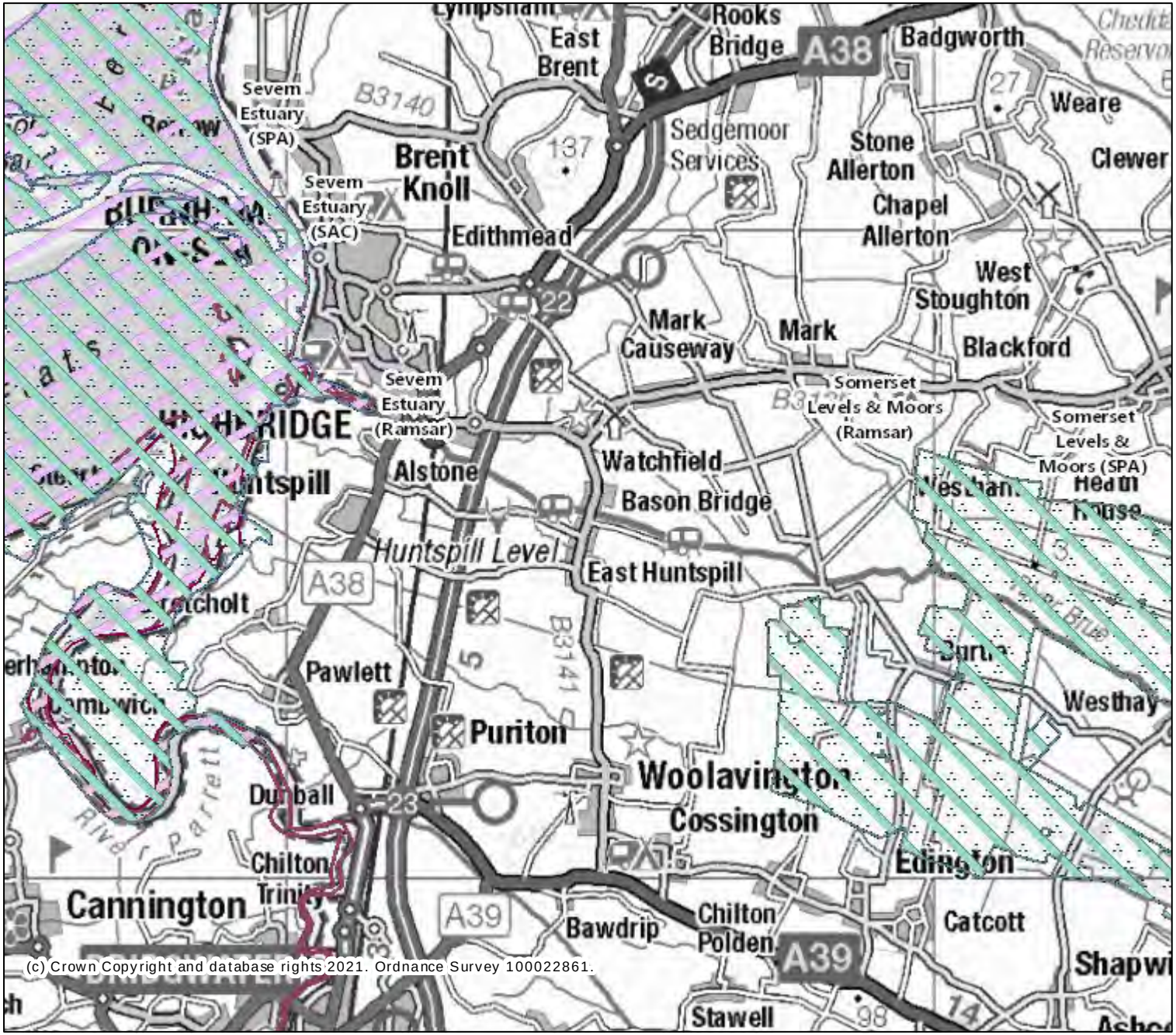
ANNEXES

ANNEX 1

Information downloaded from MAGIC

MAGIC

MAGIC A



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- Special Protection Areas (England)

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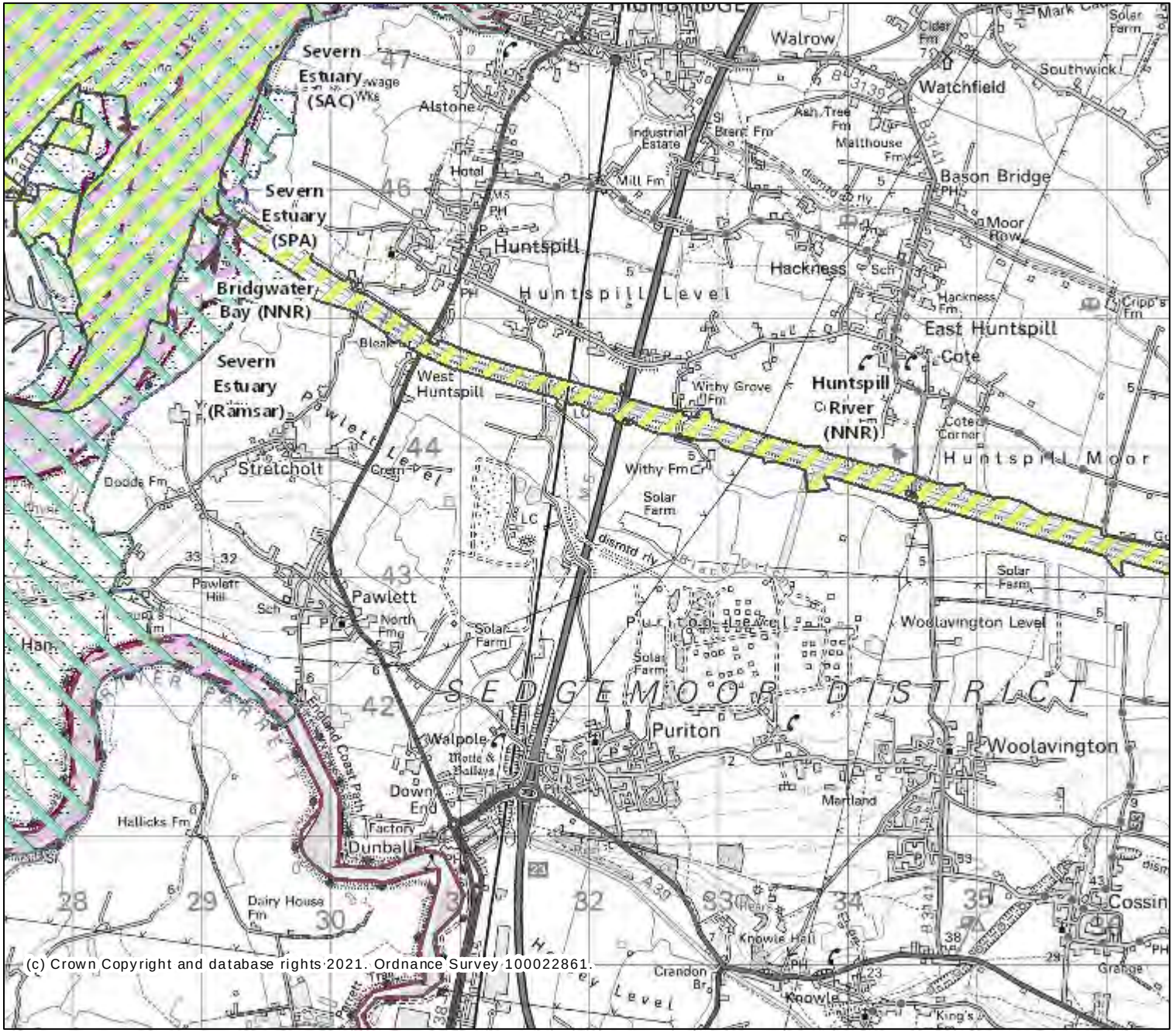
MAGIC B



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- Ramsar Sites (England)
- Special Areas of Conservation (England)
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Map produced by MAGIC on 23 September, 2021.

MAGIC

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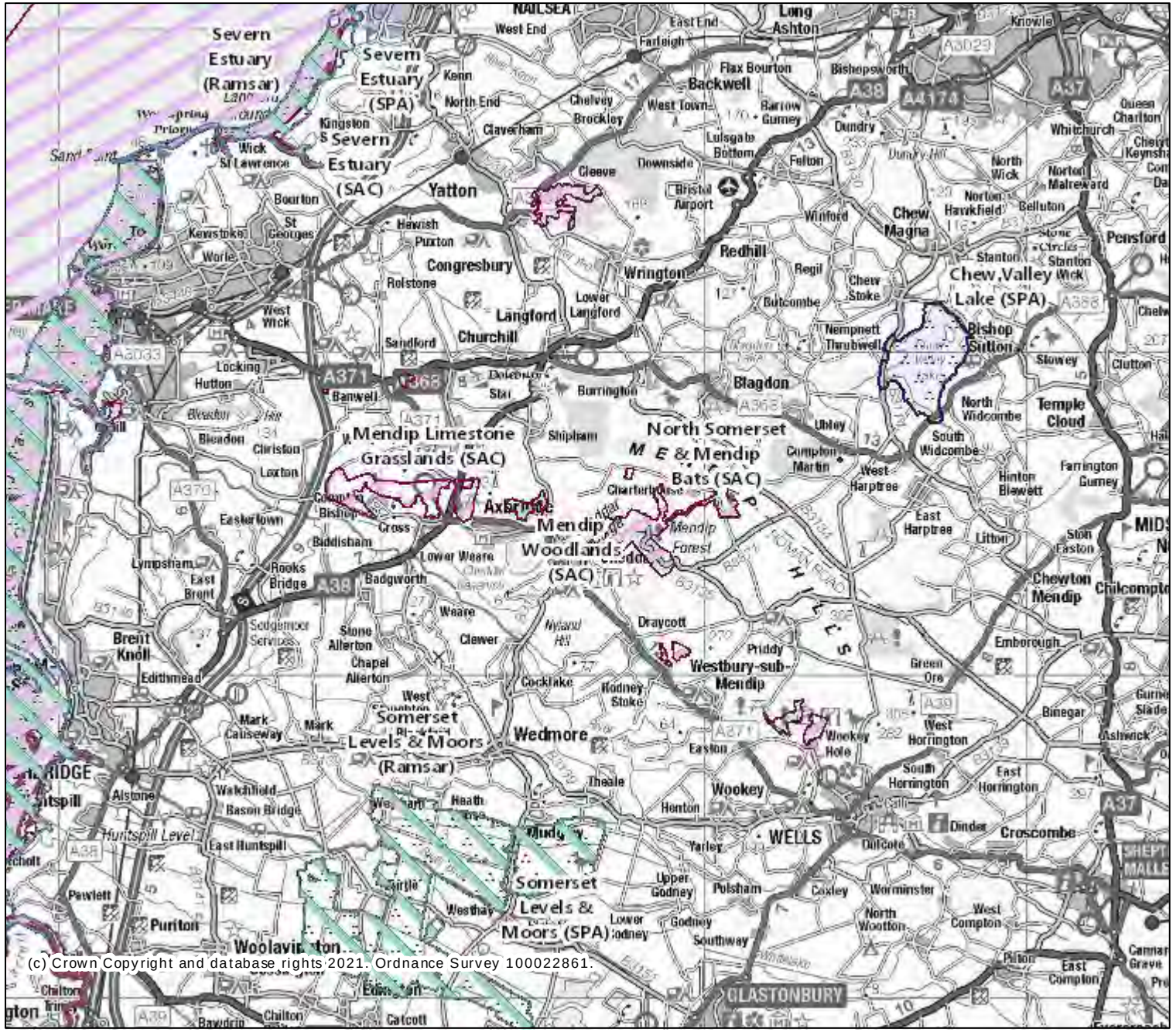

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Legend

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- Special Areas of Conservation (England)
- Special Protection Areas (England)

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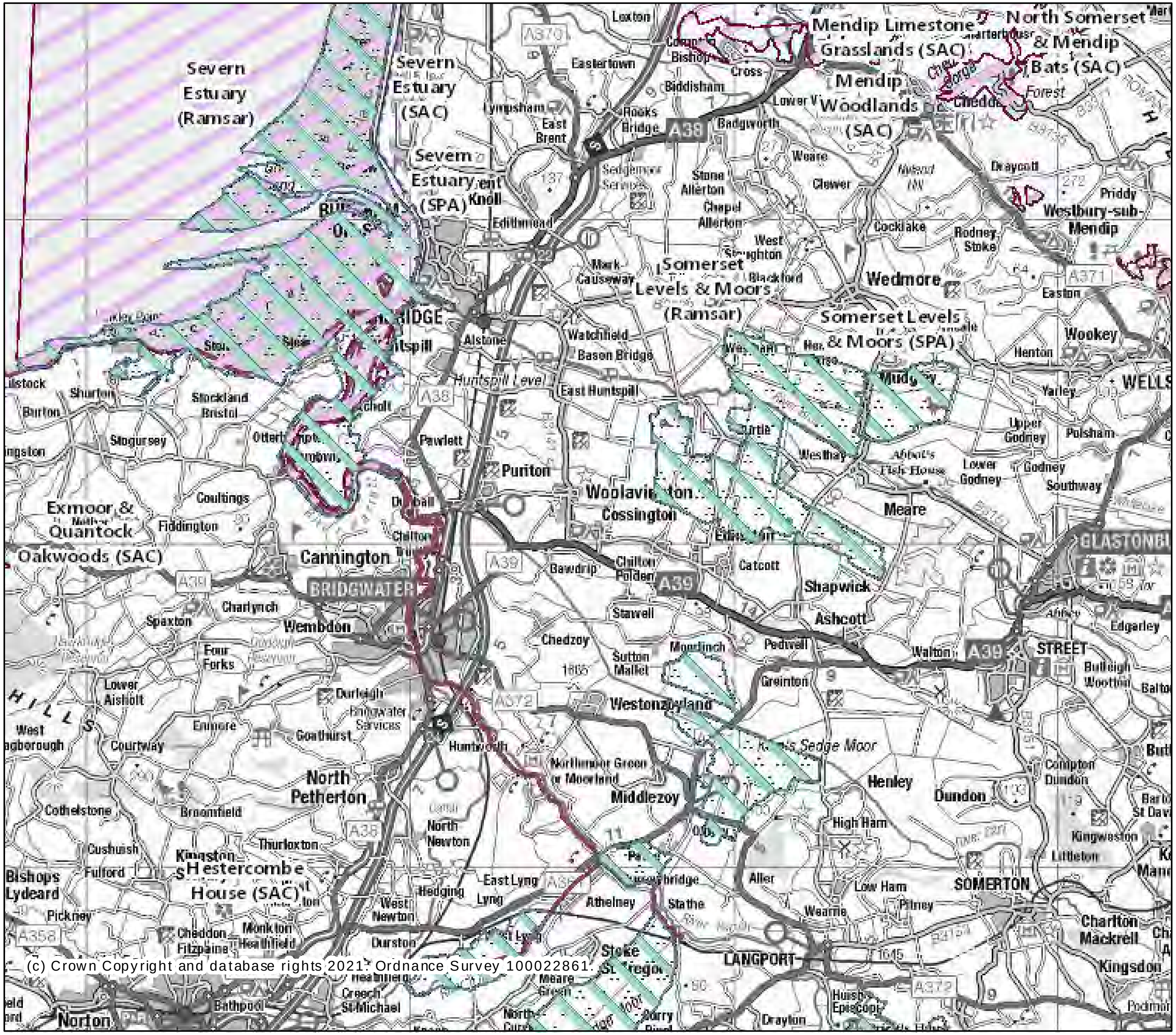

Legend

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- Special Areas of Conservation (England)
- Special Protection Areas (England)

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Map produced by MAGIC on 23 September, 2021.

MAGIC

MAGIC E

Legend

National Nature Reserves (England)

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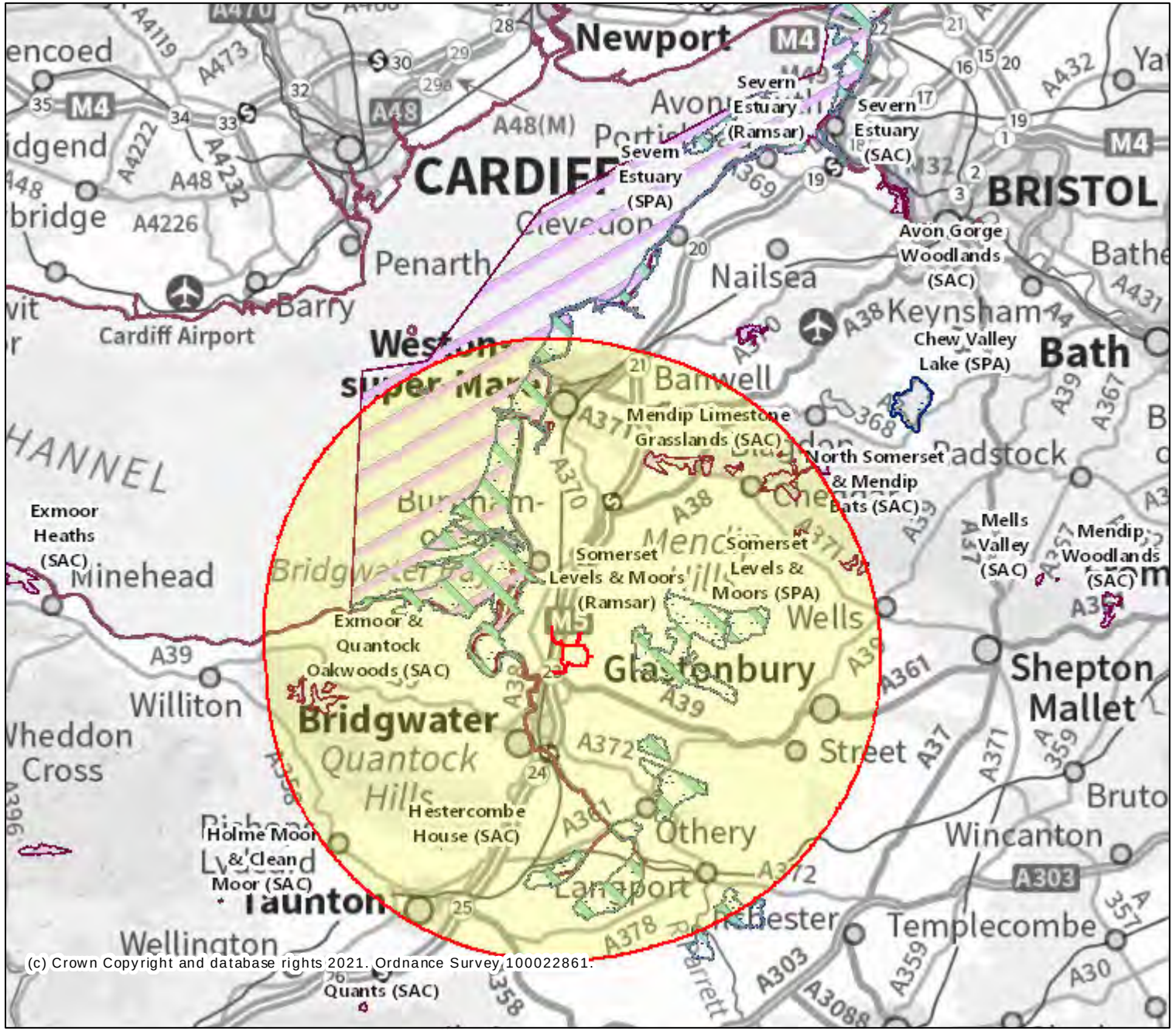
Map produced by MAGIC on 23 September, 2021.

MAGiC

20,000km buffer



Legend

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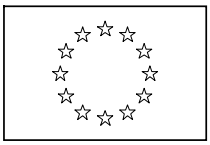
Map produced by MAGIC on 15 October, 2021.

ANNEX 2

Copy of Communication from the Commission on the Application of the Precautionary Principle (2000)



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 2.2.2000
COM(2000) 1 final

COMMUNICATION FROM THE COMMISSION

on the precautionary principle

SUMMARY

1. The issue of when and how to use the precautionary principle, both within the European Union and internationally, is giving rise to much debate, and to mixed, and sometimes contradictory views. Thus, decision-makers are constantly faced with the dilemma of balancing the freedom and rights of individuals, industry and organisations with the need to reduce the risk of adverse effects to the environment, human, animal or plant health. Therefore, finding the correct balance so that the proportionate, non-discriminatory, transparent and coherent actions can be taken, requires a structured decision-making process with detailed scientific and other objective information.

2. The Communication's fourfold aim is to:

   - outline the Commission's approach to using the precautionary principle,
   - establish Commission guidelines for applying it,
   - build a common understanding of how to assess, appraise, manage and communicate risks that science is not yet able to evaluate fully, and
   - avoid unwarranted recourse to the precautionary principle, as a disguised form of protectionism.

   It also seeks to provide an input to the ongoing debate on this issue, both within the Community and internationally.

3. The precautionary principle is not defined in the Treaty, which prescribes it only once - to protect the environment. But *in practice*, its scope is much wider, and specifically where preliminary objective scientific evaluation, indicates that there are reasonable grounds for concern that the potentially dangerous effects on the *environment, human, animal or plant health* may be inconsistent with the high level of protection chosen for the Community.

   The Commission considers that the Community, like other WTO members, has the right to establish the level of protection - particularly of the environment, human, animal and plant health, - that it deems appropriate. Applying the precautionary principle is a key tenet of its policy, and the choices it makes to this end will continue to affect the views it defends internationally, on how this principle should be applied.

4. The precautionary principle should be considered within a structured approach to the analysis of risk which comprises three elements: risk assessment, risk management, risk communication. The precautionary principle is particularly relevant to the management of risk.

   The precautionary principle, which is essentially used by decision-makers in the management of risk, should not be confused with the element of caution that scientists apply in their assessment of scientific data.

Recourse to the precautionary principle presupposes that potentially dangerous effects deriving from a phenomenon, product or process have been identified, and that scientific evaluation does not allow the risk to be determined with sufficient certainty.

The implementation of an approach based on the precautionary principle should start with a scientific evaluation, as complete as possible, and where possible, identifying at each stage the degree of scientific uncertainty**.**

5. Decision-makers need to be aware of the degree of uncertainty attached to the results of the evaluation of the available scientific information. Judging what is an "acceptable" level of risk for society is an eminently *political* responsibility. Decision-makers faced with an unacceptable risk, scientific uncertainty and public concerns have a duty to find answers. Therefore, all these factors have to be taken into consideration.

In some cases, the right answer may be not to act or at least not to introduce a binding legal measure. A wide range of initiatives is available in the case of action, going from a legally binding measure to a research project or a recommendation.

The decision-making procedure should be transparent and should involve as early as possible and to the extent reasonably possible all interested parties.

6. Where action is deemed necessary, measures based on the precautionary principle should be, *inter alia*:

- *proportional* to the chosen level of protection,
- *non-discriminatory* in their application,
- *consistent* with similar measures already taken,
- *based on an examination of the potential benefits and costs* of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis),
- *subject to review,* in the light of new scientific data, and
- *capable of assigning responsibility for producing the scientific evidence* necessary for a more comprehensive risk assessment.

Proportionality means tailoring measures to the chosen level of protection. Risk can rarely be reduced to zero, but incomplete risk assessments may greatly reduce the range of options open to risk managers. A total ban may not be a proportional response to a potential risk in all cases. However, in certain cases, it is the sole possible response to a given risk.

Non-discrimination means that comparable situations should not be treated differently, and that different situations should not be treated in the same way, unless there are objective grounds for doing so.

Consistency means that measures should be of comparable scope and nature to those already taken in equivalent areas in which all scientific data are available.

Examining costs and benefits entails comparing the overall cost to the Community of action and lack of action, in both the short and long term. This is not simply an economic cost-benefit analysis: its scope is much broader, and includes non-economic considerations, such as the efficacy of possible options and their acceptability to the public. In the conduct of such an examination, account should be taken of the general principle and the case law of the Court that the protection of health takes precedence over economic considerations.

Subject to review in the light of new scientific data, means measures based on the precautionary principle should be maintained so long as scientific information is incomplete or inconclusive, and the risk is still considered too high to be imposed on society, in view of chosen level of protection. Measures should be periodically reviewed in the light of scientific progress, and amended as necessary.

Assigning responsibility for producing scientific evidence is already a common consequence of these measures. Countries that impose a prior approval (marketing authorisation) requirement on products that they deem dangerous *a priori* reverse the burden of proving injury, by treating them as dangerous unless and until businesses do the scientific work necessary to demonstrate that they are safe.

Where there is no prior authorisation procedure, it may be up to the user or to public authorities to demonstrate the nature of a danger and the level of risk of a product or process. In such cases, a specific precautionary measure might be taken to place the burden of proof upon the producer, manufacturer or importer, but this cannot be made a general rule.

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1. INTRODUCTION

A number of recent events has shown that public opinion is becoming increasingly aware of the potential risks to which the population or their environment are potentially exposed.

Enormous advances in communications technology have fostered this growing sensitivity to the emergence of new risks, before scientific research has been able to fully illuminate the problems. Decision-makers have to take account of the fears generated by these perceptions and to put in place preventive measures to eliminate the risk or at least reduce it to the minimum acceptable level. On 13 April 1999 the Council adopted a resolution urging the Commission inter alia " *to be in the future even more determined to be guided by the precautionary principle in preparing proposals for legislation and in its other consumer-related activities and develop as priority clear and effective guidelines for the application of this principle"*. This Communication is part of the Commission's response.

The dimension of the precautionary principle goes beyond the problems associated with a short or medium-term approach to risks. It also concerns the longer run and the well-being of future generations.

A decision to take measures without waiting until all the necessary scientific knowledge is available is clearly a precaution-based approach.

Decision-makers are constantly faced with the dilemma of balancing the freedoms and rights of individuals, industry and organisations with the need to reduce or eliminate the risk of adverse effects to the environment or to health.

Finding the correct balance so that proportionate, non-discriminatory, transparent and coherent decisions can be arrived at, which at the same time provide the chosen level of protection, requires a structured decision making process with detailed scientific and other objective information. This structure is provided by the three elements of risk analysis: the assessment of risk, the choice of risk management strategy and the communication of the risk.

Any assessment of risk that is made should be based on the existing body of scientific and statistical data. Most decisions are taken where there is sufficient information available for appropriate preventive measures to be taken but in other circumstances, these data may be wanting in some respects.

Whether or not to invoke the Precautionary Principle is a decision exercised where scientific information is insufficient, inconclusive, or uncertain and where there are indications that the possible effects on the environment, or human, animal or plant health may be potentially dangerous and inconsistent with the chosen level of protection.

2. THE GOALS OF THIS COMMUNICATION

The aim of this Communication is to inform all interested parties, in particular the European Parliament the Council and Member States of the manner in which the Commission applies or intends to apply the precautionary principle when faced with taking decisions relating to the containment of risk. However, this general Communication does not claim to be the final word - rather, the idea is to provide input to the ongoing debate both at Community and international level.

This Communication seeks to establish a common understanding of the factors leading to recourse to the precautionary principle and its place in decision making, and to establish guidelines for its application based on reasoned and coherent principles.

The guidelines outlined in this Communication are only intended to serve as general guidance and in no way to modify or affect the provisions of the Treaty or secondary Community legislation.

Another objective is to avoid unwarranted recourse to the precautionary principle, which in certain cases could serve as a justification for disguised protectionism. Accordingly the development of international guidelines could facilitate the achievement of this end. The Commission also wishes to stress in this Communication that, far from being a way of evading obligations arising from the WTO Agreements, the envisaged use of the precautionary principle complies with these obligations.

It is also necessary to clarify a misunderstanding as regards the distinction between reliance on the precautionary principle and the search for zero risk, which in reality is rarely to be found. The search for a high level of health and safety and environmental and consumer protection belongs in the framework of the single market, which is a cornerstone of the Community.

The Community has already relied on the precautionary principle. Abundant experience has been gained over many years in the environmental field, where many measures have been inspired by the precautionary principle, such as measures to protect the ozone layer or concerning climate change.

3. THE PRECAUTIONARY PRINCIPLE IN THE EUROPEAN UNION

The Community has consistently endeavoured to achieve a high level of protection, among others in environment and human, animal or plant health. In most cases, measures making it possible to achieve this high level of protection can be determined on a satisfactory scientific basis. However, when there are reasonable grounds for concern that potential hazards may affect the environment or human, animal or plant health, and when at the same time the available data preclude a detailed risk evaluation, the precautionary principle has been politically accepted as a risk management strategy in several fields.

To understand fully the use of the precautionary principle in the European Union, it is necessary to examine the legislative texts, the case law of the Court

of Justice and the Court of First Instance, and the policy approaches that have emerged.

Legal Texts

The analysis starts with the legal texts which explicitly or implicitly refer to the precautionary principle (Annex I, Ref. 1).

At Community level the only explicit reference to the precautionary principle is to be found in the environment title of the EC Treaty, and more specifically Article 174. However, one cannot conclude from this that the principle applies only to the environment (Annex I, Refs. 2 and 3). Although the principle is adumbrated in the Treaty, it is not defined there.

Like other general notions contained in the legislation, such as subsidiarity or proportionality, it is for the decision-makers and ultimately the courts to flesh out the principle. In other words, the scope of the precautionary principle also depends on trends in case law, which to some degree are influenced by prevailing social and political values.

However, it would be wrong to conclude that the absence of a definition has to lead to legal uncertainty. The Community authorities' practical experience with the precautionary principle and its judicial review make it possible to get an ever-better handle on the precautionary principle.

Case law

The Court of Justice of the European Communities and the Court of First Instance have already had occasion to review the application of the precautionary principle in cases they have adjudicated and hence to develop case law in this area. (see Annex I, Refs. 5, 6 and 7)

Policy orientations

Policy orientations were set out by the Commission in the Green Paper on the General Principles of Food Safety and the Communication of 30 April 1997 on Consumer Health and Food Safety, by Parliament in its Resolution of 10 March 1998 concerning the Green Paper, by the Council in its Resolution of 13 April 1999 and by the Joint Parliamentary Committee of the EEA (European Economic Area) in its Resolution of 16 March 1999 (Annex I, Refs. 8-12).

Hence the Commission considers that the precautionary principle is a general one which should in particular be taken into consideration in the fields of environmental protection and human, animal and plant health.

Although the precautionary principle is not explicitly mentioned in the Treaty except in the environmental field, its scope is far wider and covers those specific circumstances where scientific evidence is insufficient, inconclusive or uncertain and there are indications through preliminary objective scientific evaluation that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or

plant health may be inconsistent with the chosen level of protection .

4. THE PRECAUTIONARY PRINCIPLE IN INTERNATIONAL LAW

At international level, the precautionary principle was first recognised in the World Charter for Nature, adopted by the UN General Assembly in 1982. It was subsequently incorporated into various international conventions on the protection of the environment. (cf. Annex II).

This principle was enshrined at the 1992 Rio Conference on the Environment and Development, during which the Rio Declaration was adopted, whose principle 15 states that: "*in order to protect the environment, the precautionary approach shall be widely applied by States according to their capability. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation*". Besides, the United Nations' Framework Convention on Climate Change and the Convention of Biological Diversity both refer to the precautionary principle. Recently, on 28 January 2000, at the Conference of the Parties to the Convention on Biological Diversity, the Protocol on Biosafety concerning the safe transfer, handling and use of living modified organisms resulting from modern biotechnology confirmed the key function of the Precautionary Principle (see Annex II).

Hence this principle has been progressively consolidated in international environmental law, and so it has since become a full-fledged and general principle of international law.

The WTO agreements confirm this observation. The preamble to the WTO Agreement highlights the ever closer links between international trade and environmental protection[1]. A consistent approach means that the precautionary principle must be taken into account in these agreements, notably in the Agreement on Sanitary and Phytosanitary Measures (SPS) and in the Agreement on Technical Barriers to Trade (TBT), to ensure that this general principle is duly enforced in this legal order.

Hence, each Member of the WTO has the independent right to determine the level of environmental or health protection they consider appropriate. Consequently a member may apply measures, including measures based on the precautionary principle, which lead to a higher level of protection than that provided for in the relevant international standards or recommendations.

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[1] *"The parties to this agreement ... recognising that their relations in the field of trade and economic endeavour should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing to in a manner consistent with their respective needs and concerns at different levels of economic development ..."*

The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) clearly sanctions the use of the precautionary principle, although the term itself is not explicitly used. Although the general rule is that all sanitary and phytosanitary measures must be based on scientific principles and that they should not be maintained without adequate scientific evidence, a derogation from these principles is provided for in Article 5 (7) which stipulates that: "*in cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organizations as well as from sanitary or phytosanitary measures applied by other Members. In such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time.*"

Hence, according to the SPS Agreement, measures adopted in application of a precautionary principle when the scientific data are inadequate, are provisional and imply that efforts be undertaken to elicit or generate the necessary scientific data. It is important to stress that the provisional nature is not bound up with a time limit but with the development of scientific knowledge.

The use of the term "more objective assessment of risk" in Article 5.7 infers that a precautionary measure may be based on a less objective appraisal but must nevertheless includes an evaluation of risk.

The concept of risk assessment in the SPS leaves leeway for interpretation of what could be used as a basis for a precautionary approach. The risk assessment on which a measure is based may include non-quantifiable data of a factual or qualitative nature and is not uniquely confined to purely quantitative scientific data. This interpretation has been confirmed by the WTO's Appellate body in the case of growth hormones, which rejected the panel's initial interpretation that the risk assessment had to be quantitative and had to establish a minimum degree of risk.

The principles enshrined in Article 5.7 of the SPS must be respected in the field of sanitary and phytosanitary measures; however, because of the specific nature of other areas, such as the environment, it may be that somewhat different principles will have to be applied.

International guidelines are being considered in relation to the application of the Precautionary Principle in Codex Alimentarius. Such guidance in this, and other sectors, could pave the way to a harmonised approach by the WTO Members, to drawing up health or environment protection measures, while avoiding the misuse of the precautionary principle which could otherwise lead to unjustifiable barriers to trade.

In the light of these observations, the Commission considers that, following the example set by other Members of the WTO, the Community is entitled to prescribe the level of protection, notably as regards the environment and human, animal and plant health, which it considers appropriate. In this context, the Community must respect Articles 6, 95, 152 and 174 of the Treaty. To this end,

reliance on the precautionary principle constitutes an essential plank of its policy. It is clear that the choices made will affect its positions at international and notably multilateral level, as regards recourse to the precautionary principle.

> Bearing in mind the very origins of the precautionary principle and its growing role in international law, and notably in the agreements of the World Trade Organisation, this principle must be duly addressed at international level in the various areas in which it is likely to be of relevance.
>
> ***Following the example set by the other members of the WTO, the Commission considers that the Community is entitled to prescribe the level of protection, notably as regards environmental protection and human, animal and plant health, that it considers appropriate. Recourse to the precautionary principle is a central plank of Community policy. The choices made to this end will continue to influence its positions at international level, and notably at multinational level, as regards the precautionary principle.***

5. THE CONSTITUENT PARTS OF THE PRECAUTIONARY PRINCIPLE

An analysis of the precautionary principle reveals two quite distinct aspects: (i) **the political decision to act or not to act as such,** which is linked to the **factors triggering** recourse to the precautionary principle; (ii) in the affirmative, **how to act, i.e.** the **measures** resulting from application of the precautionary principle.

There is a controversy as to the role of scientific uncertainty in risk analysis, and notably as to whether it belongs under risk assessment or risk management. This controversy springs from a confusion between a prudential approach and application of the precautionary principle. These two aspects are complementary but should not be confounded.

The prudential approach is part of risk assessment policy which is determined before any risk assessment takes place and which is based on the elements described in 5.1.3; it is therefore an integral part of the scientific opinion delivered by the risk evaluators.

On the other hand, application of the precautionary principle is part of risk management, when scientific uncertainty precludes a full assessment of the risk and when decision-makers consider that the chosen level of environmental protection or of human, animal and plant health may be in jeopardy.

The Commission considers that measures applying the precautionary principle belong in the general framework of risk analysis, and in particular risk management.

5.1. Factors triggering recourse to the precautionary principle

The precautionary principle is relevant only in the event of a potential risk, even if this risk cannot be fully demonstrated or quantified or its effects determined because of the insufficiency or inclusive nature of the scientific data.

It should however be noted that the precautionary principle can under no circumstances be used to justify the adoption of arbitrary decisions.

5.1.1. Identification of potentially negative effects

Before the precautionary principle is invoked, the scientific data relevant to the risks must first be evaluated. However, one factor logically and chronologically precedes the decision to act, namely identification of the potentially negative effects of a phenomenon. To understand these effects more thoroughly it is necessary to conduct a scientific examination. The decision to conduct this examination without awaiting additional information is bound up with a less theoretical and more concrete perception of the risk.

5.1.2. Scientific evaluation

A scientific evaluation of the potential adverse effects should be undertaken based on the available data when considering whether measures are necessary to protect the environment, the human, animal or plant health. An assessment of risk should be considered where feasible when deciding whether or not to invoke the precautionary principle. This requires reliable scientific data and logical reasoning, leading to a conclusion which expresses the possibility of occurrence and the severity of a hazard's impact on the environment, or health of a given population including the extent of possible damage, persistency, reversibility and delayed effect. However it is not possible in all cases to complete a comprehensive assessment of risk, but all effort should be made to evaluate the available scientific information.

Where possible, a report should be made which indicates the assessment of the existing knowledge and the available information, providing the views of the scientists on the reliability of the assessment as well as on the remaining uncertainties. If necessary, it should also contain the identification of topics for further scientific research.

Risk assessment consists of four components - namely hazard identification, hazard characterisation, appraisal of exposure and risk characterisation (Annex III). The limits of scientific knowledge may affect each of these components, influencing the overall level of attendant uncertainty and ultimately affecting the foundation for protective or preventive action. An attempt to complete these four steps should be performed before decision to act is taken.

5.1.3. Scientific uncertainty

Scientific uncertainty results usually from five characteristics of the scientific method : the variable chosen, the measurements made, the samples drawn, the models used and the causal relationship employed. Scientific uncertainty may

also arise from a controversy on existing data or lack of some relevant data . Uncertainty may relate to qualitative or quantitative elements of the analysis.

A more abstract and generalised approach preferred by some scientists is to separate all uncertainties into three categories of – Bias, Randomness and True Variability. Some other experts categorise uncertainty in terms of estimation of confidence interval of the probability of occurrence and of the severity of the hazard's impact.

This issue is very complex and the Commission launched a project "Technological Risk and the Management of Uncertainty" conducted under the auspices of the European Scientific Technology Observatory. The four ESTO reports will be published shortly and will give a comprehensive description of scientific uncertainty.

Risk evaluators accommodate these uncertainty factors by incorporating prudential aspects such as :

– relying on animal models to establish potential effects in man;

– using body weight ranges to make inter-species comparisons;

– adopting a safety factor in evaluating an acceptable daily intake to account for intra- and inter-species variability; the magnitude of this factor depends on the degree of uncertainty of the available data;

– not adopting an acceptable daily intake for substances recognised as genotoxic or carcinogenic;

– adopting the "ALARA" (as low as reasonably achievable) level as a basis for certain toxic contaminants.

Risk managers should be fully aware of these uncertainty factors when they adopt measures based on the scientific opinion delivered by the evaluators.

However, in some situations the scientific data are not sufficient to allow one to apply these prudential aspects in practice, i.e. in cases in which extrapolations cannot be made because of the absence of parameter modelling and where cause-effect relationships are suspected but have not been demonstrated. It is in situations like these that decision-makers face the dilemma of having to act or not to act.

Recourse to the precautionary principle presupposes:

– ***identification of potentially negative effects resulting from a phenomenon, product or procedure;***

– ***a scientific evaluation of the risk which because of the insufficiency of the data, their inconclusive or imprecise nature, makes it impossible to determine with sufficient certainty the risk in question.***

5.2. Measures resulting from reliance on the precautionary principle

5.2.1. The decision whether or not to act

In the kind of situation described above - sometimes under varying degrees of pressure from public opinion - decision-makers have to respond. However, responding does not necessarily mean that measures always have to be adopted. The decision to do nothing may be a response in its own right.

The appropriate response in a given situation is thus the result of an eminently political decision, a function of the risk level that is "acceptable" to the society on which the risk is imposed.

5.2.2. Nature of the action ultimately taken

The nature of the decision influences the type of control that can be carried out. Recourse to the precautionary principle does not necessarily mean adopting final instruments designed to produce legal effects that are open to judicial review. There is a whole range of actions available to decision-makers under the head of the precautionary principle. The decision to fund a research programme or even the decision to inform the public about the possible adverse effects of a product or procedure may themselves be inspired by the precautionary principle.

It is for the Court of Justice to pronounce on the legality of any measures taken by the Community institutions. The Court has consistently held that when the Commission or any other Community institution has broad discretionary powers, notably as regards the nature and scope of the measures it adopts, review by the Court must be limited to examining whether the institution committed a manifest error or misuse of power or manifestly exceed the limits of its powers of appraisal.

Hence the measures may not be of an arbitrary nature.

Recourse to the precautionary principle does not necessarily mean adopting final instruments designed to produce legal effects, which are subject to judicial review.

6. GUIDELINES FOR APPLYING THE PRECAUTIONARY PRINCIPLE.

6.1. Implementation

When decision-makers become aware of a risk to the environment or human, animal or plant health that in the event of non-action may have serious consequences, the question of appropriate protective measures arise. Decision-makers have to obtain, through a structured approach, a scientific evaluation, as complete as possible, of the risk to the environment, or health, in order to select the most appropriate course of action

The determination of appropriate action including measures based on the precautionary principle should start with a scientific evaluation and, if necessary, the decision to commission scientists to perform an as objective and complete as possible scientific evaluation. It will cast light on the existing objective evidence, the gaps in knowledge and the scientific uncertainties.

The implementation of an approach based on the precautionary principle should start with a scientific evaluation, as complete as possible, and where possible, identifying at each stage the degree of scientific uncertainty.

6.2. The triggering factor

Once the scientific evaluation has been performed as best as possible, it may provide a basis for triggering a decision to invoke the precautionary principle. The conclusions of this evaluation should show that the desired level of protection for the environment or a population group could be jeopardised. The conclusions should also include an assessment of the scientific uncertainties and a description of the hypotheses used to compensate for the lack of the scientific or statistical data. An assessment of the potential consequences of inaction should be considered and may be used as a trigger by the decision-makers. The decision to wait or not to wait for new scientific data before considering possible measures should be taken by the decision-makers with a maximum of transparency. The absence of scientific proof of the existence of a cause-effect relationship, a quantifiable dose/response relationship or a quantitative evaluation of the probability of the emergence of adverse effects following exposure should not be used to justify inaction. Even if scientific advice is supported only by a minority fraction of the scientific community, due account should be taken of their views, provided the credibility and reputation of this fraction are recognised.[2]

The Commission has confirmed its wish to rely on procedures as transparent as possible and to involve all interested parties at the earliest possible stage[3]. This will assist decision makers in taking legitimate measures which are likely to achieve the society's chosen level of health or environmental protection

An assessment of the potential consequences of inaction and of the uncertainties of the scientific evaluation should be considered by decision-makers when determining whether to trigger action based on the precautionary principle.

All interested parties should be involved to the fullest extent possible in the

[2] *cf The WTO Appellate Body report on hormones, paragraph 124 : « In some cases, the very existence of divergent views presented by qualified scientists who have investigated the particular issue at hand, may indicate a state of scientific uncertainty »*

[3] *A considerable effort has already been made notably as regards public health and the environment. As regards the latter, the Community and the Member States have demonstrated the importance they attach to access to information and justice by signing the Aarhus Convention of June 1998.*

study of various risk management options that may be envisaged once the results of the scientific evaluation and/or risk assessment are available and the procedure be as transparent as possible.

6.3. The general principles of application

The general principles are not limited to application of the precautionary principle. They apply to all risk management measures. An approach inspired by the precautionary principle does not exempt one from applying wherever possible these criteria, which are generally used when a complete risk assessment is at hand.

Thus reliance on the precautionary principle is no excuse for derogating from the general principles of risk management.

These general principles include:

- proportionality,
- non-discrimination,
- consistency,
- examination of the benefits and costs of action or lack of action
- examination of scientific developments.

6.3.1. Proportionality

The measures envisaged must make it possible to achieve the appropriate level of protection. Measures based on the precautionary principle must not be disproportionate to the desired level of protection and must not aim at zero risk, something which rarely exists. However, in certain cases, an incomplete assessment of the risk may considerably limit the number of options available to the risk managers.

In some cases a total ban may not be a proportional response to a potential risk. In other cases, it may be the sole possible response to a potential risk.

Risk reduction measures should include less restrictive alternatives which make it possible to achieve an equivalent level of protection, such as appropriate treatment, reduction of exposure, tightening of controls, adoption of provisional limits, recommendations for populations at risk, etc. One should also consider replacing the products or procedures concerned by safer products or procedures.

The risk reduction measure should not be limited to immediate risks where the proportionality of the action is easier to assess. It is in situations in which the adverse effects do not emerge until long after exposure that the cause-effect relationships are more difficult to prove scientifically and that – for this reason – the precautionary principle often has to be invoked. In this case the potential long-term effects must be taken into account in evaluating the proportionality of measures in the form of rapid action to limit or eliminate a risk whose effects

will not surface until ten or twenty years later or will affect future generations. This applies in particular to effects on the eco-system. Risks that are carried forward into the future cannot be eliminated or reduced except at the time of exposure, that is to say immediately.

Measures should be proportional to the desired level of protection.

6.3.2. Non-discrimination

The principle of non-discrimination means that comparable situations should not be treated differently and that different situations should not be treated in the same way, unless there are objective grounds for doing so.

Measures taken under the precautionary principle should be designed to achieve an equivalent level of protection without invoking the geographical origin or the nature of the production process to apply different treatments in an arbitrary manner.

Measures should not be discriminatory in their application.

6.3.3. Consistency

Measures should be consistent with the measures already adopted in similar circumstances or using similar approaches. Risk evaluations include a series of factors to be taken into account to ensure that they are as thorough as possible. The goal here is to identify and characterise the hazards, notably by establishing a relationship between the dose and the effect and assessing the exposure of the target population or the environment. If the absence of certain scientific data makes it impossible to characterise the risk, taking into account the uncertainties inherent to the evaluation, the measures taken under the precautionary principle should be comparable in nature and scope with measures already taken in equivalent areas in which all the scientific data are available.

Measures should be consistent with the measures already adopted in similar circumstances or using similar approaches.

6.3.4. Examination of the benefits and costs of action and lack of action

A comparison must be made between the most likely positive or negative consequences of the envisaged action and those of inaction in terms of the overall cost to the Community, both in the long- and short-term. The measures envisaged must produce an overall advantage as regards reducing risks to an acceptable level.

Examination of the pros and cons cannot be reduced to an economic cost-benefit analysis. It is wider in scope and includes non-economic considerations.

However, examination of the pros and cons should include an economic cost-benefit analysis where this is appropriate and possible.

Besides, other analysis methods, such as those concerning the efficacy of possible options and their acceptability to the public may also have to be taken into account. A society may be willing to pay a higher cost to protect an interest, such as the environment or health, to which it attaches priority.

The Commission affirms, in accordance with the case law of the Court that requirements linked to the protection of public health should undoubtedly be given greater weight that economic considerations.

The measures adopted presuppose examination of the benefits and costs of action and lack of action. This examination should include an economic cost/benefit analysis when this is appropriate and feasible. However, other analysis methods, such as those concerning efficacy and the socio-economic impact of the various options, may also be relevant. Besides the decision-maker may, in certain circumstances, by guided by non-economic considerations such as the protection of health.

6.3.5. Examination of scientific developments

The measures should be maintained as long as the scientific data are inadequate, imprecise or inconclusive and as long as the risk is considered too high to be imposed on society. The measures may have to be modified or abolished by a particular deadline, in the light of new scientific findings. However, this is not always linked to the time factor, but to the development of scientific knowledge.

Besides, scientific research should be carried out with a view to obtaining a more advanced or more complete scientific assessment. In this context, the measures should be subjected to regular scientific monitoring, so that they can be reevaluated in the light of new scientific information.

The Agreement on Sanitary and Phytosanitary Measures (SPS) provides that measures adopted in the context of inadequate scientific evidence must respect certain conditions. Hence these conditions concern only the scope of the SPS Agreement, but the specific nature of certain sectors, such as the environment, may mean that somewhat different principles have to be applied.

Article 5(7) of the SPS agreement includes certain specific rules:

- The measures must be of a provisional nature pending the availability of more reliable scientific data. However this provisional nature is linked to the development of scientific knowledge rather than to a time factor.

- Research must be carried out to elicit the additional scientific data required for a more objective assessment of the risk.

- The measures must be periodically reviewed to take account of new scientific data. The results of scientific research should make it possible to complete the risk evaluation and if necessary to review the measures on the basis of the conclusions.

- Hence the reasonable period envisaged in the SPS Agreement includes the time needed for completion of the necessary scientific work and, besides, the time needed for performance of a risk evaluation based on the conclusions of this scientific work. It should not be possible to invoke budgetary constraints or political priorities to justify excessive delays in obtaining results, re-evaluating the risk or amending the provisional measures.

Research could also be conducted for the improvement of the methodologies and instruments for assessing risk, including greater integration of all pertinent factors (e.g. socio-economic information, technological perspectives).

The measures, although provisional, shall be maintained as long as the scientific data remain incomplete, imprecise or inconclusive and as long as the risk is considered too high to be imposed on society.

Maintenance of the measures depends on the development of scientific knowledge, in the light of which they should be reevaluated. This means that scientific research shall be continued with a view to obtaining more complete data.

Measures based on the precautionary principle shall be reexamined and if necessary modified depending on the results of the scientific research and the follow up of their impact.

6.4. The burden of proof

- Community rules and those of many third countries enshrine the principle of prior approval (positive list) before the placing on the market of certain products, such as drugs, pesticides or food additives. This is one way of applying the precautionary principle, by shifting responsibility for producing scientific evidence. This applies in particular to substances deemed "a priori" hazardous or which are potentially hazardous at a certain level of absorption. In this case the legislator, by way of precaution, has clearly reversed the burden of proof by requiring that the substances be deemed hazardous until proven otherwise. Hence it is up to the business community to carry out the scientific work needed to evaluate the risk. As long as the human health risk cannot be evaluated with sufficient certainty, the legislator is not legally entitled to authorise use of the substance, unless exceptionally for test purposes.

- In other cases, where such a prior approval procedure does not exist, it may be for the user, a private individual, a consumer association, citizens or the public authorities to demonstrate the nature of a danger and the level of risk posed by a product or process. Action taken under the head of the

precautionary principle must in certain cases include a clause reversing the burden of proof and placing it on the producer, manufacturer or importer, but such an obligation cannot be systematically entertained as a general principle. This possibility should be examined on a case-by-case basis when a measure is adopted under the precautionary principle, pending supplementary scientific data, so as to give professionals who have an economic interest in the production and/or marketing of the procedure or product in question the opportunity to finance the necessary research on a voluntary basis.

Measures based on the precautionary principle may assign responsibility for producing the scientific evidence necessary for a comprehensive risk evaluation.

7. CONCLUSION

This Communication of a general scope sets out the Commission's position as regards recourse to the precautionary principle. The Communication reflects the Commission’s desire for transparency and dialogue with all stakeholders. At the same it is provides concrete guidance for applying the precautionary principle.

The Commission wishes to reaffirm the crucial importance it attaches to the distinction between the decision to act or not to act, which is of an eminently political nature, and the measures resulting from recourse to the precautionary principle, which must comply with the general principles applicable to all risk management measures. The Commission also considers that every decision must be preceded by an examination of all the available scientific data and, if possible, a risk evaluation that is as objective and comprehensive as possible. A decision to invoke the precautionary principle does not mean that the measures will be adopted on an arbitrary or discriminatory basis.

This Communication should also contribute to reaffirming the Community's position at international level, where the precautionary principle is receiving increasing attention. However the Commission wishes to stress that this Communication is not meant to be the last word; rather, it should be seen as the point of departure for a broader study of the conditions in which risks should be assessed, appraised, managed and communicated.

ANNEX I

LEGAL AND OTHER BASES FOR EC DECISIONS ON PRECAUTIONARY MEASURES

The legislative texts

Ref. 1

The EC Treaty, incorporating provisions already introduced by the Maastricht Treaty of 1992, and more specifically Article 174 thereof, states:

– "2. Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay …

3. In preparing its policy on the environment, the Community shall take account of:

– available scientific and technical data, …

– the potential benefits and costs of action or lack of action …"

Ref. 2

Article 6 of the EC Treaty provides that "environmental protection requirements must be integrated into the definition and implementation of the Community policies and activities referred to in Article 3, in particular with a view to promoting sustainable development".

Ref. 3

Hence, Article 95(3) of the EC Treaty provides that: "The Commission, in its proposals envisaged in paragraph 1 concerning health, safety, environmental protection and consumer protection, will take as a base a high level of protection, taking account in particular of any new development based on scientific facts. Within their respective powers, the European Parliament and the Council will also seek to achieve this objective".

Ref. 4

The first paragraph of Article 152 of the EC Treaty provides that: "A high level of human health protection shall be ensured in the definition and implementation of all Community policies and activities".

Case law

Ref. 5

In its judgement on the validity of the Commission's decision banning the exportation of beef from the United Kingdom to reduce the risk of BSE transmission (Judgements of 5 May 1998, cases C-157/96 and C-180/96), the Court held:

"Where there is uncertainty as to the existence or extent of risks to human health, the institutions may take protective measures without having to wait until the reality and seriousness of those risks become fully apparent." (Grounds 63). The next section fleshes out the Court's reasoning: "That approach is borne out by Article 130r(1) of the EC Treaty, according to which Community policy on the environment is to pursue the objective inter alia of protecting human health. Article 130r(2) provides that that policy is to aim at a high level of protection and is to be based in particular on the principles that preventive action should be taken and that environmental protection requirements must be integrated into the definition and implementation of other Community policies."(Grounds 64).

Ref. 6

In another judgement concerning protection of consumer health (Judgement of 16 July 1998, case T-199/96), the Court of First Instance cites the above passage from the BSE judgement (see Grounds 66 and 67).

Ref. 7

Recently, in the Order of 30 June 1999 (Case T-70/99), the President of the Court of First Instance confirmed the positions expressed in the abovementioned judgements. Note that this judgement contains an explicit reference to the precautionary principle and affirms that “requirements linked to the protection of public health should undoubtedly be given greater weight that economic considerations.”

Policy orientations

Ref. 8

In its Communication of 30 April 1997 on consumer health and food safety (COM(97) 183 final), the Commission states: "the Commission will be guided in its risk analysis by the precautionary principle, in cases where the scientific basis is insufficient or some uncertainty exists".

Ref. 9

In its Green Paper on the General Principles of Food Law in the European Union of 30 April 1997 (COM(97) 176 final), the Commission reiterates this point:

"The Treaty requires the Community to contribute to the maintenance of a high level of protection of public health, the environment and consumers. In order to ensure a high level of protection and coherence, protective measures should be based on risk assessment, taking into account all relevant risk factors, including technological aspects, the best available scientific evidence and the availability of inspection sampling and

testing methods. Where a full risk assessment is not possible, measures should be based on the precautionary principle."

Ref. 10

In its Resolution of 10 March 1998 on the Green Paper, the European Parliament states:

“European food law is based on the principle of preventive protection of consumer health;

stresses that policy in this area must be founded on a scientifically-based risk analysis supplemented, where necessary, by appropriate risk management based on the precautionary principle;

invites the Commission to anticipate possible challenges to Community food law by WTO bodies by requesting the scientific committees to present a full set of arguments based on the precautionary principle.”

Ref. 11

The Joint Parliamentary Committee of the EEA (European Economic Area), adopted a Resolution on Food Safety in the EEA on 16 March 1999. In this connection, on the one hand, it “emphasises the importance of application of the precautionary principle” (point 5) and, on the other, “reaffirms the over-riding need for a precautionary approach within the EEA to the assessment and evaluation of applications for the marketing of GMOs intended to enter the food chain…” (point 13).

Ref. 12

On 13 April 1999, the Council adopted a Resolution urging the Commission, inter alia, "to be in the future even more determined to be guided by the precautionary principle in preparing proposals for legislation and in its other consumer-related activities and develop as a priority clear and effective guidelines for the application of this principle".

ANNEX II

THE PRECAUTIONARY PRINCIPLE IN INTERNATIONAL LAW

The environment

Although applied more broadly, the Precautionary Principle has been developed primarily in the context of environmental policy.

Hence, the Ministerial Declaration of the Second International Conference on the Protection of the North Sea (1987) states that "*in order to protect the North Sea from possibly damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence*". A new Ministerial Declaration was delivered at the Third International Conference on the Protection of the North Sea (1990). It fleshes out the earlier declaration, stating that "*the participants ... will continue to apply the precautionary principle, that is to take action to avoid potentially damaging impacts of substances that are persistent, toxic and liable to bioaccumulate even where there is no scientific evidence to prove a causal link between emissions and effects*"

The Precautionary Principle was explicitly recognised during the UN Conference on Environment and Development (UNCED) in Rio de Janeiro 1992 and included in the so-called Rio Declaration. Since then the Precautionary Principle has been implemented in various environmental instruments, and in particular in global climate change, ozone depleting substances and biodiversity conservation.

The precautionary Principle is listed as Principle 15 of the Rio Declaration among the principles of general rights and obligations of national authorities:

"In order to protect the environment, the precautionary approach should be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".

Principle 15 is reproduced in similar wording in:

1. The preamble of the Convention of Biological Diversity (1992):

(…) *Noting also that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat* (…)

2. In article 3 (Principles) of the Convention of Climate Change (1992):

(..)The Parties should take *precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.* To achieve this, such policies and measures should take into account different socio-

economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties.

In the Paris Convention for the protection of the marine environment of the north-east Atlantic (September 1992), the precautionary principle is defined as the principle "*by virtue of which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects.*"

Recently, on 28 January 2000, at the Conference of the Parties to the Convention on Biological diversity, the Protocol on Biosafety concerning the safe transfer, handling and use of living modified organisms resulting from modern biotechnology confirmed the key function of the Precautionary Principle. In fact, article 10, paragraph 6 states: *"Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, shall not prevent that Party from taking a decision, as appropriate, with regard to the import of living modified organism in question as referred to in paragraph 3 above, in order to avoid or minimize such potential adverse effects".*

Besides, the preamble to the WTO Agreement highlights the ever closer links between international trade and environmental protection.

The WTO SPS Agreement

Although the term „Precautionary Principle" is not explicitly used in the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS), the Appellate Body on EC measures concerning meat and meat products (Hormones) (AB-1997-4, paragraph 124) states that it finds reflection in Article 5.7 of this Agreement. Art 5.7 reads:„*In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available scientific information, including that from the relevant international organizations as well as from sanitary and phytosanitary measures applied by other Members. In such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time*."

The Appellate Body on Hormones (Paragraph 124) recognises…." that there is no need to assume that Article 5.7 exhausts the relevance of a precautionary principle". Moreover, Members have the "right to establish their own level of sanitary protection, which level may be higher (i.e. more cautious) than that implied in existing international standards, guidelines and recommendations". Furthermore, it accepts that "responsible, representative governments commonly act from perspectives of prudence and precaution where risks of irreversible, e.g. life-terminating, damage to human health are concerned." The Appellate Body on Japan-Measures affecting agricultural products (AB-1998-8, paragraph 89) clarifies the four requirements which must be met in order to adopt and

maintain provisional SPS measures. A Member may provisionally adopt an SPS measure if this measure is:

1) imposed in respect of a situation where „relevant scientific information is insufficient“; and

2) adopted “on the basis of available pertinent information“.

Such a provisional measure may not be maintained unless the Member which adopted the measure:

1) „seek(s) to obtain the additional information necessary for a more objective risk assessment“; and

2) „review(s) the … measure accordingly within a reasonable period of time“

These four requirements are clearly cumulative and are equally important for the purpose of determining consistency with the provision of Art 5.7. Whenever one of these four requirements is not met, the measure at issue is inconsistent with Art 5.7. As to what constitutes a „reasonable period of time“ to review the measure, the Appellate Body points out (Paragraph 93), that this has to be established on a case-by-case basis and depends on the specific circumstances of each case, including the difficulty of obtaining the additional information necessary for the review *and* the characteristics of the provisional SPS measure.

ANNEX III

THE FOUR COMPONENTS OF RISK ASSESSMENT

An attempt to complete as far as possible these four components should be performed before action is taken.

Hazard identification means identifying the biological, chemical or physical agents that may have adverse effects. A new substance or biological agent may reveal itself through its effects on the population (illness or death), or on the environment and it may be possible to describe the actual or potential effects on the population or environment before the cause is identified beyond doubt.

Hazard characterisation consists of determining, in quantitative and/or qualitative terms, the nature and severity of the adverse effects associated with the causal agents or activity. It is at this stage that a relationship between the amount of the hazardous substance and the effect has to be established. However, the relationship is sometimes difficult or impossible to prove, for instance because the causal link has not been established beyond doubt.

Appraisal of exposure consists of quantitatively or qualitatively evaluating the probability of exposure to the agent under study. Apart from information on the agents themselves (source, distribution, concentrations, characteristics, etc.), there is a need for data on the probability of contamination or exposure of the population or environment to the hazard.

Risk characterisation corresponds to the qualitative and/or quantitative estimation, taking account of inherent uncertainties, of the probability, of the frequency and severity of the known or potential adverse environmental or health effects liable to occur. It is established on the basis of the three preceding and closely depends on the uncertainties, variations, working hypotheses and conjectures made at each stage of the process. When the available data are inadequate or non-conclusive, a prudent and cautious approach to environmental protection, health or safety could be to opt for the worst-case hypothesis. When such hypotheses are accumulated, this will lead to an exaggeration of the real risk but gives a certain assurance that it will not be underestimated.

ANNEX 3

Relevant Natura Data Forms and Ramsar Information Sheets

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030148**

SITENAME **Exmoor and Quantock Oakwoods**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030148

1.3 Site name

Exmoor and Quantock Oakwoods

1.4 First Compilation date	1.5 Update date
2001-01	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2001-01
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-3.5825	51.18388889

2.2 Area [ha]:

1894.05

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset
UKK4	Devon

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
4030			0.57	0	G	D			
9120			70.08	0	G	D			
91A0			1414.86	0	G	A	C	B	B
91E0	X		45.46	0	G	C	C	A	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1308	Barbastella barbastellus			p	51	100	i		M	B	A	C	A
F	1163	Cottus gobio			p				C	DD	D			
F	1096	Lampetra planeri			p				R	DD	D			
I	1083	Lucanus cervus			p				P	DD	D			
M	1355	Lutra lutra			p				P	DD	C	B	C	C
M	1323	Myotis bechsteinii			p				P	DD	C	B	C	C
M	1303	Rhinolophus hipposideros			p				P	DD	D			
F	1106	Salmo salar			p				C	DD	D			

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N16	87.0
N07	0.5
N09	3.0
N06	0.5
N23	0.5
N19	1.0
N10	0.5
N08	6.0

N17	1.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sedimentary,acidic,sandstone,neutral,nutrient-poor 2 Terrestrial: Geomorphology and landscape: upland,hilly,valley,slope,floodplain

4.2 Quality and importance

Old sessile oak woods with Ilex and Blechnum in the British Isles for which this is considered to be one of the best areas in the United Kingdom. Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) for which the area is considered to support a significant presence. Myotis bechsteini for which the area is considered to support a significant presence. Barbastella barbastellus for which this is considered to be one of the best areas in the United Kingdom. Lutra lutra for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A04		I
H	K04		I
H	H04		B
H	B02		I
H	I01		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02		I
H	B06		I
H	A02		I
H	A04		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0	UK01	22.4		

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

[ ]	Yes
[ ]	No, but in preparation
[X]	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

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- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
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Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE	**UK0030168**
SITENAME	**Hestercombe House**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030168

1.3 Site name

Hestercombe House

1.4 First Compilation date	1.5 Update date
2001-03	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2001-03
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-3.084166667	51.05194444

2.2 Area [ha]:

0.06

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1303	Rhinolophus hipposideros			p	250	250	i		G	C	B	C	B

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N23	100.0
Total Habitat Cover	100

Other Site Characteristics

2 Terrestrial: Geomorphology and landscape: lowland

4.2 Quality and importance

Rhinolophus hipposideros for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	G01		I
H	J02		B
H	E06		B
H	M02		B
H	K02		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

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- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030203**

SITENAME **Mendip Limestone Grasslands**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030203

1.3 Site name

Mendip Limestone Grasslands

1.4 First Compilation date	1.5 Update date
2001-01	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2001-01
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.859166667	51.29666667

2.2 Area [ha]:

415.24

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
4030			84.71	0	G	B	C	C	C
6210			158.21	0	G	A	C	A	B
8310			2.91	0	G	B	C	C	C
9180	X		19.93	0	G	B	C	C	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1304	Rhinolophus ferrumequinum			p	11	50	i		M	C	B	C	C
M	1303	Rhinolophus hipposideros			p	11	50	i		M	D			

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N22	7.0
N08	45.0
N16	10.0
N09	38.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: basic,sedimentary,limestone,nutrient-poor 2 Terrestrial: Geomorphology and landscape: hilly,escarpment,caves

4.2 Quality and importance

European dry heaths for which the area is considered to support a significant presence. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) for which this is considered to be one of the best areas in the United Kingdom. Caves not open to the public for which the area is considered to support a significant presence. Tilio-Acerion forests of slopes, screes and ravines for which the area is considered to support a significant presence. Rhinolophus ferrumequinum for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	K04		I
H	H04		B
H	A02		I
H	K02		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A02		I
H	A04		I
H	B02		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

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http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

- [ ] Yes
- [ ] No, but in preparation
- [X] No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

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1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
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2190	Humid dune slacks	57
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4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
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5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
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7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030048**

SITENAME **Mendip Woodlands**

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1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030048

1.3 Site name

Mendip Woodlands

1.4 First Compilation date	1.5 Update date
1998-03	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	1998-03
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.421666667	51.20694444

2.2 Area [ha]:

251.39

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
6210			4.02	0	G	D			
9180	X		82.98	0	G	A	C	A	A
91E0	X		1.01	0	G	D			

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1304	Rhinolophus ferrumequinum			p	1	5	i		M	D			
M	1303	Rhinolophus hipposideros			p	6	10	i		M	D			

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N09	1.5
N16	98.5
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: basic,limestone,nutrient-poor,sedimentary 2 Terrestrial: Geomorphology and landscape: hilly,lowland,caves,escarpment

4.2 Quality and importance

Tilio-Acerion forests of slopes, screes and ravines for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	H04		B
H	G05		I
H	K04		I
H	I02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	D05		I
H	A04		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
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5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0	UK01	25.7		

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
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Email:	

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An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

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8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE	**UK0030052**
SITENAME	**North Somerset and Mendip Bats**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0030052

1.3 Site name

North Somerset and Mendip Bats

1.4 First Compilation date	1.5 Update date
1998-03	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	1998-03
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.746388889	51.28611111

2.2 Area [ha]:

555.93

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
4030			10.56	0	G	D			
6210			151.77	0	G	B	C	A	B
8310			10.01	0	G	C	C	B	C
9180	X		138.43	0	G	B	C	B	B

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
I	1065	Euphydryas (Eurodryas, Hypodryas) aurinia			p				P	DD	D			
M	1304	Rhinolophus ferrumequinum			p	101	250	i		M	B	A	C	A
M	1303	Rhinolophus hipposideros			p	101	250	i		M	C	B	C	B

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N16	30.0
N08	22.5
N23	1.0
N09	27.5
N19	19.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sedimentary,nutrient-poor,basic,limestone 2 Terrestrial: Geomorphology and landscape: hilly,lowland,caves

4.2 Quality and importance

Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) for which this is considered to be one of the best areas in the United Kingdom. Caves not open to the public for which the area is considered to support a significant presence. Tilio-Acerion forests of slopes, screes and ravines for

which this is considered to be one of the best areas in the United Kingdom. Rhinolophus ferrumequinum for which this is considered to be one of the best areas in the United Kingdom. Rhinolophus hipposideros for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02		I
H	E06		B
H	A04		I
H	K04		I
H	U		O

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02		I
H	A04		I
H	A02		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification, T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐ Yes

[ ]	No, but in preparation
[X]	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

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C	Average or reduced conservation	59

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D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

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B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

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B	Population not-isolated, but on margins of area of distribution	63
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3.3 Other species – essentially covers bird assemblage types

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SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
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N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
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A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

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Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0013030**

SITENAME **Severn Estuary/ Môr Hafren**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0013030

1.3 Site name

Severn Estuary/ Môr Hafren

1.4 First Compilation date	1.5 Update date
2007-08	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2007-08
Date site confirmed as SCI:	2008-12
Date site designated as SAC:	2010-12
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.978055556	51.46861111

2.2 Area [ha]:

73714.11

2.3 Marine area [%]

98.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset
UKZZ	Extra-Regio
UKL2	East Wales
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
1110			11779.51	0	G	C	C	B	C
1130			73677.25	0	G	A	A	B	B
1140			20271.38	0	G	A	B	B	B
1170			1474.28	0	P	C	C	A	C
1310				0		D			
1320			191.66	0	G	D			
1330			656.06	0	G	A	B	B	A

2110				0		D			

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
F	1102	Alosa alosa			p				P	DD	D			
F	1103	Alosa fallax			p				P	DD	A	B	C	A
F	1099	Lampetra fluviatilis			p				P	DD	C	B	C	B
F	1095	Petromyzon marinus			p				P	DD	C	A	C	B

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N02	99.0
N03	1.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: mud,clay,shingle,sedimentary,sand,peat 2 Terrestrial: Geomorphology and landscape: coastal 3 Marine:

Geology: sandstone/mudstone,pebble,sand,peat,gravel,shingle,sedimentary,cobble,biogenic reef,limestone/chalk,mud 4 Marine: Geomorphology: intertidal sediments (including sandflat/mudflat),estuary,subtidal rock (including rocky reefs),subtidal sediments (including sandbank/mudbank),intertidal rock,cliffs,pools,tidal rapids,islands,open coast (including bay),islands

4.2 Quality and importance

Sandbanks which are slightly covered by sea water all the time for which the area is considered to support a significant presence. Estuaries for which this is considered to be one of the best areas in the United Kingdom. Mudflats and sandflats not covered by seawater at low tide for which this is considered to be one of the best areas in the United Kingdom. Reefs for which the area is considered to support a significant presence. Atlantic salt meadows (Glauco-Puccinellietalia maritimae) for which this is considered to be one of the best areas in the United Kingdom. Petromyzon marinus for which this is considered to be one of the best areas in the United Kingdom. Lampetra fluviatilis for which this is considered to be one of the best areas in the United Kingdom. Alosa fallax for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	J02		B
H	M01		B
H	A02		I
H	E06		B
H	G01		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A02		I
M	G03		B
H	D05		I
H	A04		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-lan

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK00	77.3	UK04	22.7	UK01	3.4

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

Organisation:	Natural Resources Wales
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

[X] Yes Name: SEVERN ESTUARY / MÔR HAFREN
Link:
https://naturalresources.wales/media/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-jur

[ ] No, but in preparation

[ ] No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
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More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE	**UK9015022**
SITENAME	**Severn Estuary**

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1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
A	UK9015022

1.3 Site name

Severn Estuary

1.4 First Compilation date	1.5 Update date
1995-07	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1995-07
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-3.049166667	51.22472222

2.2 Area [ha]:

24487.91

2.3 Marine area [%]

90.3

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKL2	East Wales
UKK2	Dorset and Somerset
UKL1	West Wales and The Valleys
UKK1	Gloucestershire, Wiltshire and Bristol/Bath area

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A051	Anas strepera			w	282	282	i		G	B		C	
B	A394	Anser albifrons albifrons			w	2664	2664	i		G	A		B	
B	A672	Calidris alpina alpina			w	44624	44624	i		G	B		C	
B	A037	Cygnus columbianus bewickii			w	280	280	i		G	B		C	
B	A048	Tadorna tadorna			w	3330	3330	i		G	B		C	
B	A162	Tringa totanus			w	2330	2330	i		G	B		C	

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	WATR	Waterbird assemblage			84317	84317	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N04	4.0
N02	89.0
N14	1.0
N03	6.0
Total Habitat Cover	100

Other Site Characteristics

3 Marine:
Geology: limestone/chalk,sandstone/mudstone,clay,shingle,sedimentary,mud,sand,cobble,peat,gravel,biogenic reef 4 Marine: Geomorphology: islands,intertidal rock,subtidal rock (including rocky reefs),tidal rapids,intertidal sediments (including sandflat/mudflat),open coast (including bay),subtidal sediments (including sandbank/mudbank),pools,cliffs,estuary

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe) 3.9% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Anas strepera (North-western Europe) 0.9% of the population 5 year peak mean 1991/92-1995/96 Anser albifrons albifrons (North-western Siberia/North-eastern & North-western Europe) 0.4% of the population 5 year peak mean 1991/92-1995/96 Calidris alpina alpina (Northern Siberia/Europe/Western Africa) 3.3% of the population 5 year peak mean 1991/92-1995/96 Tadorna tadorna (North-western Europe) 1.1% of the population 5 year peak mean 1991/92-1995/96 Tringa totanus (Eastern Atlantic - wintering) 1.3% of the population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 84317 waterfowl (5 year peak mean 1991/92-1995/96) Including: Cygnus columbianus bewickii , Tadorna tadorna , Anas strepera , Calidris alpina alpina , Tringa totanus

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	J02		B
H	M01		B
H	A02		I
H	E06		B
H	G01		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A02		I
M	G03		B
H	A03		I
H	A04		I
H	D05		I
H	A03		I
H	D05		I
H	A02		I
H	A04		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-lan

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]

Code	Cover [%]	Code	Cover [%]
UK01	9.0	UK04	100.2

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

Organisation:	Natural Resources Wales
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

- [X] Yes — Name: SEVERN ESTUARY
  Link: https://naturalresources.wales/media/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-jur
- [ ] No, but in preparation
- [ ] No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE	**UK9010031**
SITENAME	**Somerset Levels and Moors**

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1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
A	UK9010031

1.3 Site name

Somerset Levels and Moors

1.4 First Compilation date	1.5 Update date
1997-06	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1997-06
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-2.866666667	51.17055556

2.2 Area [ha]:

6395.47

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKK2	Dorset and Somerset

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A052	Anas crecca			w	13307	13307	i		G	B		C	
B	A037	Cygnus columbianus bewickii			w	191	191	i		G	B		B	
B	A140	Pluvialis apricaria			w	3029	3029	i		G	C		C	
B	A142	Vanellus vanellus			w	36316	36316	i		G	B		C	

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with

some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	WATR	Waterbird assemblage			73014	73014	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N14	26.0
N10	52.0
N16	4.0
N23	5.0
N06	5.0
N15	1.0
N21	2.0
N07	5.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: peat,neutral,alluvium,clay 2 Terrestrial: Geomorphology and landscape: lowland,floodplain

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe) 2.7% of the GB population 5 year peak mean 1991/92-1995/96 Pluvialis apricaria [North-western Europe - breeding] 1.2% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Anas crecca (North-western Europe) 3.3% of the population 5 year peak mean 1991/92-1995/96 Vanellus vanellus (Europe - breeding) 0.5% of the population 5 year peak mean

1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 73014 waterfowl (5 year peak mean 1991/92-1995/96) Including: Cygnus columbianus bewickii , Anas crecca , Pluvialis apricaria [North-western Europe - breeding], Vanellus vanellus

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A01		I
H	A02		I
H	J02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02		I
H	A02		I
H	A04		I
H	D05		I
H	A03		I
H	D05		I
H	G03		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0	UK01	11.9		

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 26 June 1997

3. Country:

UK (England)

4. Name of the Ramsar site:

Somerset Levels and Moors

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* ;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 10 14 N 02 52 00 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Weston-super-Mare

The Somerset Levels and Moors Ramsar site is bounded by Bridgwater Bay in the west and the higher ground of the Mendips, Dorset Hills, Blackdown Hills, Brendons and Quantocks

Administrative region: North Somerset; Somerset

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 6388.49

Min. 2
Max. 9
Mean 4

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Ramsar site consists of a series of Sites of Special Scientific Interest (SSSI) within the largest area of lowland wet grassland and associated wetland habitat remaining in Britain. It covers about 35,000 ha in the flood plains of the Rivers Axe, Brue, Parrett, Tone and their tributaries. The majority of the site is only a few metres above mean sea level and drains through a large network of ditches, rhynes, drains and rivers. Flooding may affect large areas in winter depending on rainfall and tidal conditions. Parts of the site in the Brue Valley include areas of former raised peat bog which have now been substantially modified by agricultural improvement and peat extraction which has created areas of open water, fen and reedbed.

The site attracts internationally important numbers of wildfowl in winter and is one of the most important sites in southern Britain for breeding waders. The network of rhynes and ditches support an outstanding assemblage of aquatic invertebrates, particularly beetles.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

Supports 17 species of British Red Data Book invertebrates.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
97155 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):
Species with peak counts in winter:

Tundra swan , *Cygnus columbianus bewickii*, NW Europe	112 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	21231 individuals, representing an average of 5.3% of the population (5 year peak mean 1998/9-2002/3)
Northern lapwing , *Vanellus vanellus*, Europe - breeding	36580 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.
Species with peak counts in winter:

Mute swan , *Cygnus olor*, Britain	842 individuals, representing an average of 2.2% of the population (5 year peak mean 1998/9-2002/3)
Eurasian wigeon , *Anas penelope*, NW Europe	25759 individuals, representing an average of 1.7% of the population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	927 individuals, representing an average of 1.5% of the population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	1094 individuals, representing an average of 2.7% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	acidic, basic, neutral, clay, alluvium, peat
Geomorphology and landscape	lowland, floodplain
Nutrient status	eutrophic
pH	acidic, circumneutral
Salinity	fresh
Soil	mainly organic
Water permanence	usually seasonal / intermittent
Summary of main climatic features	Annual averages (Cardiff, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/cardiff.html) Max. daily temperature: 14.3° C Min. daily temperature: 6.8° C Days of air frost: 33.0 Rainfall: 1111.7 mm Hrs. of sunshine: 1518.0

General description of the Physical Features:

The Somerset Levels and Moors are one of the largest and richest areas of traditionally managed wet grassland and fen habitats in lowland UK. The majority of the site is only a few metres above mean sea level and drains through a large network of ditches, rhynes, drains and rivers. Flooding may affect large areas in winter depending on rainfall and tidal conditions. Parts of the site in the Brue Valley include areas of former raised peatbog that have now been substantially modified by agricultural intensification and peat extraction. This has created areas of open water, fen and reedbed.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Somerset Levels and Moors are one of the largest and richest areas of traditionally managed wet grassland and fen habitats in lowland UK. The majority of the site is only a few metres above mean sea level and drains through a large network of ditches, rhynes, drains and rivers. Flooding may affect large areas in winter depending on rainfall and tidal conditions. Parts of the site in the Brue Valley include areas of former raised peatbog that have now been substantially modified by agricultural intensification and peat extraction. This has created areas of open water, fen and reedbed.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Inland wetland

Code	Name	% Area
4	Seasonally flooded agricultural land	85.1
U	Peatlands (including peat bogs swamps, fens)	5
O	Freshwater lakes: permanent	3
Other	Other	2.9
9	Canals and drainage channels	2
Xp	Forested peatland	2

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The majority of the site is dominated by open wet grassland and ditches with a range of plant communities: Species-poor grassland including the semi-improved grassland communities with perennial rye grass and naturally-occurring species-poor floodplain or inundation grassland communities (National Vegetation Classification communities (NVC) include MG13, MG6, MG7, MG10).

Species-rich fen meadows and flood pastures where agricultural improvement has been less intense with MG8 *Cynosurus cristatus- Caltha palustris* grassland with *Cirsium dissectum* and *Caltha palustris* and mire communities such as M23, M24 and M25 with more *Juncus* and *Carex* species.

Smaller areas of drier species-rich hay meadows (MG5) with *Centaurea nigra, Orchis morio* and *Briza media*.

In the rivers, rhynes and ditches the floristic diversity is largely dependent upon sympathetic cleaning practises. The field ditches support the greatest floristic diversity including the species; *Wolffia arrhiza, Hottonia palustris* and *Hydrocharis morsus-ranae*.

Other habitats include - withy beds, orchards and pollarded willows.

The remaining habitats are largely restricted to the SSSIs within the Bure Valley where areas of former raised bog have been modified by peat extraction and agricultural improvement.

Small areas of tall herb fen (S24) with *Lathyrus palustris, Peucedanum palustre* and *Thelypteris palustris* and small remnants of raised bogs which are very degraded and support vegetation more akin to wet heath with *Erica tetralix* and *Molinia caerulea*.

Open water, reed swamp and reedbed with a range of species from submerged plants to tall stands of *Phragmites australis* and *Typha latifolia* are found in the flooded peat workings.

Wet woodland where peat has been cut many years ago and dominated by *Salix* spp., *Betula* spp. and *Alnus glutinosa*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Althaea officinalis, Persicaria laxiflora, Lathyrus palustris, Peucedanum palustre, Potamogeton coloratus, Potamogeton trichoides, Sium latifollum, Wolffia arrhiza

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species with peak counts in winter:

Gadwall , *Anas strepera strepera*, NW Europe	522 individuals, representing an average of 3% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Rallus aquaticus*, Europe	36 individuals, representing an average of 8% of the GB population (5 year peak mean 1998/9-2002/3)
European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	3857 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	16 individuals, representing an average of 2.2% of the GB population (5 year peak mean 1998/9-2002/3)
Common snipe , *Gallinago gallinago gallinago*, Europe -breeding	1633 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

Hydrochara caraboides, Bagous nodulosus, Odontomyia angulata, Oulema erichsoni, Valvata macrostoma, Odontomyia ornata, Stethophyma grossum, Pteromicra leucopeza, Lejops vittata, Cantharis fusca, Paederus caligatus, Hydaticus transversalis, Dytiscus dimidiatus, Hydrophilus piceus, Limnebus aluta, Laccornis oblongus

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Aquatic vegetation (e.g. reeds, willows, seaweed)
Archaeological/historical site
Environmental education/ interpretation
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Tourism
Traditional cultural

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	
National/Crown Estate	+	
Private	+	
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Collection of non-timber natural products: commercial	+	+
Commercial forestry	+	+

Cutting of vegetation (small-scale/subsistence)	+	+
Fishing: recreational/sport	+	+
Arable agriculture (unspecified)	+	+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Permanent pastoral agriculture	+	+
Hay meadows	+	+
Hunting: recreational/sport	+	+
Industrial water supply		+
Flood control	+	+
Irrigation (incl. agricultural water supply)	+	+
Mining/quarrying	+	+
Transport route		+
Urban development		+
Non-urbanised settlements	+	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
No factors reported	NA				

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site

Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Other	+	+

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.
Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Separate surveys to assess bird populations in relation to the restoration of disused peat workings on Shapwick Heath SSSI.
Ditch fauna: repeat Levels and Moors wide surveys undertaken approximately every five years by EN.

Flora.
Ditch flora: repeat Levels and Moors wide surveys undertaken approximately every five years by EN.
Meadow flora: repeat surveys 4-5 year repeat surveys by EN.

Completed.

Fauna.
Analysis of most recent trends undertaken by RSPB 2002.
Breeding waders: Four most recent major collaborative surveys on Levels and Moors, 1992, 1995, 1997, 2004.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Existing programmes: Guided walks and school group visits are available to Shapwick National Nature Reserves. Somerset Wildlife Trust run their own programme of events on Westhay Moor SSSI and likewise the RSPB on West Sedgemoor SSSI. English Nature's team newsletter for farmers and landowners runs regular features about the site.
Interpretation facilities: Are available at the Peat Moors visitor centre adjacent to the Shapwick National Nature Reserve. Interpretation panels have been located around the Reserve where appropriate. SWT have provided interpretation boards on Westhay Moor SSSI.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.
Controlled microlighting with few reported incidences of disturbance.

Wildfowling on a number of moors across the area although the affects of disturbance on the Ramsar is largely unknown and requires further work. Further work on disturbance to waterfowl has been undertaken for EN. Closer working between Wildflowing Clubs, BASC is ongoing.

Facilities provided.
Limited facilities for visitors to use the site except at NNRs in Brue Valley. General visitors and bird watchers at Shapwick National Nature Reserve, Westhay Moor and West Sedgemoor. Walking, including dog walking on droves, cycling, bird watching, coarse angling on the Main Drains may cause some limited disturbance to sites.

Seasonality.
All year.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

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ANNEX 4

Regulation 33 Advice – Severn Estuary

The Severn Estuary / Môr Hafren European Marine Site

comprising :

The Severn Estuary / Môr Hafren Special Area of Conservation (SAC)

The Severn Estuary Special Protection Area (SPA)

The Severn Estuary / Môr Hafren Ramsar Site

Natural England & the Countryside Council for Wales' advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.

June 2009

NATURAL ENGLAND

Cyngor Cefn Gwlad Cymru
Countryside Council for Wales

Llywodraeth Cynulliad Cymru
Welsh Assembly Government
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A Welsh version of all or part of this document can be made available on request from the Countryside Council for Wales

CONTENTS

4.2 Conservation objectives for SPA European Marine Site interest features

4.3 Conservation objectives for the Severn Estuary / Môr Hafren Ramsar Site

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Appendixes

SUMMARY

This document contains Natural England and the Countryside Council for Wales' (CCW's) advice issued under Regulation 33 of the Conservation (Natural Habitats, &c.) Regulations 1994, for the *Severn Estuary European Marine Site (EMS,) which comprises the Special Area of Conservation (SAC), Special Protection Area (SPA), and Ramsar site*, namely conservation objectives and advice on operations. It also includes an explanation of the purpose and format of Natural England and CCW's "Regulation 33 advice".

Section 1 provides the legal basis and practical requirements for setting conservation objectives for Natura 2000 sites, as understood by Natural England and CCW. It also briefly explains the legal and practical basis of the operations advice.

Section 2 details the qualifying features for the Severn Estuary SAC, SPA and Ramsar site under the EU Habitats and Birds directives and the Convention on Wetlands of International Importance.

Section 3 provides a description of the features of the Severn Estuary EMS

Section 4 contains Natural England and CCW's advice as to the conservation objectives (Regulation 33(2)(a)) for SAC, SPA and Ramsar site. This section also includes the favourable condition tables for the SAC, SPA and Ramsar site.

Section 5 contains Natural England and CCW's advice on operations which may cause deterioration or disturbance of the habitats and species for which the SAC, SPA and Ramsar site has been selected (Regulation 33(2)(b)). This is provided to assist the relevant authorities and others in understanding the implications of the designation of these sites and the requirements of the Habitats Regulations and government policy.

Section 6 contains the references.

Section 7 contains a glossary of terms.

Appendices 1-9 provide maps of the extent of the SAC, SPA and Ramsar designations; the indicative extent of the habitat features, and sub features where information is available; and the low-tide distribution of birds.

Appendices 10-11 provide additional background information useful to the understanding of this advice.

Notes :

CCW and Natural England's predecessor English Nature, issued advice under Regulation 33(2)(a) and 33(2)(b) in relation to the SPA in February 2005 which is now superseded by this document.

This advice does not cover the terrestrial areas of the Severn Estuary SPA (ie ground which lies behind flood defences and which are not subject to the tidal influence of the estuary and are not therefore within the European Marine Site.

CCW and Natural England also issued advice under Regulation 33(2)(a) in relation to the cSAC in June 2008 which is also superseded by this document.

1. Introduction

This document provides advice under Regulation 33 (2) for the Severn Estuary European Marine Site (EMS), which comprises the following sites :

- Severn Estuary Special Area of Conservation (SAC)*
- Severn Estuary Special Protection Area (SPA)
- Severn Estuary Ramsar Site

(*At the time of issue of this document the Severn Estuary has been accepted by the European Commission as a Site of Community Importance (SCI) but formal notices have not yet been issued (expected to take place in 2009). Given the imminent notification of the SAC the Severn Estuary SCI is referred to as SAC throughout this document).

The indicative extent and relationship of these designated sites is shown in Appendix 1

This document:

- is designed to help relevant and competent authorities responsible for complying with the requirements of the Habitats Directive to understand the international importance of the site and the underlying physical and ecological processes supporting the habitats and species for which each of the above designated sites has been selected.
- is intended to assist the relevant authorities to develop, if considered appropriate, a management scheme under Regulation 34 of the Habitats Regulations, under which they shall exercise their functions in accordance with the requirements of the Directive;
- contains Natural England and CCW's advice to competent authorities as to the conservation objectives of each of the above designated sites, for the purpose of considering plans and projects in accordance with Article 6 of the Habitats Directive and Parts IV and IVa of the Habitats Regulations. Natural England and CCW will provide more detailed advice to competent authorities to assess the implications of particular plans or projects, where appropriate, at the time those plans or projects are being considered.

Anyone proposing to undertake plans or projects with a potential impact on site features are encouraged to consult Natural England or CCW early in the planning stages to identify possible issues of concern.

The advice in this document is subject to review by Natural England and CCW, for example to:

- add further advice on monitoring requirements in order to assess the degree to which the conservation objectives are being achieved in future;
- add further advice on operations likely to damage the features for which the SPA, SAC and Ramsar Site are selected (under Habitats Regulation 33(2)(b));
- take account of new information about the SPA, SAC and Ramsar site or its features, or any future changes to the designations.

Notes :

CCW and Natural England's predecessor English Nature, issued advice under Regulation 33(2)(a) and 33(2)(b) in relation to the SPA in February 2005 which is now superseded by this document.

This advice does not cover the terrestrial areas of the Severn Estuary SPA (ie ground which lies behind flood defences are which are not subject to the tidal influence of the estuary and are not therefore within the European Marine Site.

CCW and Natural England also issued advice under Regulation 33(2)(a) in relation to the cSAC in June 2008 which is also superseded by this document.

1.1 Natura 2000

The European Union Habitats[1] and Birds[2] Directives are international obligations which set out a number of actions to be taken for nature conservation. They represent one of the ways in which EU member states are fulfilling the commitments they made at the "Earth Summit" in Rio de Janeiro in 1992, for the conservation of the Earth's biological diversity[3].The Habitats Directive aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements, and sets out measures to maintain or restore, natural habitats and species of European Union interest at favourable conservation status[4].

European sites include Special Areas of Conservation (SACs) designated under the 1992 Habitats Directive, which support natural habitats and species of European importance, and Special Protection Areas (SPAs) classified under the 1979 Birds Directive, which support internationally important wild bird populations. UK and Welsh Assembly Government policy also requires that Ramsar sites should receive the same level of protection as European sites[5].

The Habitats Directive is given effect in the UK largely through the Conservation (Natural Habitats, &c.) Regulations 1994 ("the Habitats Regulations")[6]. These Regulations set out the powers and duties of UK statutory bodies towards compliance with the requirements of the Habitats Directive. Under these Regulations, SACs together with Special Protection Areas (SPAs) classified under the 1979 EC Birds Directive for the conservation of birds, are called "European sites" and will form a network of conservation areas to be known as 'Natura 2000'. Where SAC or SPA consist of marine areas they are referred to as European Marine Sites.[7]

There are various sources of guidance on the legal framework for European sites and European Marine Sites.[8]

A note on Ramsar :
The Convention on Wetlands of International Importance especially as Waterfowl Habitats (Ramsar Convention) was signed in Ramsar, Iran in 1971. The broad objectives of the Convention are to stem the loss and progressive encroachment on wetlands now and in the future, including through the designation of Ramsar sites.

A habitat can qualify as a Ramsar site for its representation of a wetland, or for the plant or animal species, including waterbirds, that it supports.

In accordance with Office of the Deputy Prime Minister (2005) *Planning Policy Statement 9: Biological and Geological Conservation*, Welsh Office Planning Guidance *Technical Advice Note No. 5* (TAN5), the DETR and NAW statements *Ramsar Sites in England* (November 2000) and *Ramsar Sites in Wales* (February

[1] Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.
[2] Council Directive 79/409/EEC on the conservation of wild birds.
[3] Biological diversity is defined as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." (1992 International Convention on Biological Diversity, Article 2. http://www.biodiv.org/convention/)
[4] A habitat or species is defined as being at favourable conservation status when its natural range and the areas it covers within that range are stable or increasing and the specific structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future.
[5] Office of the Deputy Prime Minister (2005) *Planning Policy Statement 9: Biological and Geological Conservation,* Welsh Assembly Government (2006) *Draft Revised Technical Advice Note 5 Nature Conservation and Planning,* DETR (2000) *Ramsar sites in England*, National Assembly for Wales (20010, *Ramsar sites in Wales*.
[6] SI 1994/2716, HMSO, London. http://www.legislation.hmso.gov.uk/si/si1994/uksi_19942716_en_1.htm)
[7] "Marine areas" are defined in the Habitats Regulations as areas "continuously or intermittently covered by tidal waters or any part of the sea in or adjacent to Great Britain up to the limit of territorial waters."
[8] *European Marine Sites in England & Wales: A guide to the Conservation (Natural Habitats &c.) Regulations 1994 and to the Preparation and Application of Management Schemes* (DETR & The Welsh Office, 1998), Office of the Deputy Prime Minister (2005) *Planning Policy Statement 9: Biological and Geological Conservation,* Welsh Assembly Government (2006*) Draft Revised Technical Advice Note 5 Nature Conservation and planning,* CCW (undated) *Natura 2000: European wildlife sites.*

2001); Ramsar sites classified under the Convention on Wetlands of International Importance should be given the same consideration as European sites when considering plans and projects that may affect them.

1.2 The role of Natural England and the Countryside Council for Wales

Regulation 33 of the Habitats Regulations requires Natural England and the Countryside Council for Wales (CCW) to advise the relevant authorities[9] for each European Marine Site in, or partly in, England and Wales as to

(a) the conservation objectives for that site, and

(b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated.

This document contains Natural England and CCW's advice under Regulation 33 in relation to the designated sites which comprise the Severn Estuary EMS.

The Conservation (Natural Habitats &c.) Regulations 1994, as amended transpose the Habitats Directive into law in Great Britain. They give Natural England and CCW a statutory responsibility to advise relevant authorities as to the conservation objectives for European Marine Sites and Ramsar Sites in England and Wales and to any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the sites have been designated. This information will be a key component of any management scheme that may be developed for this site. It will also aid competent authorities in defining the scope and nature of 'appropriate assessment' which the Habitats Directive requires to be undertaken for 'plans and projects' having a significant effect on the European site (Habitats Regulations 20, 48, 50, 60-62 and 85B). Note that Natural England and CCW will also advise competent authorities on individual plans and projects as they arise. Natural England and CCW are also competent and relevant authorities under the Habitats Regulations.

1.3 The precautionary principle

The advice on operations contained within this package has been made based on the precautionary principle and any actions which may need to be taken in response to concerns identified as a result of monitoring undertaken by Natural England and the Countryside Council for Wales will also be made on this basis. All forms of environmental risk should be tested against the precautionary principle which means that where there are real risks to the site, lack of full scientific certainty should not be used as a reason for postponing measures that are likely to be cost effective in preventing such damage. It does not however imply that the suggested cause of such damage must be eradicated unless proved to be harmless and it cannot be used as a licence to invent hypothetical consequences. Moreover, it is important, when considering whether the information available is sufficient, to take account of the associated balance of likely costs, including environmental costs, and benefits (DETR & the Welsh Office, 1998).

1.4 The role of other competent and relevant authorities

The Conservation (Natural Habitats &c.) Regulations 1994 require competent authorities to exercise their functions so as to secure compliance with the requirements of the Habitats and Birds Directives. The term "competent authority" includes all public bodies and statutory undertakers. The Regulations identify a number of competent authorities as "relevant authorities", with particular functions in relation to European Marine Sites. In addition to their duties as competent authorities, under Regulation 34 the relevant authorities may establish a management scheme for a European Marine Site under which they shall exercise their relevant functions. Such a management scheme should be guided by the information contained in this document. Relevant authorities must, within their areas of jurisdiction, have regard to both direct and indirect effects on an interest feature of the site. This may include consideration of issues outside the boundary of the European Marine Site.

[9] The types of bodies that are "relevant authorities" are identified in Regulation 5 of the Habitats Regulations.

Relevant authorities should ensure that all plans for the area integrate with the management scheme for the European Marine Site. Such plans may include Shoreline Management Plans, the Environment Agency's Flood Risk Management Strategy and Catchment Flood Management Plans, Local Development Plans/ Frameworks, Sites of Special Scientific Interest management plans, local Biodiversity Action Plans and sustainable development strategies for estuaries. This must occur to ensure that there is only a single management scheme through which all relevant authorities exercise their duties under the Conservation (Natural Habitats &c.) Regulations 1994.

Relevant authorities also need to have regard to changing circumstances of the European Marine Site and may therefore need to modify the management scheme and/or the way in which they exercise their functions so as to maintain the favourable condition of interest features concerned in the long term. There is no requirement for relevant authorities to take any actions outside their statutory functions. For the purposes of this document the term 'interest feature' refers to any of the habitat types or species for which the European Marine Sites have been designated.

Under certain circumstances, where another relevant authority is unable to act for legal reasons, or where there is no other relevant authority, Natural England and CCW are empowered to use their bylaw-making powers under Regulation 36 of the Habitats Regulations 1994.

None of the information contained in this document legally binds any organisation (including Natural England and CCW) to any particular course of action. However, in exercising their functions in accordance with the requirements of the Habitats Directive, as required by the Habitats Regulations, and in accordance with government policy on Ramsar sites, the relevant authorities should be guided by the advice contained in this document. This applies amongst other things to the establishment of a "management scheme"[10], if such a scheme is established.

1.5 Responsibilities under other conservation designations

In addition to its SAC, SPA and Ramsar Site status, parts of the Severn Estuary are also notified as Sites of Special Scientific Interest (SSSIs) under the 1981 Wildlife and Countryside Act and Bridgwater Bay is also a National Nature Reserve. The obligations of relevant authorities and other organisations under such designations are not directly affected by the advice contained in this document.

Relevant authorities and others may have obligations towards the conservation of habitats and species that are not features for which the Severn Estuary European Marine Site has been designated, and such obligations are not affected by this document.

1.6 Role of advice provided under Regulation 33

The information provided under Regulation 33 is in two parts: the conservation objectives, and the advice on operations. The legal context for each of these elements, the format of the advice and its underlying rationale are explained here. Sections 4 (conservation objectives and favourable condition tables) and 5 (operations advice) should be read in conjunction with these explanatory notes.

The information contained in this document is based on best available knowledge at time of writing and is subject to review at Natural England and CCW's discretion.

As referred to under section 1.1. above, there are various sources of guidance on the legal framework for European sites and European Marine Sites.[11]

[10] Regulation 34 of the Habitats Regulations.

[11] European Marine Sites in England & Wales: A guide to the Conservation (Natural Habitats &c.) Regulations 1994 and to the Preparation and Application of Management Schemes (DETR & The Welsh Office, 1998), Office of the Deputy Prime Minister (2005) Planning Policy Statement 9: Biological and Geological Conservation, Welsh Assembly Government (2006) Draft Revised Technical Advice Note 5 Nature Conservation and planning, CCW (undated) Natura 2000: European wildlife sites.

1.6.1 Outline of legal context and purpose of conservation objectives

The conservation objectives for a European Marine Site are intended to represent the aims of the Habitats and Birds Directives in relation to that site. The Habitats Directive requires that measures taken under it, including the designation and management of SACs, be designed to maintain or restore habitats and species of European Community importance at "favourable conservation status" (FCS), as defined in Article 1 of the Directive as follows;

Favourable conservation status as defined in Article 1 of the Habitats Directive

Conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2.

The conservative [sic] status of a natural habitat will be taken as 'favourable' when:

- its natural range and the areas it covers within that range are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- conservation status of typical species is favourable as defined in [Article] 1(i).

Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term natural distribution and abundance of its populations within the territory referred to in Article 2;

The conservation status of a species will be taken as 'favourable' when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis

In addition, the Birds Directive requires that, in relation to certain species of birds listed in Annex 1 of the Directive and regularly occurring migratory species, special measures are taken in order to ensure their survival and reproduction in their area of distribution. The species listed in Annex 1 of the Birds Directive are the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. Species listed on Annex 1 are in danger of extinction, rare or vulnerable. Annex 1 species that regularly occur at levels over 1% of the national population meet the SPA qualifying criteria.

Therefore, the conservation objectives for the Severn Estuary SAC, SPA and Ramsar site represents Natural England and the Countryside Council for Wales' current judgement of the appropriate contribution of the site to the achievement of the favourable conservation status of the habitats and species of the European Marine Site. The conservation objectives in this document are intended to guide relevant and competent authorities in the exercise of their functions to comply with the requirements of the Directives outlined above.

1.7 Condition

Natural England and CCW use the term "favourable condition" for the condition represented by the achievement of the conservation objectives, in other words the desired condition for a designated habitat or a species on an individual site.

On many terrestrial European sites, we know sufficient about the required condition of qualifying habitats to be able to define favourable condition with confidence. In contrast understanding the functioning of large, varied, dynamic marine and estuarine sites, which experience a variety of pressures resulting from historic and current activities, is much more difficult. Consequently it is much harder to precisely define favourable condition in sites like the Severn Estuary. In general the conservation objectives provided are based on a working assumption that the current condition of the features is favourable for most attributes. Nevertheless there are certain instances where the assumption does not apply. In particular some of the intertidal habitats of the Severn are subject to coastal squeeze. Where existing problems *have* been identified, the relevant objectives reflect this.

If it becomes evident that the condition of other features is significantly degraded, and is therefore unfavourable, then restorative management actions will need to be undertaken to return the interest feature to favourable condition. In future revisions of our advice under Regulation 33, Natural England and CCW will keep our assumption under review in light of ongoing and future monitoring and our developing understanding of the features and the factors affecting them.

1.8 Favourable Condition Tables

The detailed information regarding the measures and targets that may be used during site monitoring to determine whether favourable condition is being achieved in practice is presented within the Favourable Condition Tables in section 4.

The favourable condition table specifies the following (in columns from left to right):

- **Features**: interest features for which the SAC, SPA or Ramsar site is selected.
- **Subfeatures**: ecologically important sub-divisions of an interest feature. In the case of a habitat interest feature, subfeatures would be component habitats or communities (eg. defined by type and/or by geographic location within the site). In the case of species interest features, subfeatures include the population itself, or any ecologically relevant subdivisions of the population, and any habitats or communities on which it/they depend.
- **Attributes**: particular characteristics of the features or sub-features which provide an indication of the condition of the feature (eg. total population size, extent of a habitat type).
- **Measures**: what exactly about the attributes will be measured, in terms of the units of measurement to be used, arithmetic nature and an indication of the frequency at which the measurement is taken. An indication of the method that is likely to be used to obtain the observed values of attributes. The method is closely linked to the way in which the measure is expressed. It is important to note that in many cases the precise monitoring method to be used may not be known at this stage.
- **Targets**: These define the attribute values that equate to favourable condition. If changes are observed that are 'significantly' different from the target, this will act as a trigger for further investigation as to the cause of the change, or remedial management action. In general the targets in the favourable condition table are subject to natural processes as set out in the conservation objectives; i.e. where natural processes alone dictate that targets are not met this will not result in the condition of the feature being classed as unfavourable. The term 'subject to natural processes' is explained further in Section 4.1.
- **Comments**: notes on the rationale for the use of each attribute and measure.

The favourable condition table is intended to supplement the conservation objectives, including with respect to the management of established and ongoing activities, future requirements of monitoring and reporting on the condition of the features of the site and, together with the conservation objectives, informs the scope and

nature of any appropriate assessment that may be needed. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under the Habitats Regulations. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects. Natural England and CCW will provide more detailed advice to competent and relevant authorities to assess the implications of any given plan or project under the Regulations, where appropriate, at the time a plan or project is being considered.

The favourable condition table specifies the main types of information that Natural England and CCW may use to assess the condition of interest features. On many terrestrial European sites, we know sufficient about the preferred or target condition of qualifying species and habitats to be able to define measures and associated targets for all attributes. In European Marine Sites favourable condition is generally harder to define precisely since our knowledge of features is still developing. Accordingly, in the absence of such information, condition of interest features in European Marine Sites will, in the first instance, be assessed against targets based on their condition at the time the sites were selected, which may need to be established through baseline surveys in many cases.

The information contained within the favourable condition table is not necessarily what will be monitored but provides a basis for discussions with management and advisory groups. The attributes and associated measures and targets may be modified over time. The selection of attributes is based on the current understanding of the habitats and species and the available measuring techniques.

The appropriateness of individual attributes as indicators of condition will be reviewed as more knowledge of the condition of interest features is obtained and/or survey and monitoring techniques develop. Monitoring of the attributes may be of fairly coarse methodology, underpinned by more rigorous methods on specific areas within the site.

The favourable condition table will be an important, but not the only, driver of the site monitoring programme. Other data, such as results from compliance monitoring and appropriate assessments, will also have an important role in assessing condition of interest features. The monitoring programme will be developed as part of the management scheme process through discussion with the relevant authorities and other interested parties. Natural England and the Countryside Council for Wales will be responsible for collating the information required to assess condition, some of which may be collected by other organisations, and for judging the condition of each feature within the site, taking into account all available information and using the favourable condition table as a guide.

The conservation objectives and associated Favourable Condition Tables in this document are intended to guide relevant and competent authorities in the exercise of their functions to comply with the requirements of the Directives outlined above.

1.9 Advice on operations

1.9.1 Legal context

Natural England and CCW's specific duty in Regulation 33 to give advice on operations that are potentially damaging needs to be seen in the context of the Habitats Directive, which requires that:

- the necessary conservation measures are established which correspond to the ecological requirements of the habitats and species on the site;
- appropriate steps are taken to avoid deterioration of habitats and significant disturbance of species.
- any plan or project which is likely to have a significant effect on a site is subject to an appropriate assessment in view of the site's conservation objectives.

The operations advice, in combination with the conservation objectives, is designed to assist relevant authorities and other decision-makers in complying with these provisions. The operations advice given in this document is without prejudice to other advice given, including the conservation objectives themselves

and other advice which may be given by Natural England and CCW from time to time in relation to particular operations.

The term "operations" is taken to cover all types of human activity, irrespective of whether they are under any form of regulation or management.[12] This is because the obligations in the Directive are

defined by the conservation requirements of the habitats and species, not by existing regulatory or management regimes. Thus the advice contains reference to operations which may not be the responsibility of any of the relevant authorities.

1.9.2 Practical requirements

Operations manifest themselves through one or more factors[13]. The conservation status of a given habitat or species could potentially be affected by many different types of factor, and hence many different types of operation.[14] The key practical purpose of the Regulation 33 operations advice is to assist in the identification of priorities for management, by identifying operations to which features are both 'sensitive' and 'vulnerable'. Sensitivity is defined as 'the intrinsic intolerance of a habitat, community or individual of a species to damage from an external factor.' Vulnerability is defined as 'the likelihood of exposure of a habitat, community or individual of a species to a factor to which it is sensitive'.[15] Thus the potential for an operation to deteriorate or disturb a feature depends both on the sensitivity of the feature to the operation – through its associated factors - and the location, intensity, duration and frequency of the operation and the factors that it affects or causes.

Formulating the operations advice has three main elements:

1. Identifying factors to which the features are sensitive.
2. Identifying the types of operation that can cause or affect those factors.
3. Assessing the likelihood of those factors (and hence the features) being affected by those operations, in other words the vulnerability of the feature to those effects.

The first and second of these elements relies on current understanding of the inherent sensitivity of features to particular factors, and the effect of operations on factors. Although there will be site-specific elements to this information, it may often rely on information from a variety of sources which are not specific to this site. The third stage is very site-specific, relying on information about the types, location, intensity, duration and so on, of operations occurring or likely to occur in or around the site.

Given that in many cases, information of the type indicated in the previous paragraph is rudimentary, or simply not available a precautionary approach is adopted for the identification of factors and operations. The operations advice clearly has to be based on the best available knowledge at the time and is subject to continual review. It necessarily involves an element of risk assessment, both in terms of assessing the likelihood of an operation or factor occurring, and the likelihood of it having an adverse effect on a feature.

Natural England and CCW's advice to the relevant authorities is that, as a minimum, the extent and management of the operations identified in Section 5 should be reviewed in the context of the conservation objectives. The advice should also help to identify the types of plans or projects that would be likely to have a significant effect and should be subject to appropriate assessment, noting that such judgements will need to be made on a case-specific basis.

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[12] The term also includes what the Habitats Directive and Regulations call "plans and projects" (see footnote 9).

[13] A factor is defined as "A component of the physical, chemical, ecological or human environment that may be influenced by a natural event or a human activity" (*Sensitivity and mapping of inshore marine biotopes in the southern Irish Sea (Sensmap): Final report.* CCW, Bangor, December 2000.)

[14] The complexity of formulating operations advice is compounded by the "many-to-many" relationship that exists between operations and factors, where an operation may manifest itself through several factors, and a factor may be affected by several operations, in different ways and to different magnitudes.

[15] Adapted from Hiscock, K. [ed] 1996. *Marine Nature Conservation Review: rationale and methods.* Peterborough: JNCC.

The advice in Section 5 of this document is not a list of prohibited operations, or operations necessarily requiring consultation with, or consent[16] from, Natural England or CCW. The input of the relevant authorities and others is a legal and practical necessity in determining the management needs of the site. Thus, the operations advice is provided specifically with the intention of initiating dialogue between Natural England, CCW and the relevant authorities.

Note : The advice on operations previously issued for the SPA in February 2005 is superseded by the advice given in Section 5.

[16] However, in relation to land included within the European Marine Site, which has been notified as a Site of Special Scientific Interest (SSSI), owners or occupiers require Natural England or CCW's consent for any operations included in the SSSI notification, and statutory bodies intending to carry out or permit potentially damaging operations must notify Natural England or CCW and comply with certain other provisions. (Wildlife and Countryside Act 1981, section 28, as amended by the Countryside and Rights of Way Act 2000, section 75). General guidance on the operation of SSSIs is given in the CCW leaflet *Sites of Special Scientific Interest: A guide for landowners and occupiers* (Countryside Council for Wales, Bangor, 2001).

2. Qualifying features under the EU Habitats and Birds Directives and the Convention on Wetlands of International Importance

Table 1 shows the wide range of nature conservation features for which the estuary is valued and the interrelationship of these features by designation. This table outlines features of European and International importance in their own right and others of national importance for which the Severn Estuary has been designated as a Site of Special Scientific Interest (SSSI) but which form an intrinsic part of the Severn ecosystem and therefore contribute to the overarching "estuary" feature of the SAC and Ramsar Site.

Table 1 : Summary of Notified features of each designation :

Feature	**SAC**	**SPA**	**Ramsar Site**	**SSSI (Nationally important feature)**
Estuary	Yes	*Supporting habitat to designated bird interests*	Yes	(Yes)
Subtidal sandbanks	Yes	No – outside boundary of SPA	No – outside boundary of Ramsar Site	*No – outside boundary of SSSI*
Intertidal Mud and Sand	Yes	*Supporting habitat to designated bird interests*	*Component of Ramsar "estuaries" feature and supporting habitat to designated bird interests*	Yes
Atlantic salt meadow / salt marshes	Yes	*Supporting habitat to designated bird interests*	*Component of Ramsar "estuaries" feature and supporting habitat to designated bird interests*	Yes
Reefs	Yes	No	*Intertidal Sabellaria contiguous with subtidal reefs is a component of the hard substrates subfeature of the Ramsar "estuaries" feature*	No – outside boundary of SSSI
Migratory fish (river & sea lamprey & twaite shad)	Yes	No	Yes	(Yes)
Migratory fish (salmon, eel, sea trout and Allis Shad)	*Part of notable species sub-feature of estuary feature*	No	Yes	(Yes)
Assemblage of fish species (>100 species)	*Notable species sub-feature of estuary feature*	No	*Notable species sub-feature of estuary feature)*	(Yes)
Internationally important populations of migratory bird species	*Notable species sub-feature of estuary feature*	Yes	Yes Internationally important populations of waterfowl	Yes
Internationally important populations of wintering bird species	*Notable species sub-feature of estuary feature*	Yes		Yes
Assemblage of nationally important populations of waterfowl	*Notable species sub-feature of estuary feature*	Yes	Yes	Yes
Hard substrate habitats (Rocky shores)	*Notable species sub-feature of estuary feature*	*Supporting habitat to designated bird interests*	*Component of Ramsar "estuaries" feature and supporting habitat to designated bird interests*	Yes
Freshwater grazing marsh / Neutral grassland	No	*Supporting habitat to designated bird interests within SPA but outside European Marine Site* ***and therefore not addressed in this Regulation 33 advice document***		Yes (currently England only)

2.1 Qualifying interest features of the Severn Estuary / Môr Hafren SAC

The Severn Estuary has been designated an SAC on the basis that it supports occurrences of habitat types and species listed in Annexes I and II respectively of the Habitats Directive that are considered important in a European context and meeting the criteria in Annex III of the Directive. These are the interest features of the SAC and are listed in the Table 2 and their relationships are shown in Figure 1.

The designation includes an overarching **"estuaries"** feature within which **subtidal sandbanks**, **intertidal mudflats and sandflats, Altlantic salt meadows** and **reefs** (of *Sabellaria alveolata*) and **three species of migratory fish** are defined as both features in their own right and as sub-features of the estuary feature.

In addition **hard substrate habitats** including **eel grass beds,** the estuary-wide **assemblage of fish species** and the **assemblage of waterfowl species** (for which the Ramsar Site and SPA are specifically designated) are identified as **notable estuarine assemblages** which are an intrinsic part of the estuary ecosystem – these are therefore covered by the "estuaries" feature.

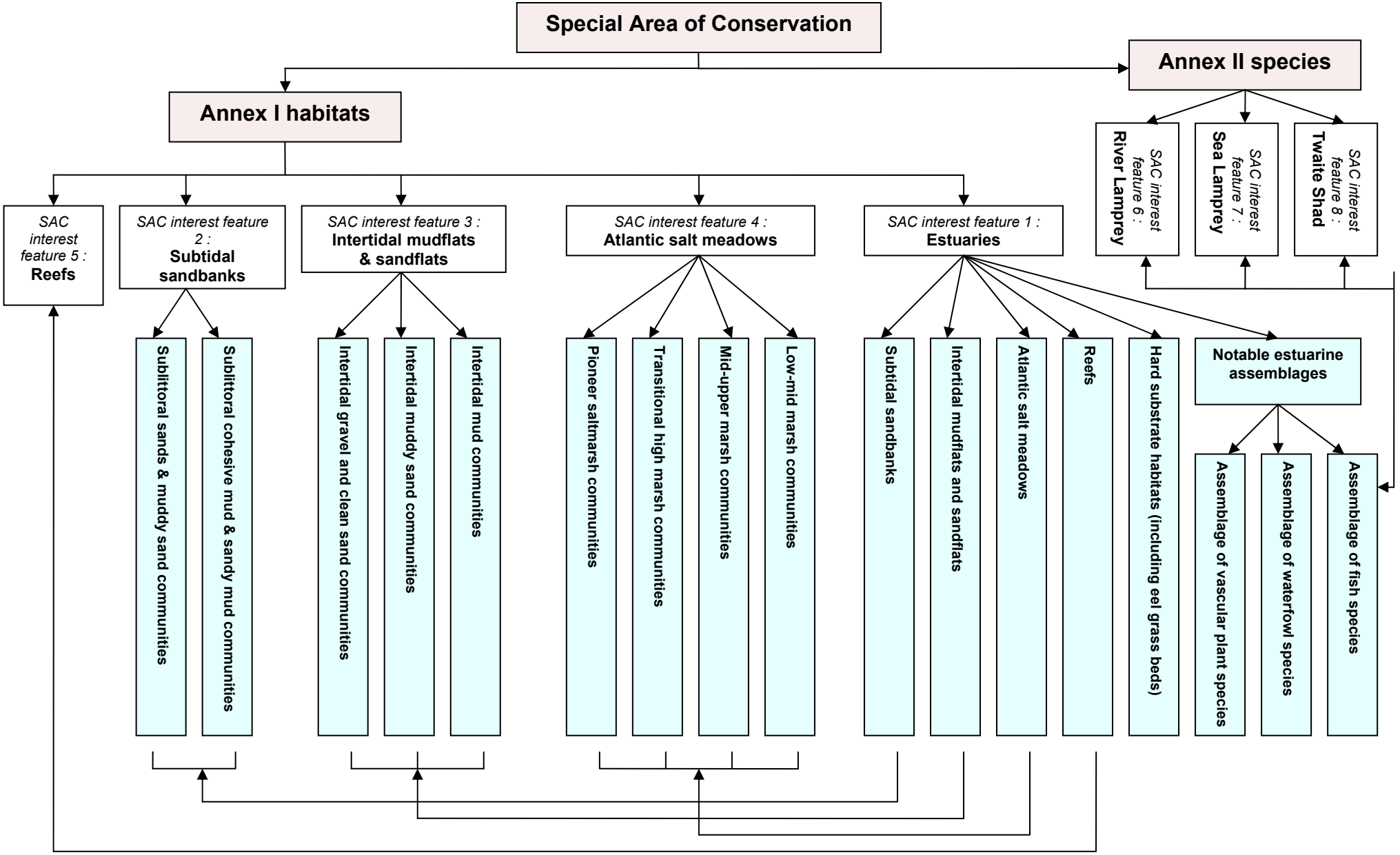
Table 2 : Interest features of the SAC

Feature name	**Scientific term**[10]	**EU Code**[17]
Annex I habitat types		
SAC interest feature 1: **Estuaries**	Estuaries	1130
SAC interest feature 2: **Subtidal sandbanks**	Sandbanks which are slightly covered by seawater all the time	1110
SAC interest feature 3: **Intertidal mudflats and sandflats**	Mudflats and sandflats not covered by seawater at low tide	1140
SAC interest feature 4: **Atlantic salt meadows**	Atlantic salt meadows (*Glauco puccinellietalia maritimae)*	1330
SAC interest feature 5: **Reefs**	Reefs	1170
Annex II species		
SAC interest feature 6: **River lamprey**	*Lampetra fluviatilis*	1099
SAC interest feature 7: **Sea lamprey**	*Petromyzon marinus*	1095
SAC interest feature 8: **Twaite shad**	*Alosa fallax*	1103

Each interest feature has a conservation objective in Section 4 of this document.

[17] European Commission (2007) Interpretation Manual of EU Habitats EUR27 July 2007, and Natura 200- Standard Data Form Explanatory Notes, Appendix C.

Figure 1 : Flow chart showing the relationship between the interest features of the Severn Estuary SAC (shown in white boxes) and their component sub features (shown in blue boxes). NB Some habitats that are sub features of the Annex II estuary feature are also features in their own right with their own sub features.



2.2 Qualifying interest features of the Severn Estuary / Môr Hafren SPA

The Severn Estuary was classified as an SPA on 13 July 1995 (subsuming a previously designated SPA called the Upper Severn Estuary) . The 1995 citation accompanying the classification is the baseline for the advice issued in this document. The qualifying interest features of the Severn Estuary SPA are shown in Table 3.

It should be noted that since designation changes in bird numbers have occurred in relation to the qualifying thresholds, which have themselves changed. These changes are highlighted by the SPA review published by the JNCC and details are also shown in Table 3. These changes are likely to be the subject of formal changes to the SPA designation in due course, however at present the legally protected species remain those in the original 1995 citation. (Note : Further information on the peak counts of the SPA species and waterfowl assemblage between 1988/9 and 2006/07 are given in Appendix 11.)

The SPA within the European Marine Site boundary includes saltmarshes and the adjacent extensive areas of intertidal mud, sand and rocky shores. All these habitats provide essential food and resting places for the wide range of wintering and migratory waterfowl and are therefore identified as key "supporting habitats" for the conservation of these species. The relationship between the features and supporting habitats supporting habitats is shown in Table 3. The supporting habitats are mapped in Appendix 8 to show their distribution and extent.

Notes relating to Table 3

[1] *Severn Estuary SPA original citation from July 1995 (though updated by Natural England in July 2002, version 2.3).*

[2] *JNCC Severn Estuary SPA Review, dated 2001 available from the JNCC www.jncc.gov.uk/pdf/SPA/UK9015022.pdf (Stroud, DA, et al., 2001)*

[3] *JNCC Natura 2000 Standard Data Form, May 2006, version 1.1.*

[4] *5 year peak mean, 1988/89 – 1992/93.*

[5] *5 year peak mean, 1991/92 – 1995/96.*

[6] *5 year peak mean, 01/04/1998.*

Table 3 : The qualifying interest features and supporting habitats of the Severn Estuary SPA.

Species	Original SPA citation (1995) *[1]	SPA Review (2001) *[2]	Natura 2000 form (2006) *[3]	Notes	Supporting habitats
Internationally important populations of regularly occurring Annex 1 species [under Article 4.1 of the EU Birds Directive].					
SPA interest feature 1 : **Bewick's swan** *Cygnus columbianus bewickii*	✓	✓	✓	Over-wintering	**Intertidal mudflats and sandflats** **Saltmarsh**
Internationally important populations of regularly occurring migratory bird species [under Article 4.2 of the EU Birds Directive].					
SPA interest feature 2 : **European white-fronted goose** *Anser albifrons albifrons*	✓	x	✓	Over-wintering	**Intertidal mudflats and sandflats** **Saltmarsh** **Hard substrate habitats** (Freshwater coastal grazing marsh, improved grassland and open standing waters also occur within the SPA but these habitats lie outside EMS boundary)
SPA interest feature 3 : **Dunlin** *Calidris alpina alpina*	✓	✓	✓		
SPA interest feature 4 : **Redshank** *Tringa totanus*	✓	✓	✓		
SPA interest feature 5 : **Shelduck** *Tadorna tadorna*	✓	✓	✓		
SPA interest feature 6 : **Gadwall** *Anas strepera*	✓	x	✓		
Curlew *Numenius arquata*	x	✓	x		
Pintail *Anas acuta*	x	✓	x		
Ringed plover *Charadrius hiaticula*	x	✓	x	On passage	
SPA interest feature 7 **: Internationally important assemblage of waterfowl** (wildfowl & waders) [under Article 4.2 of the EU Birds Directive].					
Bewick's swan *Cygnus columbianus bewickii*	✓	✓	The Natura 2000 data form does not list separate waterfowl species within this assemblage.	The wintering waterfowl assemblage includes all regularly occurring waterfowl. Species that qualify as a listed component of the assemblage include all the internationally important regularly occurring migratory species as well as the Annex 1 wintering species. The list also includes species present in nationally important numbers or species whose populations exceed 2,000 individuals In the original citation, in winter, it is stated that the area regularly supported 68,026 individual waterbirds *[4]. In the SPA Review it is stated that the area regularly supports 93,986 individual waterfowl in winter *[5]. In the Natura 2000 form, in winter, it is stated that the area regularly supports 84,317 waterfowl *[6].	**Intertidal mudflats and sandflats** **Saltmarsh** **Hard substrate habitats** (Freshwater coastal grazing marsh, improved grassland and open standing waters also occur within the SPA but these habitats lie outside EMS boundary)
European white-fronted goose *Anser albifrons albifrons*	✓	✓			
Dunlin *Calidris alpina alpina*	✓	✓			
Redshank *Tringa totanus*	✓	✓			
Shelduck *Tadorna tadorna*	✓	✓			
Gadwall *Anas strepera*	✓	✓			
Wigeon *Anas penelope*	✓	✓			
Teal *Anas crecca*	✓	✓			
Pintail *Anas acuta*	✓	✓			
Pochard *Aythya ferina*	✓	✓			
Tufted duck *Aythya fuligula*	✓	✓			
Ringed plover *Charadrius hiaticula*	✓	x			
Grey plover *Pluvialis squatarola*	✓	✓			
Curlew *Numenius arquata*	✓	✓			
Whimbrel *Numenius phaeopus*	✓	✓			

Species	Original SPA citation (1995) *[1]	SPA Review (2001) *[2]	Natura 2000 form (2006) *[3]	Notes	Supporting habitats
Spotted redshank *Tringa erythropus*	✓	x			
Lapwing *Vanellus vanellus*	x	✓			
Mallard *Anas platyrhynchos*	x	✓			
Shoveler *Anas clypeata*	x	✓			

Information on populations of bird species using the Severn Estuary European Marine Site at the time the SPA was classified is contained in Table 4 and their relationships are shown in Figure 2.

Table 4 : Information on populations of bird species using the Severn Estuary European Marine Site at the time the Severn Estuary SPA was classified (1995).

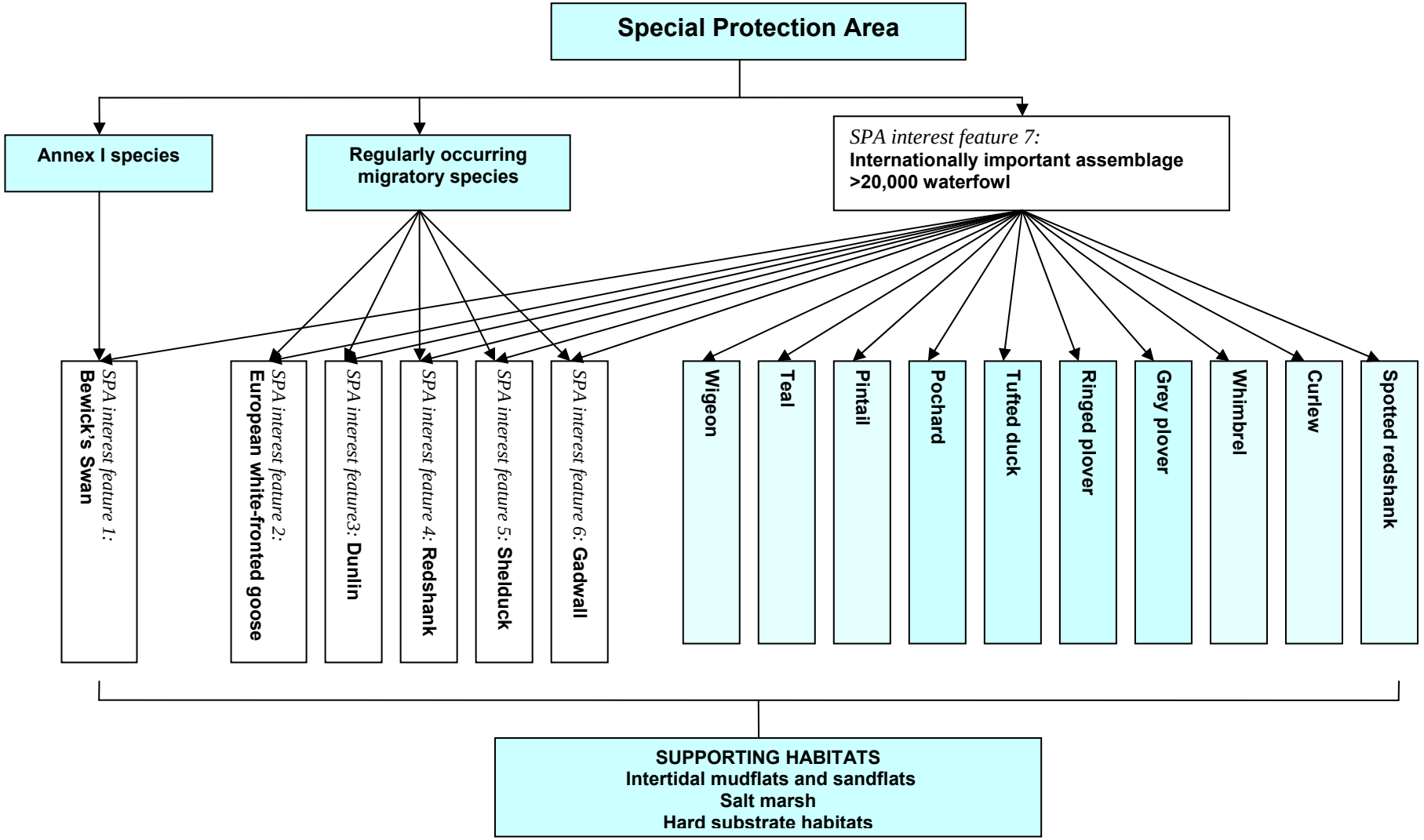
Internationally important populations of regularly occurring Annex 1 species		
Species	**Population (5 yr peak mean :1988/9 to 1992/3)**	
SPA interest feature 1: **Bewick's swan**	289 birds	4.1% Great Britain 1.7% NW Europe
Internationally important populations of regularly occurring migratory bird species		
Species (wintering)	**Population (5 yr peak mean: 1988/9 to 1992/3)**	
SPA interest feature 2: **European white-fronted goose**	3,002	50% British, 1% North West Europe
SPA interest feature 3: **Dunlin**	41,683	2.9% East Atlantic flyway
SPA interest feature 4: **Redshank**	2,013	1.3% East Atlantic flyway
SPA interest feature 5: **Shelduck**	2,892	1.2% North West Europe
SPA interest feature 6: **Gadwall**	330	2.8 % NW Europe
SPA interest feature 7: **An internationally important assemblage of waterfowl** *(Assemblage includes above species plus the following listed nationally important populations)*		
Importance	**Population (5 yr peak mean: 1988/9 to 1992/3)**	
The Severn Estuary supports over 20,000 wintering waterfowl.	68,026 individual birds comprising 17,502 wildfowl and 50,524 waders	
Nationally important bird populations within internationally important assemblage of waterfowl		
Species	**Population (5 yr peak mean: 1988/9 to 1992/3)**	
Wigeon	3,977 birds	1.6% Great Britain
Teal	1,998	2.0% Great Britain
Pintail	523	2.1% Great Britain
Pochard	1,686	3.8% Great Britain
Tufted duck	913	1.5% Great Britain
Ringed plover	227	1.0% Great Britain
Grey plover	781	3.7% Great Britain
Curlew	3,096	3.4% Great Britain
Whimbrel	246	4.9% Great Britain
Spotted redshank	3	1.5% Great Britain

Notes :
1. Previous advice issued in respect of the Severn Estuary SPA in February 2005 excluded Gadwall for the listed species of internationally important populations of regularly occurring migratory birds as they were considered not to use the European Marine Site area to any significant degree. Further recent evidence (2002/03 Low Tide Bird Counts) has demonstrated that this species does make use of areas within the European Marine Site and has consequently now been included.
2. The SPA review has identified that since the classification of the Severn Estuary SPA in 1995 the Severn Estuary now supports nationally important populations of Mallard, Lapwing and Shoveler.

(Note : Further information on the peak counts of the SPA species and waterfowl assemblage between 1988/9 and 2006/07 are given in Appendix 11.)

Each interest feature has a conservation objective in Section 4 of this document. Reference should also be made to sections of this document that relate to the Severn Estuary SAC interest features (particularly with respect to the conservation requirements of the supporting habitats) and the Severn Estuary Ramsar Site interest features.

Figure 2 : Flow chart showing the relationship between the qualifying bird species features (in white boxes) of the Severn Estuary SPA and their supporting habitats



2.3 Qualifying interest features of the Severn Estuary/ Môr Hafren Ramsar Site

The Severn Estuary was classified as a Ramsar Site on 13 July 1995 (subsuming a previously designated Upper Severn Estuary Ramsar Site). The 1995 citation is the basis for the advice issued in this document as this defines the legally protected species covered by the Ramsar designation at this time.

It should be noted that a number of changes have been made to the criteria since the listing of the Severn Estuary Ramsar Site and it is these new (2005) criteria which are now presented on the JNCC website used by many authorities as a reference source. For completeness qualification under both the criteria used at the time of 1995 Ramsar designation and the revised 2005 criteria have been outlined in Table 5 which provides a confirmation of the defined Ramsar features for which Conservation Objectives have been written.

The qualifying interest features of the Severn Estuary Ramsar Site overlap with those of the Severn Estuary SPA and SAC. To facilitate the development of integrated objectives across the designations the Ramsar criteria have been interpreted and the Ramsar features defined so that they are consistent with those already identified in the SAC and SPA sections of this document.

Table 5 : confirmation of Ramsar features in context of 1995 and 2005 Ramsar criteria

Ramsar Features (for which conservation objectives have been written)	**Criteria at designation (1995)** (original criteria)	**Revised Criteria (2005)** (criteria currently used on JNCC website)
Ramsar interest feature 1: ***Estuaries** *- characteristic physical form and flow, estuarine habitat communities and species assemblages*	**Criterion 1** : qualifies due to its immense tidal range affecting both the physical environment and biological communities present	**Criterion 1** : qualifies due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities.
- estuarine habitat communities and species assemblages	**Criterion 2b** : qualifies due to its unusual estuarine communities, reduced species diversity and high productivity. The high tidal range leads to strong tidal streams and high turbidity, producing communities characteristic of the extreme physical conditions of liquid mud and tide swept sand and rock	**Criterion 3** : qualifies due to its unusual estuarine communities, reduced diversity and high productivity
Ramsar interest feature 2: **Assemblage of migratory fish species :** Sea Lamprey River Lamprey Twaite Shad Allis Shad Salmon Sea Trout Eel	**Criterion 2c** : qualifies as it is important for the run of migratory fish between sea and river via estuary. Species include Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla anguilla*.	**Criterion 4** : qualifies as it is important for the run of migratory fish between sea and river via estuary. Species include Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla anguilla*.
** The wider estuarine fish assemblage is covered as a "notable species assemblage" sub feature of the SAC "Estuaries" feature*		**Criterion 8** : qualifies as the fish assemblage of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded.

Table continued …

<table>
<tr><th>Ramsar Features
(for which conservation objectives have been written)</th><th>Criteria at designation (1995)
(original criteria)</th><th>Revised Criteria (2005)
(criteria currently used on JNCC website)</th></tr>
<tr><td>Ramsar interest feature 3:
Bewick's Swan

Ramsar interest feature 4:
European white-fronted goose

Ramsar interest feature 5: Dunlin
Ramsar interest feature 6: Redshank
Ramsar interest feature 7: Shelduck
Ramsar interest feature 8: Gadwall

ie Internationally important <u>populations</u> of waterfowl</td><td>Criterion 3c : qualifies by regularly in winter supporting internationally important populations (1% or more) of species of waterfowl

Bewick's swan
European white-fronted goose
Dunlin
Redshank
Shelduck
Gadwall</td><td rowspan="2">Criterion 6 : qualifies as it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Species with peak counts in winter - at designation:
Tundra/Bewick's swan
Greater /European white-fronted goose
Dunlin
Common redshank
Common shelduck
Gadwall

Populations identified subsequent to designation:
Ringed plover (spring/autumn)
Eurasian teal (winter)
Northern pintail (winter)
Lesser black-backed gull (breeding)</td></tr>
<tr><td rowspan="3">Ramsar interest feature 9:
Internationally important <u>assemblage</u> of waterfowl

This feature incorporates :

• waterfowl which contribute to the total peak winter count (criterion 3a)
• the above internationally important wintering populations (qualifying under criterion 3c)
• the migratory passage species (qualifying under criterion 2c)
• the nationally important populations (identified under other notable features of the Ramsar Site citation)

The species are as follows :
(w = wintering and p = passage):

Bewick's swan (w)
European white-fronted goose (w)
Shelduck (w)
Dunlin (w, p)
Redshank (w, p)
Gadwall (w)
Ringed plover (w, p)
Whimbrel (p)
Teal (w)
Pintail (w)
Wigeon (w)
Pochard (w)
Tufted duck (w)
Grey plover (w)
Curlew (w)
Spotted redshank (w)</td><td>Qualifies under Criterion 2c as it is particularly important for migratory birds during passage periods in spring and autumn. Nationally important populations of :

Ringed plover
Dunlin
Whimbrel
Redshank</td></tr>
<tr><td>Criterion 3a : qualifies by regularly supporting in winter over 20,000 waterfowl - (1988/89 to 1992/93 average peak count was 68,026 waterfowl: 17,502 wildfowl and 50,524 waders)</td><td>Criterion 5 : qualifies as it supports an assemblage of international importance - (1998/99-2002/2003 5 year peak mean was 70,919 waterfowl</td></tr>
<tr><td>Other notable features :
Nationally important wintering populations of:

Wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew and spotted redshank. Also nationally important breeding population of Lesser Black backed gull</td><td></td></tr>
</table>

Each interest feature has a conservation objective in Section 4 of this document.

Reference should also be made to sections of this document that relate to the Severn Estuary SAC interest features (particularly with respect to the conservation requirements of the supporting habitats) and the Severn Estuary SPA interest features.

Information on the populations of bird species using the Severn Estuary Ramsar Site at the time of designation is contained in Table 6 and their relationships are shown in Figure 3. Ramsar interest feature 9 incorporates both wintering and passage populations of some birds and hence some species are included more than once in the lists given in Table 6.

Table 6 : Information on populations of bird species using the Severn Estuary Ramsar Site at the time of classification (1995)

Ramsar interest features3 to 8: **Internationally important <u>populations</u> of wintering waterfowl** (1995 Ramsar Criterion 3c)		
Species	**Population (5 yr peak mean: 1988/9 to 1992/3)**	
Ramsar interest feature 3: **Bewick's swan**	289	4.1% Great Britain, 1.7% North West Europe
Ramsar interest feature 4: **European white-fronted goose**	3,002	50% British, 1% North West Europe
Ramsar interest feature 5: **Dunlin**	41,683	2.9% East Atlantic flyway, 9.6% British
Ramsar interest feature 6: **Redshank**	2,013	1.3% East Atlantic flyway, 2.6% British
Ramsar interest feature 7: **Shelduck**	2,892	1.2% NW European, 3.9 % British
Ramsar interest feature 8: **Gadwall**	330	2.8 % NW European, 5.5 % British

Ramsar interest feature 9: **Internationally important <u>assemblage</u> of waterfowl (**1995 Ramsar Criterion 2c, 3a and 3c) *(Assemblage includes above wintering species populations plus the following listed nationally important populations (migratory passage and wintering species)*	
International importance (1995 Ramsar Criterion 3a)	**Population (5 yr peak mean: 1988/9 to 1992/3)**
Regularly supporting in winter over 20,000 waterfowl.	68,026 individual birds comprising 17,502 wildfowl and 50,524 waders

Nationally important bird populations within internationally important assemblage of waterfowl (1995 Ramsar Criterion 2c and other nationally important populations)		
Species	**Population (5 yr peak mean: 1987/8 to 1991/2)**	
Dunlin	3,510 (spring migration) 5,500 (autumn migration)	1.7 % British passage 2.7 % British passage
Redshank	2,456 (autumn migration)	2 % British passage
Ringed plover	442 (spring migration) 1,573 (autumn migration)	1.4 % British passage 5.2 % British passage
Whimbrel	246 (spring migration) 66 (autumn migration)	4.9 % British passage 1.3 % British passage
	Population (5 yr peak mean: 1988/9 to 1992/3)	
Wigeon	3,977 birds	1.6% Great Britain
Teal	1,998	2.0% Great Britain
Pintail	523	2.1% Great Britain
Pochard	1,686	3.8% Great Britain
Tufted duck	913	1.5% Great Britain
Grey plover	781	3.7% Great Britain
Curlew	3,096	3.4% Great Britain
Spotted redshank	3	1.5% Great Britain

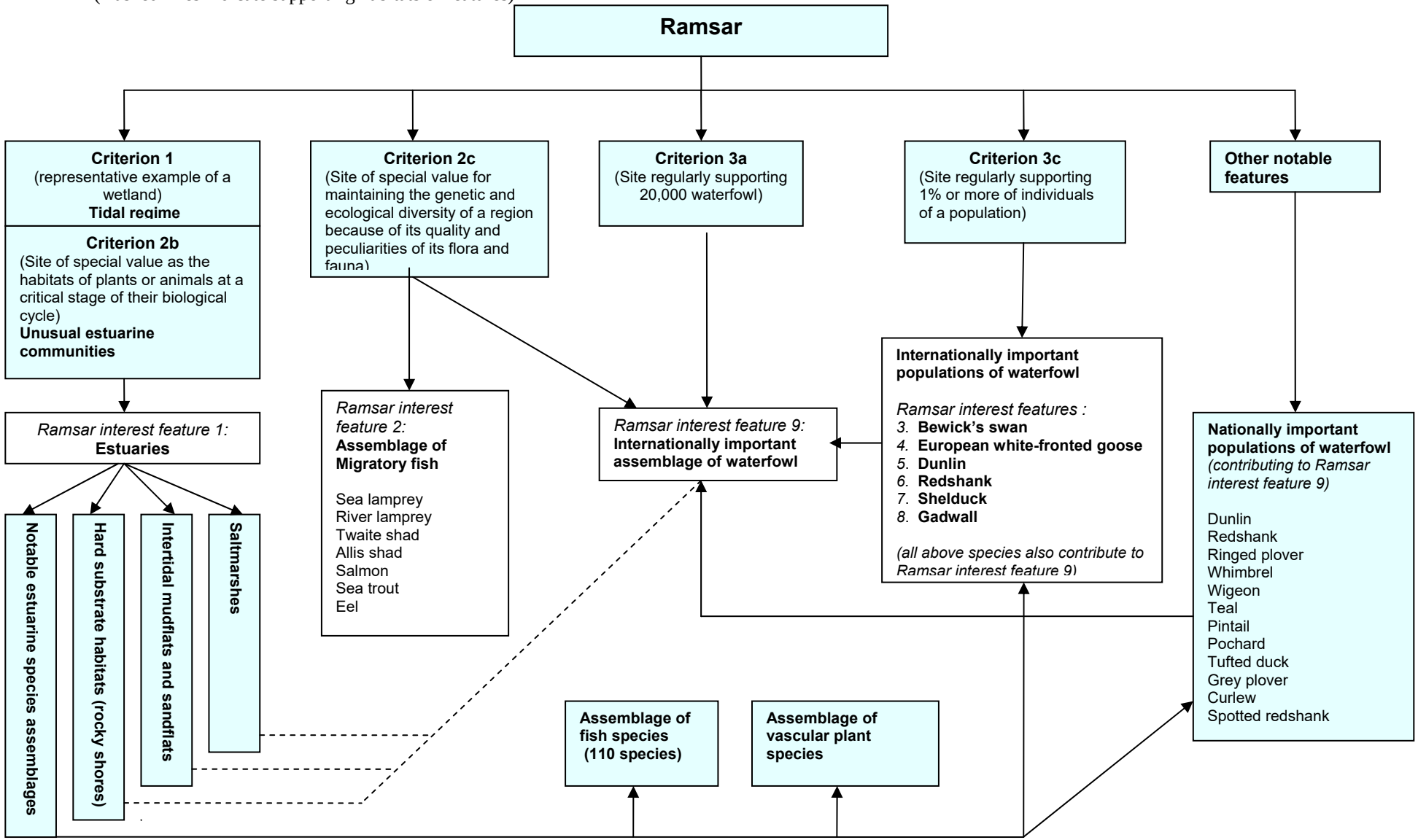
(Note : Further information on the peak counts of the SPA species and waterfowl assemblage between 1988/9 and 2006/07 are given in Appendix 11.)

The Ramsar Site within the European Marine Site boundary includes saltmarshes and the adjacent extensive areas of intertidal mud, sand and rocky shores. All these habitats provide essential food and resting places for the wide range of wintering and migratory waterfowl and are therefore identified as key "supporting habitats" for the conservation of these species. The relationship between the Ramsar Site bird features (Ramsar interest features 3 to 9) and their supporting habitats is shown in Table 7. The supporting habitats are mapped in Appendix 8 to show their distribution and extent.

Table 7 : A summary of the qualifying bird features and associated supporting habitats within the Severn Estuary Ramsar Site

Designation	**Qualifying feature**	**Protected Supporting habitats**		
		Estuary		
		Intertidal mudflats and sandflats	**Hard substrate habitats (rocky shores)**	**Saltmarsh**
Ramsar Site (*classified 13 July 1995)*	*Ramsar interest features 3 to 8 :* Internationally important populations of individual species of waterfowl	✓	✓	✓
	Ramsar interest feature 9: Internationally important assemblage of waterfowl	✓	✓	✓

Figure 3 : Flow chart showing the relationship between the interest features (in white boxes) for which the Severn Estuary Ramsar Site qualifies.
(Dashed lines indicate supporting habitats of features)



3. General description of the Severn Estuary and its designated features

Introduction

The Severn Estuary is the largest example of a coastal plain estuary in the United Kingdom and one of the largest estuaries in Europe. The overall area of the European and International conservation designations is 73,715.4 ha (see Appendix 1) of which roughly two thirds is composed of subtidal habitats (stable sandbanks and shifting sediments of gravel, sand and mud) and one third is composed of intertidal habitats (tide washed mud and sand, saltmarshes and rocky shores).

The estuary lies in the broad Severn Vale, with most of the sediments on the margins of the estuary having accumulated since the last ice age. As with many other estuaries in England and Wales, it has been a focus for human activity, a location for settlement, a source of food, water and raw materials and a gateway for trading and exploration. The Estuary and its coastal hinterland support the cities of Cardiff, Bristol, Newport and Gloucester. Today, major industries are sited around the Estuary's shores. There are modern port installations, chemical processing companies and nuclear power stations among others. Exploitation of the natural resources includes commercial shrimp fishing and fishing for salmon using putchers, lave nets, draught nets and bag nets. The Severn supports an important eel and elver fishery. Aggregate extraction also occurs within the estuary.

Alongside all these competing activities, the Estuary also supports a wide array of habitats and species of international importance for nature conservation.

Human activity has increasingly influenced the character of the marginal wetland mudflats and marshes, with extensive land claim occurring during and since the Roman period. Sediment flows and fluxes affecting the estuary are of particular importance for estuarine processes and ecology and the morphology of the estuary is constantly changing due to the complex hydrodynamics. Sediment deposits provide essential material to maintain the mudflats, sandflats and saltmarsh. Estuary-wide fluctuations in the wind-wave climate over recent centuries have led to major movements of the high-tide shoreline, and some reclaimed lands have been lost (Allen, 1990, Atkins, W.S. 2004). In addition, the Severn Estuary CHaMP (ABPMer, 2006) predicts losses of intertidal mudflats and sandflats and saltmarsh habitats over the next 100 years in response to rising sea-level.

A number of habitats and species have also been recognised through the designation of several Sites of Special Scientific Interest (most notably, the Upper Severn Estuary, Severn Estuary and Bridgwater Bay SSSIs in the 1980's) which underpin the European and International designations.

The following sections briefly describe each of the main habitat and species features covered by the three designations and the inter-relationships between them. All feature descriptions are based on best available knowledge at the present time and in some cases this is limited. For example there is limited information on the extent of the subtidal reef habitat within the estuary. Maps showing the distribution of the habitats are indicative only and the advice in this document is provided on the basis of current knowledge and may be subject to change as knowledge improves.

3.1 Estuaries

3.1.1 Range

Estuaries are habitat complexes which comprise an interdependent mosaic of subtidal and intertidal habitats, which are closely associated with surrounding terrestrial habitats. Many of these habitats, such as mudflats and sandflats not covered by sea water at low tide, saltmarshes, sandbanks which are slightly covered by sea water all the time and reefs, are identified as Annex I habitat types in their own right.

Estuaries are defined as the downstream part of a river valley, subject to the tide and extending from the limit of brackish water. There is a gradient of salinity from freshwater in the river to increasingly marine conditions towards the open sea.

Estuaries are widespread throughout the Atlantic coasts of Europe. Approximately one-quarter of the area of estuaries in north-western Europe occurs in the UK. The UK has over 90 estuaries[18].

The selection of estuary sites has taken account of the UK's EU responsibility for this habitat type, and the SAC series contains a high proportion of the total UK resource. Sites have been selected to represent the geographical range of estuaries in the UK, and to encompass examples of the four geomorphological sub-types (coastal plain, bar-built, complex, and ria estuaries) and the associated range of communities. Selection has generally favoured larger estuaries, as they display a wider variety of habitats, but smaller estuaries have also been selected where they have specific features of interest, such as undisturbed transitions from marine to terrestrial habitats, or are representative of a particular geomorphological sub-type.

The Severn Estuary is the largest example of a coastal plain estuary in the UK, and one of the largest estuaries in Europe. It contributes approximately 30% of the UK Natura 2000 resource for estuaries, by area.[19]

3.1.2 Extent and Distribution

The extent of the Estuary feature is 73678 ha.

The Severn Estuary SAC covers the extent of the tidal influence from an upstream limit between Frampton and Awre in Gloucestershire out seawards to a line drawn between Penarth Head in Wales and Hinckley point in Somerset. It includes subtidal and intertidal areas landward to the line of high ground and flood defences (banks and walls) that provide the limit of tidal inundation.

The Estuary is an over-arching feature which incorporates all aspects of the physical, chemical and biological attributes of the estuary as an ecosystem. The physical nature of the tidal regime determines not only the structure of the estuary and individual habitats but also the conditions affecting it and the biological communities it therefore supports.

3.1.3 Structure and Function

The Severn Estuary is important for its immense tidal range, which affects both the physical environment and the diversity and productivity of the biological communities. The tidal range is the second largest in the world, reaching in excess of 13 m at Avonmouth[20]. This macrotidal environment is partly due to the estuary's funnel shape which concentrates the tidal wave as it moves up the Bristol Channel. Tidal currents

[18] JNCC website

[19] Based on Natura 2000 Standard data forms for all UK Natura 2000 sites which have estuaries as a feature- source: JNCC website http://www.jncc.gov.uk/ProtectedSites/SACselection/habitat.asp?FeatureIntCode=H1130

[20] Data on tidal range can be found on the Proudman Oceanographic Laboratory website http://www.pol.ac.uk/ntslf/tides/?port=0060 .

are also amplified and exceed 7 metres per second close to Avonmouth (British Geological Survey, 1996). These factors make the estuary important in representing one of the most dynamic estuarine systems in the UK , Europe and the world.

There are several major rivers, including the Taff, Usk, Wye, Severn, Avon and Parrett which feed into the estuary, and influence the salinity regime. Together these rivers tend to produce a marked east-west salinity gradient and a range of conditions varying from brackish to fully saline, depending on the season and rainfall, which in turn influences the occurrence and distribution of habitats and species throughout the estuary and its fringes.

Fine sediments which are mainly derived from erosion of the intertidal zone and suspended sediments in river water entering the estuary create high turbidity, which has its highest average level between Avonmouth and the outer part of Bridgwater Bay (British Geological Survey, 1996, ABPMer, 2006). The strong tidal currents create a highly dynamic environment and the resultant scouring of the seabed and high turbidity give rise to low diversity communities. The Severn has an extreme type of hydrodynamic and sedimentary regime which distinguishes it from other estuaries and which dominates the whole system. It is estimated that the estuary carries 10 million tons of suspended sediments on spring tides (Kirby & Parker,1983; Kirby, 1986). Such conditions were initiated by the start of sea-level rise in late glacial times, with some evidence for steady sedimentation persisting for at least 5000 years, during which there has been a steady rise in sea level of 5 m, a trend which is continuing at present (British Geological Survey, 1996). Defra guidance[21] indicates sea –level rise for Wales and the South West to be 3.5 mm per annum to 2025, rising to 8 mm per annum (2025-2055), 11.5 mm (2055-2085) and 14.5 mm (2085-2115).

3.1.4 Typical Habitats and Species

The extreme hydrodynamic and sedimentary conditions essentially determine the type of habitats and species present and result in characteristic animal and plant communities. Typical species for each habitat are given in the individual habitat sections.

The predominant unconsolidated sediments are muds and sands which form the basis of the structure of the estuarine habitats which include saltmarshes (section 3.5), intertidal mud and sand flats (section 3.4) and subtidal sand banks (section 3.3), mixed mud and sand, rock outcrops, boulder and shingle shores (section 3.7) as well as biogenic (worm built) reefs (section 3.6). There are also sandy beaches on the southern shores in the outer part of the estuary, backed by sand dunes.

The intertidal zone of mudflats, sandbanks, rocky platforms and saltmarsh is one of the largest and most important in Britain and this range of habitats provide an ecosystem of great importance for a wide range of fish (section 3.8) and bird (section 3.9) species – for feeding, breeding, resting and migration.

3.1.5 Natural Processes

The structure of estuaries is largely determined by geomorphological and hydrographic factors, with the original shaping forces having their beginnings in the geological origins of the adjacent land areas and the influence of major geological events such as ice ages and periods of higher and lower sea levels.

The shape of the estuaries, their macro- and micro-topography, and bathymetry, are important components of the character of the habitats and influences the distribution and abundance of marine life, *i.e.* the features' typical species. It is both determined by, and influences, natural environmental processes and consequently, can be impacted either directly or indirectly (through changes to natural processes) by man.

Estuaries are complex dynamic systems that have a natural tendency to accumulate sediment, thereby changing their form from their original Holocene morphology to a state where tidal energy is dissipated by

[21] Defra, 2006. Flood and Coastal Defence Appraisal Guidance FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts October 2006

sub- and intertidal sediment banks. The width and depth of the estuary will therefore change over time towards a state of dynamic equilibrium or "most probable state".

The velocities of currents passing through the mouth are determined partly by the tidal range and partly by the cross sectional area of the mouth itself. If these velocities are higher than the sediment erosion threshold, erosion will widen the channel and lower velocities will ensue. If velocities are lower than the sediment depositional threshold, deposition will narrow the mouth and higher velocities will ensue. In this way, an equilibrium cross section will evolve which balances tidal prism, velocities and erosion/depositional thresholds. Sea level rise means that estuaries will show a natural tendency to migrate inland (roll-over) and may erode at the mouth. Where changes in extent are attributable to the estuary adjusting to equilibrium, then the feature should be determined favourable. Where this process is constrained by hard sea defence, then this would be considered as coastal squeeze. (JNCC Common Standards Monitoring Guidance for Estuaries (version 4)).

A complex pattern and combination of physical, chemical and biological conditions and processes operates within estuaries, with many parameters varying temporally and spatially. These parameters establish the baseline conditions in the estuary and continually shape the estuaries and the habitats and wildlife they support. The key parameters are: the flood hydrograph[22]; the nature of the catchment and its influence on freshwater flow and nutrient and sediment input; the nature of the estuary sediment; and the relatively high sediment levels in the estuaries resulting in low water retention within the estuary system and exposure of significant proportions of sediment at low tide. The biological communities of the estuaries have developed in response to these prevailing conditions and the daily patterns of water flow, exposure, sediment movement and water chemistry.

3.2 Subtidal sandbanks

3.2.1 Range

Sandbanks which are slightly covered by sea water all the time (subtidal sandbanks) consist of sandy sediments that are permanently covered by shallow sea water, typically at depths of less than 20 m below chart datum (but sometimes including channels or other areas greater than 20 m deep). The habitat comprises distinct banks (i.e. elongated, rounded or irregular 'mound' shapes) which may arise from horizontal or sloping plains of sandy sediment. Where the areas of horizontal or sloping sandy habitat are closely associated with the banks, they are included within the Annex I type.

Sandbanks which are slightly covered by sea water all the time occur widely on the Atlantic coasts of north-west Europe, and occur widely around the UK coast. They are widespread in inshore waters (within 12 nautical miles of the coast) and also occur offshore in the southern North Sea and in the Irish Sea (between 12 and 200 nautical miles).

The UK SAC series includes large sublittoral sandbanks showing good habitat structure and function. The selected sites represent the range of variation within the four main sub-types (gravelly and clean sands, muddy sands, eelgrass beds, and maerl beds), which are often associated with different physiographic features (e.g. estuaries, open coast, bays, sea lochs). The differing character of this habitat around the UK coast has also been taken into account.

The Severn Estuary subtidal sandbanks can be considered to contribute to the gravelly and clean sand sandbank resource. The Severn Estuary contributes approximately 3% of the UK Natura 2000 resource for subtidal sandbanks, by area.[23]

[22] A flood hydrograph is a dual plot of river discharge (line) and rainfall (bars) over time

[23] Based on Natura 2000 Standard data forms for all UK Natura 2000 sites which have estuaries as a feature- source: JNCC website http://www.jncc.gov.uk/ProtectedSites/SACselection/habitat.asp?FeatureIntCode=H1130

3.2.2 Extent and Distribution

The subtidal sandbanks are largely restricted to the middle and outer parts of the estuary. The sand banks of the Middle and Welsh Grounds are relatively permanent sandbank features in the Severn Estuary, along with other long established sandbank features at Cardiff Grounds and in Bridgwater Bay. The tops of these banks are intertidal, and the permanently submerged parts of the banks are considered to contribute to the subtidal sandbanks habitat

There are other areas of subtidal sandbank habitat within the Estuary, again sometimes the top of the bank may be exposed at low tide, with the submerged sections contributing to the subtidal sandbanks habitat. These banks are more ephemeral in nature, but are still considered part of the feature, and reflect the dynamic nature of the Severn Estuary. The areas where ephemeral subtidal sandbanks are known to occur include areas offshore from Avonmouth and at English Grounds (near Clevedon).

The approximate area of the more permanent subtidal sandbanks is 1,300 hectares and there are approximately 10,440 hectares of associated ephemeral sandbanks. Areas of associated sediments have been defined by using the sediment environments of the Bristol Channel Marine Aggregates Resources and Constraints project, commissioned by the National Assembly for Wales (Posford Duvivier and ABP, 2000). Further detail is given in section 4.1.2.1.

3.2.3 Structure and Function

The subtidal area of the Severn Estuary is subject to strong tidal currents resulting in the high mobility of sediments which range from gravely to muddy sands. The high mobility of the sediments and high turbidity means that these habitats only support animals that can tolerate the shifting seabed and scouring action of suspended sand.

As described above the subtidal sandbanks habitat includes some long established and relatively permanent sandbank features and associated sediments which form more ephemeral sandbanks. The sediments of both the more permanent sandbank features and the associated sediments (ephemeral banks) together comprise the subtidal sandbanks feature of the SAC (see map in Appendix 3).

These subtidal areas play an important role in holding and supplying sediment for other habitats notably the intertidal mud and sandflats, saltmarshes and reef features and it is likely that subtidal invertebrate communities play a role as a food resource for some species of the fish assemblage feature of the SAC and Ramsar Site.

3.2.4 Typical species

The subtidal sandbanks feature has two distinct sub-features composed of communities which are determined principally by the degree of sediment mobility, grade of sediments, mix of sediments (in terms of proportions of sand and mud) and salinity.

The first sub-feature is composed of sand and muddy sand communities dominated by worms, and burrowing shrimps which can tolerate the high sediment mobility. The second sub feature is composed of mud and sandy mud dominated communities which are slightly more stable and support a greater abundance of burrowing worms.

The typical species of these communities include a range of worms, shrimps, snails and bivalves. The species diversity of these habitats is often low but overall biomass can be high.

3.2.5 Natural Processes

Subtidal sandbanks are dynamic features with their size, shape, aspect and orientation, as well as the macro- and micro-topography and sediment characteristics largely determined by the sediment supply and the influence of the hydrodynamic processes affecting each bank. They change shape over time and while some are ephemeral others may be relatively stable and long established. Mobile sediments that form temporary

sandbanks are considered to be associated sediments that should be retained in the system but their location may change.

3.3 Intertidal mudflats and sandflats

3.3.1 Range

Intertidal mudflats and sandflats are submerged at high tide and exposed at low tide. They form a major component of Estuaries and Large shallow inlets and bays in the UK but also occur extensively along the open coast and in lagoonal inlets. The physical structure of the intertidal flats ranges from mobile, coarse-sand beaches on wave-exposed coasts to stable, fine-sediment mudflats in estuaries and other marine inlets. This habitat type can be divided into three broad categories (clean sands, muddy sands and muds), although in practice there is a continuous gradation between them. Within this range the plant and animal communities present vary according to the type of sediment, its stability and the salinity of the water.

Mudflats and sandflats not covered by sea water at low tide are a widespread habitat type on coasts of Atlantic Europe, particularly around the North Sea, and occur widely throughout the UK.

Sites have been selected to encompass the range of geographical, physical and ecological variation shown by this habitat type in the UK. Examples of clean sands, muddy sands, and mudflats have all been included. Sites with large areas of intertidal flats, as well as a range of environmental conditions and an associated diversity of communities, were favoured.

The intertidal part of the Severn Estuary supports extensive mudflats and sandflats. These cover an area of approximately 20,300 ha - the fourth largest area in a UK estuary and representing approximately 7 % of the total UK resource of this habitat type (approximately 10% of the UK Natura 2000 resource for Intertidal mudflats and sandflats, by area.[24])

The intertidal mudflats and sandflats of the Severn Estuary are representative of estuarine mudflats and sandflats influenced by strong tidal streams and extreme silt loading.

3.3.2 Extent and Distribution

The Intertidal mudlfats and sandflats feature in the Severn Estuary covers an area of approximately 20,300ha.

The Intertidal mudflats and sandflats feature is distributed throughout the Severn Estuary with extensive mudflats fronting the Welsh shore and Bridgwater Bay, and large banks of clean sands in the more central parts of the estuary at Middle and Welsh Grounds.

3.3.3 Structure and Function

This habitat type can be divided into three broad categories (which form the three main sub-features identified for this feature in the Severn Estuary), clean sands and gravels, muddy sands, and muds, although in practice there is a continuous gradation between them (Countryside Council for Wales, 2006; English Nature, 2006). The composition of the sediments and level of consolidation are the most important factors in determining the fauna of these communities and individual species distribution is largely dependant on the salinity which limits the penetration of marine species upstream where freshwater influences are strongest.

[24] Based on Natura 2000 Standard data forms for all UK Natura 2000 sites which have estuaries as a feature- source: JNCC website http://www.jncc.gov.uk/ProtectedSites/SACselection/habitat.asp?FeatureIntCode=H1130

The gravel and clean sand communities occur predominantly in the mid and upper parts of the estuary forming large banks in the centre the estuary (Frampton Sands, Lydney Sands, Oldbury Sands, Bedwyn Sands and the Welsh Grounds) through which the main tidal channel flows keeping sediments mobile.

The sandy mud communities occur in restricted locations forming the transition between the clean sand and mud communities particularly in the mid estuary and at the lowest extremes of the tide and at the flanks of the main channel.

The mud communities form in the sheltered edges of the estuary particularly where the coastline forms natural embayments and are predominantly found in the mid to outer estuary at Bridgewater Bay and on the Cardiff and Newport frontages although a narrow fringe of these communities is present throughout the estuary. These communities take the form of firm mud banks adjacent to the saltmarshes often with a liquid mud surface kept fluid by the high tidal currents.

3.3.4 Typical Species

Muddy areas in the Estuary such as those between Cardiff to Newport are generally soft and mobile, colonised by high densities of relatively few species characterised by *Hediste diversicolor* and *Macoma balthica.* Other typical species include *Nephtys hombergii*, *Hydrobia ulvae*, *Tubificoides benedii*, *Streblospio shrubsolii*, *Pygospio elegans*, and Enchytraeidae. *Corophium volutator* is also widespread in these muddy areas especially near the mudflat saltmarsh boundary. In some mid shore areas with sandier sediments *Arenicola marina*, and *Macoma balthica* are present.

Lower shore coarse sand banks such as Bedwyn and Oldbury, are dominated by mobile species such as *Bathyporeia pelagica*, *Eurydice pulchra*, and *Nephtys cirrosa.* The south side of the lower estuary has pockets of littoral muddy sand on the upper shore characterised by *Macoma balthica*, *Hydrobia ulvae*, *Bathyporeia pelagica*, and *Nephtys hombergii*. Lower down the shore the sediments become muddier and support species such as *Scoloplos armiger*, *Aphelochaeta marioni* and *Hediste diversicolor.*

Upstream of Sudbrook the infauna becomes less diverse as the salinity decreases. Mud flats here support ragworm *Hediste diversicolor*, patchy Baltic tellin *Macoma balthica* and laver spire shell *Hydrobia ulvae*, with occasional peppery furrow shell *Scrobicularia plana* near the back of the shore. Within the pills along the site and in the upper reaches towards the road crossing the soft mud often supports few species including *Hediste diversicolor* and *Oligochaeta* spp.

The high biomass of invertebrates in the mudflats of the Severn provide an important food source for a diverse range and large number of fish and benthic predators. These intertidal areas are therefore important in supporting the fish assemblage subfeature of the SAC and Ramsar Site.

Mudflats also provide a valuable feeding, roosting and resting area for a wide range of species of wading birds and waterfowl and are therefore important supporting habitats for the wintering and passage bird features of the SPA and Ramsar Site.

3.3.5 Natural Processes

Intertidal mudflats and sandflats are dynamic features. Their distribution, extent, shape, topography, aspect and orientation is the product of complex interaction between hydrodynamic and sediment transport processes, sediment supply and coastal morphology. Hydrographic functions that structure intertidal mudflats and sandflats encompass highly dynamic hydrodynamic and other properties that vary with short and long-term natural cycles, climate influences and stochastic events.

The structure of intertidal muflats and sandflats varies depending on the physical conditions and forces acting on them (in particular the degree of exposure to wave action and tidal currents) as well as the nature of the sediments occurring in any one location. The sediments vary from mobile coarse sand in more wave exposed areas to stable, fine sediment expanses of mudflat in estuaries and other marine inlets.

Intertidal mudflats and sandflats support a variety of different wildlife communities. These are predominantly infaunal communities of a variety of different animal species such as worms, molluscs and crustaceans living within the sediment habitat. The type of sediment, its stability and the salinity of the water have a large influence on the wildlife species present.

3.4 Atlantic salt meadow

3.4.1 Range

Atlantic salt meadows develop when halophytic vegetation colonises soft intertidal sediments of mud and sand in areas protected from strong wave action. This vegetation forms the middle and upper reaches of saltmarshes, where tidal inundation still occurs but with decreasing frequency and duration. A wide range of community types is represented and the saltmarshes can cover large areas, especially where there has been little or no enclosure on the landward side. The vegetation varies with climate and the frequency and duration of tidal inundation. Grazing by domestic livestock is particularly significant in determining the structure and species composition of the habitat type and in determining its relative value for plants, for invertebrates and for wintering or breeding waterfowl.

This Annex I type is predominantly found on Atlantic coasts in western Europe. Atlantic salt meadows occur on North Sea, English Channel and Atlantic shores. There are more than 29,000 ha of the habitat type in the UK, mostly in the large, sheltered estuaries of south-east, south-west and north-west England and in south Wales. Smaller areas of saltmarsh are found in Scotland.

Sites have been selected to cover the geographical range and ecological variation of Atlantic salt meadows in the UK. The sites selected are for the most part the largest examples of this habitat type, with good structure and function, and which support a well-developed zonation of plant communities within the saltmarsh. There are transitions to other high-quality habitat assemblages at many of the sites that have been selected. Sites with complete sequences of vegetation and transitions to other habitats, such as sand dunes, represent the range of variation of the habitat type, and this has been an important consideration in site selection.

The Severn Estuary holds the largest aggregation of saltmarsh in the south and south-west of the UK. It covers approximately 1,400 ha, representing about 4% of the total area of saltmarsh in the UK (Dargie, 2000).

3.4.2 Extent and Distribution

The Severn Estuary is fringed by saltmarsh. The huge tidal range in the Severn Estuary has led to extensive saltmarsh community development with an expanded zonation.

3.4.3 Structure and Function

The saltmarshes of the Severn Estuary have four principal zones corresponding to the four main sub-features that have been identified for this feature. Two of these zones (the lower to mid marsh communities and the mid to upper marsh communities) contain the principle saltmarsh types which are defined as Atlantic salt meadow as per the Annex 1 habitat description. However these occur in an intimate mosaic and in transition with the communities of the other two zones (in the pioneer saltmarsh and transitional high marsh communities) which are therefore considered in this advice as part of the feature. Section 4.1.4.1 and Table 11 provide further details of these zones and their typical species.

The pioneer saltmarsh communities play an important role in saltmarsh development as colonising plants (*eg Spartina sp.and Salicornia sp*.) stabilise and trap sediments. The upper marsh transitions to terrestrial and freshwater habitats support a range of nationally scarce and uncommon plant species and support tidal debris strandlines of value for invertebrates which are important components of the estuary feature.

Some of the saltmarshes show a sequence of saltmarsh cliffs or steps related to past cycles of accretion and erosion and in places the saltmarshes are also cut transversely by "pills" where freshwater streams enter the estuary. These features add diversity to the saltmarsh by initiating new patterns of species zonation. Recent monitoring has identified that there is a complicated present day pattern of erosion and accretion of the saltmarshes throughout the estuary and some parts appear to be exhibiting the effects of coastal squeeze – the constriction of saltmarsh habitats between rising sea levels and hard defences at the back of the saltmarsh .

Saltmarshes and mudflats have an important role to play in estuarine processes, both through the recycling of nutrients within the estuary and through their role as soft sea defences, dissipating wave energy. They are highly productive biologically, providing organic material that support other features within the marine ecosystem and they also have an important physical role, acting as a sediment store to the estuary as a whole.

Saltmarshes also provide a valuable feeding and roosting and resting areas (particularly at high tide) for a wide range of species of waterfowl and are therefore very important supporting habitats for the wintering and passage bird features of the SPA and Ramsar Site. The habitats within the "pills" provide important shelter and feeding habitats for both fish and bird species.

The Severn Estuary saltmarshes are generally grazed by sheep and/or cattle. Grazing is a significant factor in determining the plant communities found within them and their value for dependant species such as birds and rare plants.

3.4.4 Typical Species

The saltmarsh communities present relate to the four principal zones referred to above.

The low to mid marsh communities include transitional low saltmarsh with *Puccinellia maritima*, annual *Salicornia* sp. and *Suaeda maritima; Aster tripolium* (rayed) saltmarsh; *Puccinellia maritima* saltmarsh; *Atriplex portulacoides* saltmarsh; and *Juncus maritimus - Triglochin maritima* saltmarsh.

The mid to upper marsh communities include *Festuca rubra* saltmarsh; *Artemisia maritime* saltmarsh; and *Juncus maritimus* salt-marsh.

The transitional high marsh communities include *Spergularia marina - Puccinellia distans* saltmarsh; *Elytrigia atherica* saltmarsh; *Elytrigia repens* saltmarsh; *Festuca rubra - Agrostis stolonifera - Potentilla anserina* inundation grassland; *Festuca arundinacea* coarse grassland; *Agrostis stolonifera - Alopecurus geniculatus* inundation grassland; *Phragmites australis* reedbed; *Bolboshoenus maritimus* swamp; and *Agrostis stolonifera* sub-community.

The pioneer saltmarsh communities include *Spartina anglica* saltmarsh; Annual *Salicornia* saltmarsh; and *Suaeda maritima* saltmarsh.

Several notable species are also present *Alopecurus bulbosus, Althaea officinalis, Bupleurum tenuissimum, Hordeum marinum, Puccinellia rupestris, Trifolium squamosum, Lepidium latifolium, Allium oleraceum, and Petroselinum segetum (Dargie 1998).*

3.4.5 Natural Processes

The location, character, and dynamic behaviour of saltmeadows are governed by four physical factors: sediment supply, tidal regime, wind-wave climate and the movement of relative sea level. There are four elements necessary for the development and growth of a salt marsh: (1) a relatively stable area of sediment that is covered by the tide for a shorter period than the time it is exposed; (2) a supply of suitable sediment available within the period of tidal cover; (3) water velocities that are sufficiently low for some of the sediment to settle out; and (4) a supply of seeds or other propagules for the establishment of vegetation cover.

The topography and microtopography of areas of Atlantic salt meadow are the product of complex interaction between hydrodynamic and sediment transport processes, sediment supply and coastal

morphology. These can be highly dynamic and vary with short and long-term natural cycles, climate influences and stochastic events, including: tidal range and excursion, salinity, water temperature and suspended particulate concentrations.

The marsh-edge morphology provides information on the short to medium term trends of marsh morphodynamics. Accreting and stable seaward marsh edges have an accretional ramp upon which pioneer and low-marsh vegetation can become established. Erosional margins are characterised either by the presence of mud-mound topography or by marsh-edge cliffs fronted by toppled cliff blocks with live or dying vegetation, rotational slide or overhanging (cantilever) blocks. Terraced marsh margins indicate episodic erosion and accretion on timescales over decades to centuries.

The Severn Estuary saltmarshes do not generally contain a pattern of creeks and pans more typical of extensive saltmarshes in estuaries with less extreme tidal ranges. Instead the saltmarshes are dissected by "pills" (steep sided natural drainage channels cutting through the saltmarsh) where freshwater streams flow into the estuary. These are often deep and steep sided funnel shaped features, often with pioneer vegetation established along their banks although in many cases the natural structure of the pill is truncated by tidal flaps or flow valves. In a few locations natural salt pans occur within the saltmarshes.

Major erosion of saltmarsh is indicated by internal dissection and enlargement of the drainage network, ultimately leading to the creation of mud basins.

Nutrient levels are a strong influence on the growth of estuarine saltmarsh plants. Nutrient cycling within saltmarshes can also have a significant effect on coastal and estuarine water quality. In this respect, healthy, functional saltmarsh habitat may have an important role to play in the control of nutrients, which are important in determining water quality.

Given favourable conditions, depending on sediment supply and hydrodynamic regime, mudflats evolve into saltmarshes by way of substrate stabilisation by algae, diatoms and early pioneer plants, giving rise to enhanced sediment accretion rates.

3.5 Reef

3.5.1 Range

Reefs are rocky marine habitats or biological concretions that rise from the seabed. They are generally subtidal but may extend as an unbroken transition into the intertidal zone, where they are exposed to the air at low tide. Intertidal areas are only included within this Annex I type where they are connected to subtidal reefs. Reefs are very variable in form and in the communities that they support. Two main types of reef can be recognised: those where animal and plant communities develop on rock or stable boulders and cobbles, and those where structure is created by the animals themselves (biogenic reefs).

Rocky reefs are extremely variable, both in structure and in the communities they support. A wide range of topographical reef forms meet the EU definition of this habitat type. These range from vertical rock walls to horizontal ledges, sloping or flat bed rock, broken rock, boulder fields, and aggregations of cobbles. In contrast to the variety of rocky reefs, there is somewhat less variation in biogenic reefs, but the associated communities can vary according to local conditions of water movement, salinity, depth and turbidity. The main species which form biogenic reefs in the UK are blue mussels *Mytilus edulis*, horse mussels *Modiolus modiolus*, ross worms *Sabellaria* spp., the serpulid worm *Serpula vermicularis*, and cold-water corals such as *Lophelia pertusa*.

Reefs occur widely around the UK coast, and are found in both inshore and offshore waters. There is a far greater range and extent of rocky reefs than biogenic concretions. Only a few invertebrate species are able to develop biogenic reefs, and these have a restricted distribution and extent in the UK.

The Severn Estuary has areas of biogenic reefs, formed by the tube-dwelling polychaete worm *Sabellaria alveolata*. *Sabellaria alveolata* reefs in the UK are predominantly an intertidal habitat but the Severn Estuary

is one of the few places where *Sabellaria alveolata* reefs occur extensively in the subtidal, as well as the intertidal.

3.5.2 Extent and Distribution

There are patches of intertidal *Sabellaria alveolata* reef throughout the Estuary, although it tends to be more common on the English side. The subtidal *Sabellaria alveolata* tends to be in the outer parts of the Estuary, southwest of a line between Clevedon and Newport. The exact distribution of subtidal *Sabellaria alveolata* reef in the Severn Estuary is unknown, partly due to the difficulties in sampling this habitat.

3.5.3 Structure and Function

Sabellaria alveolata is a species of small worm which constructs tubes using sand particles, to build honeycomb-like structures. *Sabellaria alveolata* reefs are often also known as honeycomb worm reefs.

These biogenic reefs tend to increase habitat diversity for other species (Holt et al 1998), sometimes leading to higher species diversity within *Sabellaria* reefs compared to the surrounding sediment or rock habitats (Dubois et al 2002). *Sabellaria alveolata* reefs cycle through different phases, from newly settled worms through vigorous fast growing reef to older, more biodiverse hummocks (Cunningham et al, 1984). At other sites each of these phases tends to have a different community of plants and animals associated with it, so all phases are considered important for biodiversity (Collins, 2001; Dubois et al, 2002).

In order to thrive, *Sabellaria alveolata* requires an abundance of suitable coarse sand to support tube building (and therefore reef growth), as well as the availability of suitable substrates (pebbles, cobbles, boulders, bedrock) to attach to. Larval supply is also important and *Sabellaria* larvae are thought to stay in the water column for one to six months (Jackson 2008). The worms are filter feeders and therefore food within the water column (suspended detritus material) is also needed. *Sabellaria* larvae are thought to settle preferentially in areas where *Sabellaria* reef has been present in the past (Holt et al, 1998).

3.5.4 Typical Species

The *Sabellaria alveolata* reef biotopes which have been recorded in the Severn Estuary are *Sabellaria alveolata on variable salinity sublittoral mixed sediment* and *Sabellaria alveolata reefs on sand-abraded eulittoral rock.*

In the Severn Estuary (both subtidal and intertidal) the presence of *Sabellaria alveolata* reefs generally increases species diversity, relative to the surrounding rock or sediment, although the diversity of *Sabellaria alveolata* reefs in the Severn is still thought to be comparatively low compared to other areas of the UK. Species commonly found associated with subtidal *Sabellaria alveolata* reef from infaunal samples include *Eulalia tripunctata, Mediomastus fragilis, Typosyllis armillaris, Melinna cristata, Harpinia pectinata, Ampharete grubei, Golfingia vulgaris, Pygospio elegans, Arenicola marina, Autolytus sp, Sphenia binghami* and *Harmothoe impar* (Mettam et al. 1994 and Marine Recorder database).
Species found in intertidal *Sabellaria alveolata* reefs in the Severn Estuary at Goldcliff and Lavernock point include *Crangon crangon, Actinia equina, Cancer pagarus, Porcellana platycheles, Littorina spp., Pholas dactylus, Elminius modestus, Fucus serratus, Corralina officinalis and Enteromorpha spp.*(O'Riordan, 2006).

3.5.5 Natural Processes

Little is known about the nature of the *Sabellaria alveolata* reef in the Severn Estuary, especially in the subtidal. However, at other sites *Sabellaria alveolata* is known to have a very variable recruitment and the cover in any one area may vary greatly over a number of years (Wilson, 1974). A typical life span of 4-5 years for worms in colonies forming reefs on bedrock and large boulders has been reported from other areas (Wilson, 1971), with a likely maximum of around 9 years (Gruet, 1982; Wilson, 1971). However, it is suspected that there are many colonies on intertidal cobble and small boulder scars on moderately exposed shores where shorter lifespans are likely due to the unstable nature of the substratum (Holt et al, 1998). As

mentioned above, *Sabellaria alveolata* reefs cycle through several different phases, all of which are considered important for biodiversity.

3.6 Other estuarine habitats : Hard substrate habitats (rocky shores) and eel grass beds

3.6.1 Extent and Distribution

There is approximately 1,500 ha of hard substrate habitat within the Severn Estuary, consisting of boulders, rock, mussel/cobble scars, rocky pools and shingle (Countryside Council for Wales, 2006; English Nature, 2006). The largest areas of hard substrate are located towards the outer estuary at Brean Down, Anchor Head and Sand Point together with rocky platforms and cliffs at Clevedon and Portishead. There are also extensive rock platforms at English stones, Aust and Beachley.

Beds of eelgrass (*Zostera* spp.), the largest in Wales, occur on some of the more sheltered mixed hard substrate areas around the Welsh side of the Second Severn Crossing.

3.6.2 Structure and Function

Hard substrate habitats in the Severn Estuary display different characteristics to other areas in Wales. Where there is bedrock, fucoid algae cover is dense but with little associated flora and fauna. Areas of soft clay rock around Penarth also support the boring bivalves *Barnea candida* and *Pholas datylus*. Pebble and cobble shores tend to be dominated by barnacles mostly *Elminius modestus*, and sparse rough periwinkles and winkles. In the sublittoral fringe on bedrock, cobbles and pebbles, hydroids, bryozoans, sponges and barnacles dominate. These species form communities that are usually associated with subtidal habitats (adapted from Brazier et al 2007).

These habitats provide a wide range of services for estuarine species. They are important components of the SAC Estuary feature, important supporting habitats for the wintering and passage bird features of the SPA and Ramsar Site and also important supporting habitats for the fish assemblage of the SAC and Ramsar designations.

Seagrass beds are one of the most productive habitats of shallow water coastal ecosystems supporting large numbers of algae, invertebrates and fish and are an important food source for several species of ducks and geese including wigeon and European white-fronted geese. The *Zostera* beds in the Severn are unusual in that they occur in an area of mixed cobbles, sand and mud with large boulders, in other parts of Wales they are associated with mudflats. Both species of *Zostera* occur within the bed. On more dry elevated areas of sediment *Zostera noltii* can be found, whereas wet depressions and channels are dominated by *Zostera marina*. *Zostera* coverage can be patchy but locally abundant. Hard substrata within the *Zostera* bed is dominated by fucoid algae, ephemeral green algae and barnacles.

3.6.3 Typical Species

Typical fauna and flora of rocky and mixed shore areas of the Severn include spiral wrack, bladder wrack, eggwrack and serrated wrack, periwinkles, limpets, barnacles and whelks. On lower shore rock, cobbles and pebbles barnacles dominate including the barnacle *Balanus crenatus* and hydroids *Tubularia indivisa* and *Sertularia cupressina* the bryozoan *Alcyonidium diaphanum* and mermaids glove sponge *Haliclona oculata* .

Both species of eelgrass, *Zostera marina*, and *Z. noltii* have been recorded in the estuary. These are of restricted distribution in British estuaries. It is unusual to have both species in one location.

3.6.4 Natural Processes

The extent and distribution of the rocky shore habitat is largely determined by the underlying geology and sedimentology, along with orientation and aspect and the influence of the prevailing physical conditions such as the degree of exposure to wave action and tidal currents. These factors, combined with the influence of others, such as water quality (including turbidity) and sediment chemistry, influence the assemblages of marine species associated with the different rocky habitats throughout the estuary.

Seagrass beds typically occur in sheltered environments such as shallow inlets and are usually found on soft sediments. The Zostera beds in the Severn are unusual in that they occur in an area of mixed cobbles gravel sand and mud.

3.7 Fish

3.7.1 Introduction

The fish fauna of the Severn Estuary is very diverse (Potts & Swaby 1994, Bird 2008). More than 110 species of fish have been identified including a wide range of migratory species and estuarine specialists and some more typically marine and freshwater species reflecting the influence of the wider Bristol Channel and major rivers entering the estuary (Severn, Wye, Usk, Avon Parrett).

3.7.2 Fish features of the Severn Estuary European Marine Site

The Severn Estuary is of particular importance for migratory fish. The estuary is one of the most important British estuaries for three rare species - river lamprey *Lampetra fluviatilis,* sea lamprey *Petromyzon marinus* and twaite shad *Alosa fallax* which are designated features of the SAC. These species together with salmon *Salmo salar*, sea trout *Salmo trutta*, eel *Anguilla anguilla* and allis shad *Alosa alosa* are also a designated feature of the Ramsar Site.

The wider assemblage of fish species, which includes the migratory species, estuarine specialists and the more typically marine and freshwater species, is a designated feature of the Ramsar Site and a component of the estuary feature of the SAC.

3.7.3 Supporting habitats

The estuary habitats, tidal stretches of the feeding rivers and saltmarsh morphological features such as drainage channels, known locally as “pills” and “rhines” (“reens” in Wales) provide important feeding, breeding and sheltered nursery areas for a wide range of fish.

3.7.4 Migratory fish

The river and sea lamprey are a primitive type of fish having a distinctive suckered mouth but no jaws. Although numbers of lamprey have declined over the last 100 years, the UK is still one of their strongholds. Sea and river lampreys spend their adult life in the sea or estuaries but spawn and spend the juvenile phase in rivers. They use the Severn Estuary as a migratory passage to and from their spawning and nursery grounds in the rivers.

Allis and twaite shad are the only two members of the herring family found in fresh water in the UK. Both look like large herring and were formerly eaten in this country before numbers declined and the fisheries collapsed. In the middle of the 19th Century, the value of shad rivalled that of salmon, and in the River Severn, shad made up about one-third of all catches. Three of the four confirmed UK spawning populations of twaite shad are in the rivers Severn, Usk and Wye respectively. The major part of the spawning population of Twaite shad consists of fish that have spawned and passed up and down through the estuary more than once. The shad enter estuaries in spring and move up into the rivers to spawn. The estuary serves as a nursery area for juvenile shad where they feed on plankton.

The Severn Estuary supports an important run of migratory salmon and sea trout which pass through the estuary on their way to and from their spawning grounds in the upper reaches of the rivers and the open sea. The Severn Estuary has the largest eel run in Great Britain.

3.7.5 Assemblage of fish species

The assemblage of fish species includes the migratory species (referred to in section 3.8.4 above), as well as the following:

- Estuarine species
    - Species typically occurring and breeding in estuaries (Bird, 2008)
    - Marine species occurring in large numbers in estuaries (Bird, 2008)
- Marine species
    - Predominantly marine species occurring infrequently in the Severn (Bird, 2008)
- Freshwater species
    - Species typically occurring and breeding in freshwater and recorded within the Severn cSAC (Bird, 2008)

Estuarine species

These species of fish rely on the estuary for some aspect of their life-cycle. As a result of this dependence, these species are often the most vulnerable to anthropogenic and environmental factors that could affect the habitat and ecology of the estuary. Marine species occurring in large numbers in estuaries are all marine species who spend the first few years of life in the sheltered waters of the estuary where suitable food is abundant and there are fewer predators. The Severn Estuary ranks as one of the top ten estuaries in the UK for the number of marine estuarine-opportunistic species it supports (Potts & Swaby 1993). Marine estuarine-opportunists can be present in the estuary in very large numbers at particular times of year. These include sprat, herring, whiting, bib, poor cod, bass and common goby (Bird, 2008).

There are a few species that spend their entire life-cycle within the estuary. These include common goby, black goby, sand smolt and 3- spined stickleback (Bird, 2008).

Marine species

These fish normally spend their entire life-cycle in the sea and only occasionally enter estuaries. Therefore, they have only a minor role to play in the estuarine ecosystem. Thus, only four species, the conger eel, Norway pout, red mullet and plaice; are ever caught in numbers exceeding about 10 per year in power station samples. They probably have little impact, either as prey or as predators on other estuarine species. While they add to the biodiversity of the fish assemblage, their main populations occur in the sea. (Bird, 2008)

Freshwater species

These species typically occur and breed in freshwater, but have occasionally been recorded within the Severn Estuary. The specimens recovered at Oldbury and/or Berkeley power stations are presumably fish that have inadvertently been swept downstream and entered brackish water. They include perch, three-spined stickleback, tench, roach and chub. The numbers of freshwater species recovered at Oldbury is always low, and usually related to increases in fresh water discharge in the spring and autumn months after heavy rain. The only exception to this generalisation concerns the three-spined stickleback which occurs in considerable numbers at Oldbury and can be regarded as both a freshwater and an estuarine species (Bird, 2008)

3.8 Birds

3.8.1 Introduction

Many estuaries in the UK are of great importance to migratory and wintering wildfowl and waders. The Severn Estuary forms part of the complex chain of estuary sites along the western coast of the UK that provide habitats for migratory waterfowl. The relatively mild winter weather conditions found here compared to continental Europe at similar latitudes can be of additional importance to the survival of wintering waterfowl during periods of severe weather. It is especially important when there is severe weather affecting other sites further north and on the east coast of Britain.

The Severn Estuary ranks amongst the top ten British estuaries for the size of visiting waterfowl populations that it supports over winter (Musgrove *et. al*., 2001). Outside of this period, it is of particular importance as a staging area in autumn and spring for migratory waterfowl species as it lies on the East Atlantic Flyway route. Bird communities are highly mobile and exhibit patterns of activity related to tidal water movements and many other factors. Different bird species exploit different parts of a marine area and different prey species.

3.8.2 Bird features of the Severn Estuary European Marine Site

The migratory wintering and passage populations of birds in the Severn Estuary are designated features of the SPA (see section 2.2) and Ramsar Site (see section 2.3) which supports in excess of 70,000 birds in winter. These include internationally and nationally important populations of key bird species in winter for which the UK has particular importance in both Europe and the world. The bird assemblage is also part of the Estuaries feature of the SAC.

3.8.3 Low-tide distribution of waterbirds on the Severn Estuary SPA and Ramsar Site

Natural England and the CCW commissioned the British Trust for Ornithology (BTO) to organise , as part of the series of WeBS Low Tide Counts, a complete low tide survey of the Severn Estuary during the winter of 2002/03 (Burton et al., 2003). The mean numbers and distribution of total waterbird species recorded on each count section on the Severn Estuary in the winters 1987/88 to 1991/92 and in 2002/03 from this BTO low-tide count data for various individual species and the bird assemblage are illustrated in Appendix 9. The Figures generally indicate that the waterfowl are distributed extensively across virtually the entire intertidal area with some obviously high concentrations in specific areas.

These maps are indicative only and several constraints on their use should be noted when attempting to interpret them. Firstly, it should be noted that in each winter only a maximum of four counts were made of each count section, one a month from November to February. Observation of the central areas of the estuary is also very difficult with all observations being made from land and it is possible that the numbers of birds using these areas were underestimated. Gulls were only recorded in the 2002/03 survey. However, even in that survey, coverage of these species was patchy. The Severn is a highly dynamic estuary and thus the location and extent of many of the intertidal areas may have changed since the Ordnance Survey maps used for this project were created. The movements of sediments may potentially also cause marked differences in the distributions of invertebrates and thus waterbirds between years. It should also be noted that the numbers of birds recorded on the Severn Estuary may vary annually due to weather conditions. In cold winters, the west coast of Britain may act as a refuge for many waterbirds that in milder winters would occur on the east coast or on the Continent. In cold winters, therefore, waterbirds may be more widely distributed across the estuary than they would in milder winters. Lastly, in assessing the importance of different intertidal mudflats, it is also essential to note that some species may use different areas during the night to those where they are recorded in the day.

3.8.4 Relationship between bird populations and supporting habitats

In recognition of the fact that bird populations on a site may change in response to wider national or international trends or events, this Regulation 33 advice addresses the habitat conditions on the site necessary to support the bird populations, as well as the bird populations themselves. “Supporting habitats” are

identified which describe the key habitats within the European Marine Site necessary to support the interest features i.e. the qualifying bird species (see Table 3 for the SPA and Tables 5 and 7 for the Ramsar Site. The Favourable Condition Tables (section 4.2; Table 15 for the SPA and Section 4.3 Table 20 for the Ramsar Site) contain further details on habitat conditions.

The key supporting habitats are the intertidal mudflats and sandflats, saltmarshes and hard substrate habitats (rocky shores). Reference should also be made to sections of this document that relate to the Severn Estuary SAC interest features which provides advice in respect of these habitats (section 4.1 and Tables 8, 10 and 11).

Bird communities are highly mobile and exhibit patterns of activity related to tidal water movements and many other factors. Different bird species exploit different parts of a marine area and different prey species. Changes in the habitat may therefore affect them differently. The most important factors related to this are:

- current extent and distribution of suitable feeding and roosting habitat (eg saltmarsh, mudflats, shingle and rocky shores);
- sufficient prey availability (eg crustaceans, small fish, molluscs, worms and seeds);
- levels of disturbance maintained at or below levels necessary to provide favourable conditions for birds' feeding and roosting areas;
- water quality necessary to maintain intertidal plant and animal communities; and
- fresh water quantity, tidal flows, salinity gradients and grazing necessary to maintain saltmarsh conditions suitable for bird feeding and roosting.

There are also a number of habitats, such as the wet coastal grazing marsh, improved grassland and open standing waters that support the qualifying bird species and occur within the SPA and Ramsar Site boundary. However, these habitats lie above highest astronomical tide and therefore are not within the European Marine Site. Objectives to maintain these aspects of bird interest in favourable condition are found within Natural England and CCW's conservation objectives for the relevant SSSI within the SPA and Ramsar site boundary and will be dealt with through relevant procedures outlined in the Conservation (Natural Habitats &c.) Regulations 1994.

Some species will also use areas of land and coastal waters outside the boundaries of both the European Marine Site, SPA and Ramsar Site. Relevant authorities need to have regard to such adjacent interests, as they might be affected by activities taking place within, or adjacent to the European Marine Site.

3.8.5 Bird count data and assessing condition of bird features and their habitats

Natural England and CCW's conservation objectives at the site level focus on maintaining both the populations of the qualifying species and the habitats used by them. Site management should therefore aim to avoid both damage to the supporting habitats and disturbance to the birds. In reporting on the conservation status, account will need to be taken of both habitat conditions and the status of the bird populations.

Accordingly, Natural England and CCW will use annual counts, in the context of five year peak means for qualifying species, together with available information on population and distribution trends, to assess whether an SPA is continuing to make an appropriate contribution to the Favourable Conservation Status of the species. Count information will be assessed in combination with information on habitat condition, at the appropriate time within the reporting cycle, in order to report to the European Union.

In addition to focusing on avoiding deterioration to the habitats of the qualifying species, the Habitats Directive also requires that actions be taken to avoid significant disturbance to the species for which the site was designated. Such disturbance may result in alterations in population trends and/or distribution patterns. Avoiding disturbance to species requirements is mentioned in the favourable condition table accompanying the conservation objectives for the SPA and Ramsar Site (Tables 16 and 21). In this context, five-year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

Attention is also directed to the inclusion of disturbance in the advice on operations provided in Section 5. Where disturbance is highlighted in such advice, relevant authorities need to avoid damaging disturbance to qualifying species when exercising their functions under the Directive.

3.8.6 Description of the Severn Estuary bird features and their supporting habitats

3.8.6.1 Internationally important populations of waterfowl

This comprises:

A. Internationally important populations of regularly occurring Annex 1 species : Bewick's Swan
B. Internationally important populations of regularly occurring migratory species of the SPA
C. Internationally important populations of waterfowl of the Ramsar Site

A. Annex 1 species of the SPA

Description of the Feature

The species listed in Annex 1 of the Birds Directive are the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. Species listed on Annex 1 are in danger of extinction, rare or vulnerable. Annex 1 species that regularly occur at levels over 1% of the national population meet the SPA qualifying criteria. The Severn Estuary SPA supports internationally important populations of one Annex I species

- **Bewick's swan** *Cygnus columbianus bewickii*
  (Note : this species is also part of C. internationally important populations of waterfowl of the Ramsar Site)

Key supporting habitats for Bewick's swan

Intertidal mudflats and sandflats - The focal area for the Bewick's swans is the upper Severn Estuary in the vicinity of the New Grounds, Slimbridge area. The mudflats and sandflats exposed as the tide falls where the estuary widens in the upper reaches of the site at Waveridge Sands, Frampton Sands and The Noose are used as a safe refuge areas when the birds are disturbed.

Saltmarsh communities - The birds feed on the saltmarsh and the transition from saltmarsh to coastal grazing marsh in front of the sea defences in the upper estuary at The Dumbles, where areas of the high marsh are mainly affected only by brackish water during tidal inundation. They favour areas that have unrestricted views for the early detection of predators.

Bewick's swan graze on a range of 'soft' meadow grasses such as *Agrostis stolonifera* and *Alopecurus geniculatus* found in wet meadows which are outwith the European Marine Site boundary.

B. Internationally important populations of regularly occurring migratory species of the SPA and C. Internationally important populations of waterfowl of the Ramsar Site

Description of the features

Migratory species that regularly occur at levels of 1% or more of the total biogeographic population meet the SPA criteria and qualify for designation in their own right.

Wintering species that regularly occur at levels of 1% or more of the total biogeographic population meet the Ramsar criteria (3c) and qualify for designation in their own right.

The following qualifying species of both the SPA and Ramsar are:

- **European white-fronted goose** *Anser albifrons*
- **Dunlin** Calidris alpina alpina
- **Redshank** Tringa totanus totanus
- **Shelduck** Tadorna tadorna
- **Gadwall** Anas strepera

Note : previous Regulation 33 advice issued in respect of the Severn Estuary SPA in February 2005 excluded gadwall as they were considered not to make use of the European Marine Site to any significant degree but further recent evidence (2000/01 Low Tide Bird Counts) has demonstrated that this species does make use of the EMS and has consequently now been included.

Key supporting habitats

Intertidal mudflats and sandflats - The extensive mudflats and sandflats of the Severn Estuary provide undisturbed refuge and a rich resource of intertidal invertebrates as food for many species of migratory birds. The Severn supports massive populations of birds, many of which are highly mobile, feeding and roosting in different areas, depending on food availability and the state of the tide.

The European white-fronted geese roost at night on estuarine sandbanks and usually fly less than 10km to the daytime feeding grounds. Therefore conservation of traditional roosting sites is necessary to enable the population to exploit potential feeding habitats. The sandbanks adjacent to the New Grounds at Slimbridge are a long established, traditional wintering area for the European white-fronted geese (Owen *et al.,* 1986) where they use Waveridge Sand, Frampton Sand and the Noose. Only occasionally will small numbers occur at other localities within the Severn Estuary. Shelduck exploit the rich resources of invertebrates found in the intertidal mudflats where they forage for molluscs and other invertebrates such as the mudsnail *Hydrobia* spp, mussels *Mytilus edulis* and small crustaceans such as the common shore crab *Carcinus maenas.* They feed in groups, and are distributed widely throughout the estuary where there are extensive areas of intertidal flats, but there are major concentrations on Bridgwater Bay, around the mouth of the Rhymney river and, prior to construction of the Cardiff Barrage, in Cardiff Bay (Ferns, 1980a; Fox & Salmon, 1988a; Clarke, 1989; WWT Wetlands Advisory Service, April 2003). Bridgwater Bay is a long established traditional moulting area for shelduck during late summer and autumn (Eltringham & Boyd, 1960, 1963; Morley, 1966; Fox & Salmon, 1988a). It is the largest single moulting area in Europe away from Waddensea.

Redshank and dunlin are distributed widely and feed throughout the estuary on marine polychaete worms, crustaceans and molluscs such as the Baltic tellin *Macoma balthica*. They frequently feed along undisturbed strandlines throughout the estuary. They favour areas that have abundant invertebrate prey species and unrestricted views for the early detection of predators. The location of

feeding birds on the intertidal flats is a reflection of the invertebrate species found there which, in turn, are dependent on the sediment type. Dunlin and redshank mainly feed on invertebrates in the muddier finer sediments. Dunlin are found mostly on the mid shore whereas redshank are more thinly distributed and are often found in smaller groups in the creeks and sub-estuaries. The Severn has the third largest wintering population of Dunlin in Britain. Feeding flocks are widely distributed around the estuary particularly downstream of the first Severn Bridge, with particular concentrations at Rhymney/Peterstone, Uskmouth, Welsh Grounds, Undy, Clevedon and Bridgwater Bay (Ferns, 1977; Mudge, 1979; Ferns, 1980a; Clark, 1989). There are notable concentrations of redshank at the mouths of the Rhymney, Wye, Avon and Parrett rivers (Ferns, 1977, 1980a; Clark, 1989; WWT Wetlands Advisory Service, April 2003).

Gadwall are predominantly a frewshwater species preferring the wetland habitats tht occur within the SPA behind the flood defences and therefore outside the European Marine Site- most notably the freshwater wetlands at Slimbridge and Bridgwater bay. However, they do make use of the estuary but this is largely restricted to areas where freshwater flows come into the estuary, particularly larger pills and rivers- most notably at Avonmouth, between the two Severn Bridges and at Woodspring and Weston Bays.

Saltmarsh - Upper and lower saltmarsh provide important feeding and roosting areas for the internationally important migratory birds throughout the estuary. The saltmarshes provide a rich feeding habitat for redshank and shelduck, which feed on invertebrate species in the sediments, such as the mudsnail *Hydrobia.* The European white-fronted geese graze on a range of saltmarsh grasses and herbs such as common saltmarsh grass *Puccinellia maritima* and sea barley *Hordeum marinum*. The birds feed on the saltmarsh and the transition to coastal grazing marsh in front of the sea defences in the upper estuary and particularly at the The Dumbles.

The saltmarshes also have an important function providing a safe haven from the tides that flood the mudflats twice a day. The low-growing dense vegetation provides a suitable roosting habitat for redshank and dunlin, which prefer to roost on areas of short vegetation ensuring good visibility. The saltmarshes throughout the estuary provide an important communal roosting site for redshank, dunlin and shelduck. Upper saltmarsh in particular makes ideal highwater roost sites and there are main high tide roosts in some areas with little human disturbance where waders congregate from their feeding areas.

Hard substrate habitats (rocky shores) - the shingle and rocks in the estuary provide feeding areas for dunlin and redshank and some limited foraging at high tide. It is also provides important roost sites at high tide particularly for the dunlin and redshank. Many of the rocks are off shore and are therefore generally free from human disturbance. These include Guscar Rocks in the upper reaches, Blackstone Rocks at Clevedon and Stert Island in Bridgwater Bay.

Freshwater coastal grazing marsh, improved grassland and open standing waters – these supporting habitats lie outside the European Marine Site boundary but within the SPA. They provide key areas for feeding and roosting for all the migratory species particularly at high tide, and mainly on the English side of the Estuary.

3.8.6.2 Internationally important assemblage of waterfowl

Description of the feature

In addition to supporting internationally important populations of individual birds, the Severn Estuary also qualifies under Article 4.2 as a wetland of international importance by regularly supporting over 20,000 waterfowl (Cranswick *et al.*, 1999, JNCC website). A peak count of over 100,000 waterfowl was recorded in the winter season of 1992-93 (Waters *et al*., 1993). The wintering waterfowl assemblage (consisting of over 68,000 birds) includes all regularly occurring waterfowl.

Species that qualify as a listed component of the assemblage include all the birds covered by section 3.8.6.1 and species present in nationally important numbers.

These species are:

- **Dunlin** (migratory passage populations)
- **Redshank** (migratory passage populations)
- **Wigeon**
- **Teal**
- **Pintail**
- **Pochard**
- **Tufted duck**
- **Ringed plover**
- **Grey plover**
- **Curlew**
- **Whimbrel**
- **Spotted redshank**

The JNCC website also lists lapwing, *m*allard and shoveler as qualifying for future inclusion as part of this assemblage (Stroud, DA, et al., 2001. *The UK SPA network: its scope and content.* JNCC, Peterborough)

Key supporting habitats for the waterfowl assemblage

Since a number of species comprising the waterfowl assemblage are qualifying species in their own right, their habitat requirements are described in sections 3.4 and 3.5 above. This section therefore mainly deals with the habitat requirements of the other assemblage species which form part of the waterfowl assemblage.

Intertidal mudflats and sandflats - Many of the bird species found within the Severn Estuary are highly mobile, feeding and roosting in different areas, depending on food availability, weather and tides. They favour areas that have abundant prey species and unrestricted views for the early detection of predators. Some species of wader such as ringed plover and turnstone will feed on the rich invertebrate fauna associated with rotting seaweed occurring along undisturbed strandlines.

Pintail and Teal are widely distributed around the estuary with a notable concentration at the New Grounds. Pintail are also found at Peterstone/Rhymney. Pochard and tufted duck have a highly clumped daytime distribution mainly at New Grounds with most others at Peterstone and the mouth of the Rhymney. Large numbers of pochard move onto the estuary in periods of sustained cold weather. There is a large number of wintering ringed plover on the estuary and these numbers swell during the spring and autumn when there is a considerable passage of migrants through the Severn Estuary. There are major concentrations of curlew on the flats above the first Severn Bridge as well as Bridgwater Bay and the Welsh Grounds. The Severn Estuary is a particularly important staging post for whimbrel during autumn and spring passage periods where some birds feed on the mudflats. Spotted redshank are occasionally found on the Axe and Yeo estuaries.

Saltmarsh - Upper and lower saltmarsh provide important feeding and roosting areas for the internationally important assemblage of waterfowl throughout the estuary. The European white-fronted geese graze on a range of saltmarsh grasses and herbs. The birds feed on the saltmarsh and the transition to coastal grazing marsh in front of the sea defences in the upper estuary.

There are areas of well grazed saltmarsh with saltpans at the River Axe and in the upper reaches of the estuary, which are used by wigeon and other wildfowl. Pools in the higher marsh at Bridgwater Bay and in the saltmarsh above the Severn bridges are also attractive to waders and wildfowl, providing invertebrates and shelter. In the winter, ducks such as teal and pintail feed on seeds of saltmarsh plants such as *Salicornia* sp. and *Atriplex* sp. Probing waders such as curlew also feed on the saltmarsh.

The saltmarsh provides a safe haven for the feeding waders and wildfowl from the tides that flood the mudflats twice a day. Upper saltmarsh in particular makes ideal high water roost sites and there are main high tide roosts in some areas with little human disturbance where waders congregate from their feeding areas. Waders in particular, require very short vegetation to afford unrestricted views for the early detection of predators.

Hard substrate habitats (rocky shores) - The shingle and rocks in the estuary provide feeding areas for many wildfowl and waders and important roost sites at high tide. Many of the rocks are off shore and are therefore generally free from human disturbance. These include Guscar Rocks in the upper reaches, Blackstone Rocks at Clevedon and Stert Island in Bridgwater Bay. Whimbrel have major night roosts at Collister Pill and Stert Island and the Stert Island roost is the largest of its kind in Britain. Spotted redshank are also found around Stert Island. Some areas of hard substrate support eelgrass beds which provide a food source for grazing wildfowl species particularly European white-fronted goose and wigeon.

Freshwater coastal grazing marsh, improved grassland and open standing waters – these supporting habitats lie outside the European Marine Site boundary but within the SPA. They provide key areas for breeding, feeding and roosting for all the assemblage species particularly at high tide.

4. Conservation Objectives and Favourable Condition Tables For the European Marine Site

4.1 Conservation objectives for the Severn Estuary / Môr Hafren SAC

The protection and management of the SAC in accordance with Article 6 of the Habitats Directive, including in particular the consideration of plans and projects under Article 6(3) and 6(4), should be carried out in view of the conservation objectives in this section.

4.1.1 SAC interest feature 1: Estuaries

The conservation objective for the "estuaries" feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met

i. the total extent of the estuary[2] is maintained;

ii. the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained;

iii. the characteristic range and relative proportions of sediment sizes and sediment budget[3] within the site is maintained;

iv. the extent, variety and spatial distribution[4] of estuarine habitat communities[5] within the site is maintained[6];

v. the extent, variety, spatial distribution[4] and community composition of hard substrate habitats and their notable communities[5(v)] is maintained;

vi. the abundance of the notable estuarine species assemblages[7] is maintained or increased;

vii. the physico-chemical characteristics[8] of the water column[9] support the ecological objectives described above;

viii. Toxic contaminants in water column[9] and sediment are below levels which would pose a risk to the ecological objectives described above.

ix. Airborne nutrient and contaminant loads are below levels which would pose a risk to the ecological objectives described above

The meaning of terms [1-9] above is explained in **section 4.1.1.1**

Appendix 2 shows the extent of the "estuaries" feature within the Severn Estuary SAC European Marine Site.

4.1.1.1 Explanatory information for the "estuaries" conservation objective

[1] Natural processes in respect of the SAC

Each feature may be subject to both natural processes and human influence. Human influence on the interest features is acceptable provided that it is proved to be / can be established to be compatible with the achievement of the conditions set out under the definition of favourable condition for each interest feature. A failure to meet these conditions, which is entirely a result of natural process will not constitute unfavourable condition, but may trigger a review of the definition of favourable condition.

Dynamic physical process within estuaries can stem from variable weather conditions including one off storm events, and result in changes in wave exposure, riverine floods or tidal surges. These events can move large quantities of sediments and alter channel morphology, which affect current patterns and sediment transport within the estuary.

Where these processes occur without significant anthropogenic influence they fall under the umbrella of 'natural change'. Because estuaries are dynamic systems we can expect the amount and gross distribution of habitats to change in the future. In general estuarine communities and their supporting habitats are intrinsically more dynamic over short timescales when compared to other marine and terrestrial habitats. Some estuarine communities occur in cycles dependent upon the prevailing physical conditions. Features should not necessarily be considered in unfavourable condition caused by to the short term disappearance of a particular community due to natural processes.

An important example of natural processes occurring over a longer timescale is that estuaries have a natural tendency to accumulate sediment, thereby changing their form from their original glacial morphology to a state where tidal energy is dissipated by sediment banks and other features such as saltmarsh. This, with other forces of natural change, will therefore cause the width and depth of the estuary to change over time, moving towards a state of dynamic equilibrium or 'most probable state'. As part of this process, the location and extent of saltmarshes and mudflats may change, provided there is capacity to accommodate readjustment. Future developments should aim to avoid impact on the future evolution of the system as where this process is constrained by human influence, the capacity of habitats to accommodate readjustment may be affected.

[2] Extent of the estuary

The landward limit of the estuary feature is the limit of highest astronomical tide or the site boundary where it is below highest astronomical tide, except where the landward limit is defined as straight lines across the mouths of rivers entering the estuary. The seaward limit is as shown in the map in Appendix 2. Where other Habitats Directive Annex I habitat types occur within the estuary, they also form part of the estuary feature. In addition, there are areas of the estuary which do not form part of other Annex I habitat types.

[3] Sediment budget

The sediment budget refers to the total amount of sediment within the Severn Estuary taking into account the balance of sediment inputs and outputs.

[4] Spatial distribution

Spatial distribution of estuarine communities refers to the macro spatial pattern in which communities are distributed around the estuary. This statement does not require micro-distribution of communities e.g. the exact mapped positions of specific communities to be maintained.

[5] Estuarine habitat communities

> ***Note:*** *sections i – iv below list the habitat types which are also features of the Severn Estuary SAC in their own right as well as being 'sub-features' of the estuary feature. The detailed definitions of favourable conservation status for these features are provided under their respective conservation objectives.*

i. Subtidal sandbanks *(see section 4.1.2 for the conservation objective for this feature)*
   - Sublittoral Sands and Muddy Sands
   - Sublittoral cohesive mud and sandy mud communities

ii. Intertidal mudflats and sandflats (*see section 4.1.3 for the conservation objective for this feature)*
   - Intertidal gravel and clean sands
   - Intertidal muddy sands
   - Intertidal muds

iii. Atlantic saltmeadows (*see section 4.1.4 for the conservation objective for this feature)*
- Low – mid marsh communities
- Mid – upper marsh communities
- Transitional high marsh communities
- Pioneer marsh communities

iv. Reefs of *Sabellaria alveolata (see section 4.1.5 for the conservation objective for this feature)*
- *Sabellaria alveolata* on variable salinity sublittoral mixed sediment (subtidal)
- *Sabellaria alveolata* reefs on sand-abraded eulittoral rock (contiguous subtidal and intertidal)

v. Hard substrate habitat notable communities
- *Sabellaria alveolata reefs on sand-abraded eulittoral rock* (MLR.Sab.Salv)
- *Hydroids, ephemeral seaweeds and Littorina littorea in shallow eulittoral mixed substrata pools.* **(**LR.RkpH)
- *Balanus crenatus and Tubularia indivisa on extremely tide-swept circalittoral rock.* (ECR.BS.BalTub)
- *Fucus serratus* and piddocks on lower eulittoral soft rock (MLR.Fser.Pid)
- *Mytilus edulis* and piddocks on eulittoral firm clay (MLR.MytPid)
- *Balanus crenatus*, *Halichondria panacea* and *Alcyonidium diaphanum* on extremely tide-swept sheltered circalittoral rock (ECR.BalHpan)
- *Sertularia cupressina* and *Hydrallmania falcate* on tide-swept sublittoral cobbles or pebbles in coarse sand (IGS.ScupHyd).
- *Corrallina officinalis* and coralline crusts in shallow eulittoral rockpools (LR.Rkp.Cor)
- Eel grass (*Zostera*) beds
- Peat and clay exposures
- Any other notable hard substrata communities that may be identified.

[6] Maintained

Since the late 1990s Natural England's condition assessment has identified that parts of the saltmarsh within the Severn Estuary appear to be exhibiting the effects of coastal squeeze. For this reason NE and CCW do not consider it sufficient simply to seek to maintain the existing saltmarsh resource, rather it is our advice that measures will be required which seek to recreate the approximate extent of saltmarsh habitat present within the estuary in 1995 (the year the Severn Estuary was first identified as a proposed SAC); whilst at all times working within the framework of seeking a sustainable estuary form. N.B. This is based upon a site specific consideration of the state of habitats within the Severn Estuary, and should not be extended to other sites on the basis of this advice.

[7] Notable estuarine species assemblages

i. Assemblage of fish species:
- Migratory species
    - River and Sea Lamprey and Twaite shad (Annex 1 species) and Allis shad
    - Sea trout, salmon, eel,
- Estuarine species
    - Species typically occurring and breeding in estuaries (Bird, 2008)
    - Marine species occurring in large numbers in estuaries (Bird, 2008)
- Marine species
    - Predominantly marine species occurring infrequently in the Severn (Bird, 2008)
- Freshwater species
    - Species typically occurring and breeding in freshwater and recorded within the Severn cSAC (Bird, 2008)

ii Assemblage of waterfowl species (refer also sections 4.2 and 4.3 on the SPA and Ramsar Site):
- Regularly occurring Annex 1 species - Bewicks' swan
- Regularly occurring migratory species - European white-fronted goose, dunlin, redshank, shelduck, gadwall
- Nationally important bird populations - wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew, whimbrel and spotted redshank

iii. Assemblage of vascular plant species:
- Salt marsh species (refer to notes 5 and 6 in section 4.1.4.1 - explanatory information on the conservation objective for the Atlantic salt meadows feature)
- Eel grass *(Zostera)* species.

[8] Physico-chemical characteristics

These include nutrients, oxygen, turbidity, pH, temperature and salinity.

[9] Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.2 SAC interest feature 2: Subtidal sandbanks which are covered by sea water all the time (subtidal sandbanks)

The conservation objective for the "subtidal sandbanks" feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met:

i. the total extent of the subtidal sandbanks[2] within the site is maintained;

ii. the extent and distribution[3] of the individual subtidal sandbank communities[4] within the site is maintained;

iii. the community composition[5] of the subtidal sandbank feature within the site is maintained;

iv. the variety and distribution[3] of sediment types across the subtidal sandbank feature is maintained;

v. the gross morphology (depth, distribution and profile) of the subtidal sandbank feature within the site is maintained.

The meaning of terms [1-5] above is explained in **section 4.1.2.1**

Appendix 3 shows the extent of the "subtidal sandbanks" feature within the Severn Estuary SAC European Marine Site.

4.1.2.1 Explanatory information for the "subtidal sandbanks" conservation objective

[1] Natural processes in respect of the SAC

The meaning of 'natural processes' is explained in **section 4.1.1.1**

[2] Extent of subtidal sandbanks

The subtidal sandbanks in the Severn Estuary change their shape over time and many are ephemeral in nature, although some are relatively stable and long established. The extent of the Annex 1 habitat is considered to include both the actual sandbanks and their associated sediments. Areas of associated sediments have been defined by using the sediment environments of the Bristol Channel Marine Aggregates Resources and Constraints project, commissioned by the National Assembly for Wales (Posford Duvivier and ABP, 2000) Associated sediments have been defined as any area of of subtidal sand-sized sediment within the same sediment environment as a subtidal sandbank. Mobile sediments that form temporary sandbanks are considered to be associated sediments that should be retained in the system, but their location may change. Areas of holocence valley infill (relict sediment) are not mobile under present day estuarine conditions. Therefore, where Holocence infill is exposed, it is not considered to form part of the associated sediments. However, any mobile sand deposited over the infill does contribute to the associated sediments.

[3] Distribution

Distribution of sandbank communities and sediments refers to the macro spatial pattern in which these are distributed around the estuary. This statement does not require micro-distribution of communities or sediments e.g. the exact mapped positions of specific communities or sediments to be maintained.

The sand banks of the Middle and Welsh Grounds are relatively permanent sandbank features in the Severn Estuary, along with other long established sandbank features at Cardiff Grounds and in Bridgwater Bay. The tops of these banks are intertidal, and the permanently submerged parts of the banks are considered to contribute to the subtidal sandbanks habitat.

There are other areas of subtidal sandbank habitat within the Estuary, again sometimes the top of the bank may be exposed at low tide, with the submerged sections contributing to the subtidal sandbanks habitat. These banks are more ephemeral in nature, but are still considered part of the feature, and reflect the dynamic nature of the Severn Estuary. The areas where ephemeral subtidal sandbanks are known to occur include areas offshore from Avonmouth and at English Grounds (near Clevedon).

The macro-scale distribution of the subtidal sandbanks should be maintained, and there should be continued presence of ephemeral subtidal sandbanks in the Estuary.

[4] Subtidal sandbank communities

There are two groups of communities comprising the 'sub-features' of the subtidal sandbanks feature:

- Sublittoral Sands and Muddy Sands:

i. Infralittoral mobile sand in variable salinity (estuaries)
ii. Infralittoral mobile clean sand with sparse fauna
iii. *Nephtys cirrosa* and *Macoma balthica* in variable salinity infralittoral mobile sand
iv. *Neomysis integer* and *Gammarus* spp. in fluctuating low salinity infralittoral mobile sand

- Sublittoral cohesive mud and sandy mud communities:

i. *Capitella capitata* in enriched sublittoral muddy sediments
ii. *Nephtys hombergii* and *Tubificoides* spp. in variable salinity infralittoral soft mud
iii. *Capitella capitata* and *Tubificoides* spp. in reduced salinity infralittoral muddy sediment*
iv. *Nephtys hombergii* and *Macoma balthica* in infralittoral sandy mud*

(* these records have a lower degree of confidence than the other communities listed, i.e. the biotope assessor was uncertain regarding precisely which biotope should be recorded).

[5] Community composition

Species typical of the subtidal sandbank communities:

Aricidea minuta
Capitella capitata
Diastylis rathkei typica
Eurydice pulchra
Gammarus salinus
Harpinia pectinata
Mediomastus fragilis
Nephtys cirrosa
Nephtys hombergii
Oligochaeta
Pygospio elegans
Pontocrates arenarius
Pseudocuma longicornis
Retusa obtusa
Tubificoides amplivasatus

4.1.3 SAC interest feature 3 : Mudflats and sandflats not covered by seawater at low tide (mudflats and sandflats)

The conservation objective for "mudflats and sandflats" feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met:

i. The total extent of the mudflats and sandflats feature[2] is maintained;

ii. the variety and extent of individual mudflats and sandflats communities[3] within the site is maintained;

iii. the distribution[4] of individual mudflats and sandflats communities[3] within the site is maintained;

iv. the community composition[5] of the mudflats and sandflats feature within the site is maintained;

v. the topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration across the flats) are maintained.

The meaning of terms [1-5] above is explained in **section 4.1.3.1.**

Appendix 4 shows the extent of the "mudflats and sandflats" feature within the Severn Estuary SAC European Marine Site.

4.1.3.1 Explanatory information for the "mudflats and sandflats" conservation objective

[1] Natural processes in respect of the SAC

The meaning of 'natural processes' is explained in **section 4.1.1.1.**

[2]Extent of the intertidal mudflats and sandflats

The extent of the feature is defined using intertidal Phase 1 survey information, which gives the seaward limit of the feature as the low water mark of spring tides (MLWS) because that is in practice the lower limit to which Phase 1 survey is possible. The feature does not include other intertidal habitats which are not mudflats and sandflats, such as intertidal reefs and rocky shores. This is the basis on which the feature is shown in the map in Figure 4, the total extent being 20,271 ha. However in addition there will be some areas of intertidal mudflat and sandflat seaward of MLWS and down to Lowest Astronomical Tide, which is the absolute seaward limit of this habitat type.

[3] Mudflat and sandflat communities

There are three groups of communities comprising the "sub-features" of the "Mudflats and sandflats not covered by seawater at low tide" feature:

• Intertidal gravel and clean sand communities

i. Barren coarse sand shores; **LGS.S.BarSnd**
ii. Burrowing amphipods and *Eurydice pulchra* in well drained clean sand shores; **LGS.S.AEur**
iii. Burrowing amphipods and polychaetes in clean sand shores. **LGS.S.AP**
iv. Talitrid amphipods in decomposing seaweed on the strandline **LGS.S.Tal**
v. Dense *Lanice conchilega* in tide-swept lower shore sand **LGS.S.Lan**
vi. Barren shingle or gravel shores **LGS.Sh.BarSh**

• Intertidal muddy sand communities :

i. Polychaetes and *Cerastoderma edule* in fine sand or muddy sand shores **LMS.MS.PCer**
ii. *Bathyporeia pilosa* and *Corophium spp.* in upper shore slightly muddy fine sand shores **LMS.MS.BatCor**
iii. *Macoma balthica* and *Arenicola marina* in muddy sand shores. **LMS.MS.MacAre**

• Intertidal mud communities:

i. *Hediste diversicolor* and *Macoma balthica* in sandy mud shores: **LMU.SMu.HedMac**
ii. *Hediste diversicolor, Macoma balthica* and *Arenicola marina* in muddy sand or sandy mud shores **LMU.SMu.HedMacAre**
iii. *Hediste diversicolor* and *Scrobicularia plana* in reduced salinity mud shores **LMU.Mu.HedScr**
iv. *Hediste diversicolor* and oligochaetes in low salinity mud shores **LMU.Mu.HedOl**
v. *Hediste diversicolor* and *Streblospio shrubsolii* in sandy mud or soft mud shores **LMU.Mu Hed Str**

Appendix 4a shows the extent of the "mudflats and sandflats" subfeatures within the Severn Estuary SAC European Marine Site.

[4] Distribution

The distribution of mudflats and sandflats communities refers to the macro spatial pattern in which these communities are distributed around the estuary. This statement does not require micro-distribution of communities e.g. the exact mapped positions of specific communities to be maintained.

[5] Community composition

Species typical of the mudflat and sandflat communities:

Aphelochaeta marioni
Arenicola marina
Bathyporeia pelagica
Corophium volutator
Enchytraeidae
Eurydice pulchra
Hediste diversicolor
Hydrobia ulvae
Macoma balthica
Nephtys cirrosa
Nephtys hombergii
Oligochaeta indet.
Pygospio elegans
Scoloplos armiger
Scrobicularia plana
Streblospio shrubsolii
Tubificoides benedii

4.1.4 SAC interest feature 4: Atlantic salt meadow

The conservation objective for the "Atlantic salt meadow" feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met:

i. the total extent of Atlantic salt meadow and associated transitional vegetation communities[2] within the site is maintained[3];

ii. the extent and distribution[4] of the individual Atlantic salt meadow and associated transitional vegetation communities[2] within the site is maintained;

iii. the zonation of Atlantic salt meadow vegetation communities and their associated transitions[2] to other estuary habitats is maintained;

iv. the relative abundance of the typical species[5] of the Atlantic salt meadow and associated transitional vegetation communities[2] is maintained;

v. the abundance of the notable species[6]of the Atlantic salt meadow and associated transitional vegetation communities[2] is maintained.

vi. the structural variation of the salt marsh sward (resulting from grazing) is maintained within limits sufficient to satisfy the requirements of conditions iv and v above and the requirements of the Ramsar and SPA features[7]

vii. the characteristic stepped morphology of the salt marshes and associated creeks, pills, drainage ditches and pans, and the estuarine processes that enable their development, is maintained.

viii Any areas of *Spartina anglica* salt marsh (SM6) are capable of developing naturally into other saltmarsh communities.[8]

The meaning of terms [1-8] above is explained in **section 4.1.4.1.**

Appendix 5 shows the extent of Atlantic salt meadow and its associated transitional vegetation communities within the Severn Estuary SAC European Marine Site.

4.1.4.1 Explanatory information for the "Atlantic salt meadow" conservation objective

[1] Natural processes in respect of the SAC

The meaning of 'natural processes' is explained in **section 4.1.1.1**.

[2] Atlantic salt meadow and associated transitional vegetation communities

The vegetation communities comprising the Atlantic Salt Meadow feature can be grouped into four 'sub-features', namely:

(a) low to mid marsh communities
(b) mid to upper marsh communities
(c) transitional high marsh communities
(d) pioneer saltmarsh communities

The communities in each of these sub-features are listed below.

Sub-features (a) and (b) contain the National Vegetation Classification (NVC) communities which fall within the definition of Atlantic Salt Meadow in the EU Interpretation Manual. The extent of these two sub-features within the SAC is currently estimated at 656 ha. The communities in (c) and (d) do not fall within the Atlantic Salt Meadow definition, but are considered to be important components of this feature as they represent its landward and seaward transitions to other habitat types, namely non-saline vegetation and pioneer salt marsh respectively. Atlantic salt meadow is a naturally dynamic habitat and these transitional communities are considered to be an integral part of the Atlantic Salt Meadow feature and essential elements of its structure and function. The total extent of all four of the above sub-features in the SAC is estimated to be 1400 ha, distributed in the SAC as shown in Appendix 5a.

(a) Low to mid marsh communities:

i. Transitional low saltmarsh with *Puccinellia maritima*, annual *Salicornia* sp. and *Suaeda maritima* SM10
ii. *Aster tripolium* (rayed) saltmarsh SM12
iii. *Puccinellia maritima* saltmarsh SM13
    - *Puccinellia maritima* sub-community SM13a
    - *Glaux maritima* sub-community SM13b
    - *Limonium vulgare - Armeria maritima* sub-community SM13c
    - *Plantago maritima - Armeria maritima* sub-community SM13d
    - *Plantago maritima–Triglochin maritima* sub-community SM13x (provisional)
    - *Spartina anglica* sub-community SM13y (provisional)
iv. *Atriplex portulacoides* saltmarsh SM14
    - *Atriplex portulacoides* sub-community SM14a
v. *Juncus maritimus - Triglochin maritima* saltmarsh SM15

(b) Mid to upper marsh communities:

i. *Festuca rubra* salt-marsh SM16
    - *Puccinellia maritima* sub-community SM16a
    - *Juncus gerardii* sub-community SM16b
    - *Glaux maritima* sub-community SM16c
    - *Festuca rubra* sub-community SM16d
    - *Leontondon autumnalis* sub-community SM16e
    - *Aster tripolium* sub-community SM16x (provisional)
ii. *Artemisia maritima* saltmarsh SM17
iii. *Juncus maritimus* salt-marsh SM18
    - *Festuca arundinacea* sub-community SM18c

(c) Transitional high marsh communities:

i. *Spergularia marina - Puccinellia distans* saltmarsh SM23
ii. *Elytrigia atherica* saltmarsh SM24
iii. *Elytrigia repens* saltmarsh SM28
iv. *Festuca rubra - Agrostis stolonifera - Potentilla anserina* inundation grassland MG11
v. *Festuca arundinacea* coarse grassland MG12
vi. *Agrostis stolonifera - Alopecurus geniculatus* inundation grassland MG13
vii. *Phragmites australis* reedbed S4
    - *Phragmites australis* sub-community S4a

xiii. *Bolboshoenus maritimus* swamp S21
    - *B. maritimus* sub-community S21a

Agrostis stolonifera sub-community S21c

(d) Pioneer saltmarsh communities:

i. *Spartina anglica* saltmarsh SM6
ii Annual *Salicornia* saltmarsh SM8
iii. *Suaeda maritima* saltmarsh SM9

[3] Maintained

Since the late 1990s Natural England's condition assessment has identified that parts of the saltmarsh within the Severn Estuary appear to be exhibiting the effects of coastal squeeze. For this reason NE and CCW do not consider it sufficient simply to seek to maintain the existing saltmarsh resource, rather it is our advice that measures will be required which seek to recreate the approximate extent of saltmarsh habitat present within the estuary in 1995 (the year the Severn Estuary was first identified as a proposed SAC); whilst at all times working within the framework of seeking a sustainable estuary form. N.B. This is based upon a site specific consideration of the state of habitats within the Severn Estuary, and should not be extended to other sites on the basis of this advice.

[4]Distribution

The distribution Atlantic salt meadow communities refers to the macro spatial pattern in which these are distributed around the estuary. This statement does not require micro-distribution of communities e.g. the exact mapped positions of specific communities to be maintained.

[5] Typical species of the Atlantic salt meadow

Festuca arundinacea
Festuca rubra
Juncus gerardii
Triglochin maritimum
Carex extensa
Agrostis stolonifera
Juncus maritimus
Oenanthe lachenalii
Puccinellia maritima,
Salicornia spp.
Suaeda maritima
Aster tripolium
Glaux maritima
Plantago maritima
Armeria maritima
Elytrigia atherica
Atriplex prostrata
Phragmites australis
Spartina anglica
Spergularia media
Puccinellia distans
Cochlearia anglica
Cochlearia officinalis
Limonium vulgare
Atriplex portulacoides
Seriphidium maritimum
Plantago coronopus
Beta vulgaris maritima

[6] Notable Atlantic salt meadow vegetation species

Alopecurus bulbosus
Althaea officinalis
Bupleurum tenuissimum
Hordeum marinum
Puccinellia rupestris
Trifolium squamosum
Lepidium latifolium

Allium oleraceum
Petroselinum segetum

[7] Severn Estuary SPA and Severn Estuary Ramsar Site Conservation Objectives
Refer to sections 4.2 and 4.3 of this document

[8] *Spartina anglica* SM6
Spartina in the Severn is considered to be an invasive species and these conservation objectives do not seek the maintenance of the extent or condition of this habitat type. However, SM6 is considered to be a transitional salt marsh community and the conservation objectives seek to protect the ability of areas of *Spartina* to develop into other Atlantic Salt Meadow or transitional communities.

4.1.5 SAC interest feature 5 : Reefs

The conservation objective for the "reefs" feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met:

i. the total extent and distribution[2] of *Sabellaria* reef [3] is maintained;

ii. the community composition[4] of the *Sabellaria* reef is maintained;

iii. the full range of different age structures of *Sabellaria* reef are present;

iv. the physical[5]and ecological processes[6] necessary to support *Sabellaria* reef are maintained.

The meaning of terms [1 – 6] above is explained in **section 4.1.5.1** below.

Appendix 6 shows the extent of the "reef" feature within the Severn Estuary SAC European Marine Site.

4.1.5.1 Explanatory information for the "reefs" conservation objective

[1] Natural processes in respect of the SAC

The meaning of 'natural processes' is explained in section **4.1.1.1**

[2] Distribution

The distribution of reefs refers to the macro spatial pattern in which the reefs are distributed around the estuary. This statement does not require micro-distribution of the reefs e.g. the exact mapped positions of specific reefs to be maintained.

[3] *Sabellaria* reef

Little is known about the nature of the *Sabellaria alveolata* reef in the Severn Estuary, especially in the subtidal. However, at other sites *S. alveolata* is known to have a very variable recruitment and the cover in any one area may vary greatly over a number of years. *S. alveolata* reefs also cycle through different phases, from newly settled worms through vigorous fast growing reef to older hummocks. It is likely that subtidal *S. alveolata* reef in the Severn Estuary will exhibit reduced growth forms (lower elevation) in comparison to the intertidal reef habitat. The easiest of these phases to identify is the fast growing reef and for the purposes of these conservation objectives this is defined as a dense aggregation of worms (over 1000 per m^2, as a rough guide), generally forming a thick (2 cm or more) crust of tubes. The area covered by the habitat would generally exceed 25 m^2 although there could be patchiness within this area. The other phases of growth are also important and are encompassed in point iii of the objective.

The *S. alveolata* reef biotopes recorded in the Severn Estuary are SS.SBR.PoR.SalvMx *Sabellaria alveolata on variable salinity sublittoral mixed sediment* and LS.LBR.Sab.Salv *Sabellaria alveolata reefs on sand-abraded eulittoral rock.*

[4] Community composition

Species associated with dense aggregations of *Sabellaria alveolata* in the Severn estuary:

Subtidal

Sabellaria alveolata
Eulalia tripunctata

Mediomastus fragilis
Typosyllis armillaris
Ampharete grubei
Harpinia pectinata
Melinna cristata
Pygospio elegans
Scoloplos armiger
Nemertea
Nucula nitidosa
Nucula nucleus
Tubificoides amplivasatus
Golfingia vulgaris vulgaris
Gammarus salinus
Tubificoides
Arenicola marina
Sphenia binghami
Eumida sanguinea
Nephtys hombergii
Autolytus prolifera
Harmothoe impar
Nematoda
Polycirrus
Dodecaceria concharum
Harmothoe
Syllidae
Enchytraeidae

Intertidal

Sabellaria alveolata,
Actinia equina
Cancer pagurus
Elminius modestus
Littorina saxatilis
L.littorea
L.obtusata
Pholas dactylus
Pomatocerus lamarcki
Porcellana platycheles
Semibalanus balanoides
Halichondrea sp
Corallina officinalis
Enteromorpha sp.
Fucus serratus
Fucus vesiculosus
Pelvetia canaliculata
Porphyra sp
Ulva sp

[5]Physical processes

- abundance of suitable coarse sediments to support reef growth (tube building)
- the availability of suitable substrates where *Sabellaria* has been known to occur in the past

[6]Ecological Processes

- supply of *Sabellaria* larvae (within the water column)
- abundance of food (suspended detritus material) within the water column to support feeding

4.1.6 SAC interest feature 6 : River lamprey *Lampetra fluviatilis*

The conservation objective for the river lamprey *Lampetra fluviatilis* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met:

i. the migratory passage of both adult and juvenile river lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;

ii the size of the river lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;

iii. the abundance of prey species[2] forming the river lamprey's food resource within the estuary, is maintained.

iv. Toxic contaminants in the water column[3] and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms [1-3] above is explained in **section 4.1.6.1**.

Note : The river lamprey population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary river lamprey feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC river lamprey feature are also met in full and there is a continued recorded presence of this species in the River Severn.

4.1.6.1 Explanatory information for the river lamprey *Lampetra fluviatilis* conservation objective

[1] Natural processes in respect of the SAC fish features

River lamprey population:

The size of the population is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food / host availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats
The general meaning of 'natural processes' with respect to the supporting habitats of river lamprey within the estuary is explained in **section 4.1.1.1**

[2] Prey species

Sea trout *Salmo trutta*, shad *Alosa fallax/Alosa alosa*, herring *Clupea harengu*s, sprat *Sprattus sprattu*s, flounder *Platichthys flesu*s and small gadoids such as whiting *Merlangius merlangu*s and pout *Trisopterus luscu*s are all potential prey species for the river lamprey found within the Severn Estuary (Bird 2008).

[3]Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.7 SAC interest feature 7: The conservation objective for sea lamprey *Petromyzon marinus*

The conservation objective for the sea lamprey *Petromyzon marinus* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met:

i. the migratory passage of both adult and juvenile sea lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;

ii. the size of the sea lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained as is at a level that is sustainable in the long term;

iii. the abundance of prey species[2] forming the sea lamprey's food resource within the estuary, is maintained.

vi. Toxic contaminants in the water column[3] and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms [1-3] above is explained in **section 4.1.7.1**.

Note : The sea lamprey population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary sea lamprey feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC sea lamprey shad feature are also met in full and there is a continued recorded presence of this species in the River Severn.

4.1.7.1 Explanatory information for the sea lamprey *Petromyzon marinus* conservation objective

[1] Natural processes in respect of the SAC fish features

Sea lamprey population:
The size of the population is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food / host availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats:
The general meaning of 'natural processes' with respect to the supporting habitats of sea lamprey within the estuary is explained in **section 4.1.1.1**.

[2]Prey species

Eel *Anguilla anguilla*, cod *Gadus morhua*, and haddock *Melanogrammus aeglefinus* are all potential prey species for the sea lamprey found within the Severn Estuary (Bird 2008)

[3]Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.8 SAC interest feature 8: The conservation objective for twaite shad *Alosa fallax*

The conservation objective for the twaite Shad *Alosa fallax* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[1], each of the following conditions are met:

i. the migratory passage of both adult and juvenile twaite shad through the Severn Estuary between the Bristol Channel and their spawning rivers is not obstructed or impeded by physical barriers, changes in flows or poor water quality;

ii. the size of the twaite shad population within the Severn Estuary and the rivers draining into it is at least maintained and is at a level that is sustainable in the long term.

iii. the abundance of prey species[2] forming the twaite shad's food resource within the estuary, in particular at the salt wedge[3], is maintained.

iv. Toxic contaminants in the water column[4] and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms[1-4] above is explained in **section 4.1.8.1**.

Note : The twaite shad population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary twaite shad feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC twaite shad feature are also met in full and there is a continued recorded presence of this species in the River Severn.

4.1.8.1 Explanatory information for the Twaite shad *Alosa fallax* conservation objective

[1] Natural processes in respect of the SAC fish features

Twaite shad population:
The size of the population is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats:
The general meaning of 'natural processes' with respect to the supporting habitats of twaite shad within the estuary is explained in **section 4.1.1.1**.

[2] Prey species

Small custaceans, especially mysids and copepods, small fish, especially sprats and anchovies, and fish eggs (Maitland, P.S. & Hatton-Ellis 2003).

[3] Salt wedge

This the area within the estuary where fresh and saline water meet and where the abundance of prey species is particularly important to the twaite shad population. The actual position varies according to the state of the tide and volume of freshwater input to the estuary.

[4] Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.9 Favourable Condition Tables for the SAC interest features of the Severn Estuary European Marine Site

Background information on the role of favourable condition tables and the information provided in each column is provided in Section 1.8 of this document, and a concise glossary of terms used is provided in Section 7.

The favourable condition table is intended to supplement the conservation objectives, including with respect to the management of established and ongoing activities, future requirements of monitoring and reporting on the condition of the features of the site and, together with the conservation objectives, informs the scope and nature of any appropriate assessment that may be needed. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under the Habitats Regulations. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

These tables set out all the attributes that **may** be used to monitor the condition of the features of the SAC. Where possible we will seek available information from others which can inform our assessment process.

It will be possible to monitor many of the attributes at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the first reporting cycle in order to characterise the site and establish the baseline. Where relevant, abbreviations of National Vegetation Classification (NVC) codes are used for simplicity (Rodwell, 2000).

Comprising :

Table 8 – Favourable condition table for the “estuaries” feature of the Severn Estuary SAC and (in part) for the Ramsar Site (refer to section 4.3.1)

Table 9 – Favourable condition table for the “subtidal sandbanks” feature of the Severn Estuary SAC

Table 10 – Favourable condition table for the “intertidal mudflats and sandflats” feature of the Severn Estuary SAC

Table 11 – Favourable condition table for the “Atlantic salt meadows” feature of the Severn Estuary SAC

Table 12 – Favourable condition table for the “reefs” feature of the Severn Estuary SAC

Table 13 – Favourable condition table for the “river lamprey” and “sea lamprey” features of the Severn Estuary SAC

Table 14 – Favourable condition table for the “twaite shad” feature of the Severn Estuary SAC

Table 8 – Favourable condition table for the "estuaries" feature of the Severn Estuary SAC and (in part) for the Ramsar Site (refer to section 4.3.1)

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A1	***SAC interest feature 1:*** **Estuaries**		**Extent** *(Total extent of the estuaries feature - section 4.1.1.i of the conservation objectives)*	Total area (ha) of estuary feature	No decrease in extent due to man induced changes from the established baseline *The baseline is the extent of all areas subject to tidal influence within the boundary of the designation of the pSAC in 2000 - see also map in Appendix 2*	Extent is an attribute on which reporting is required by the Habitats Directive.
A2		All sub-features	**Morphology** *(Characteristic physical form and flow - section 4.1.1.ii of the conservation objectives)*	Intra and inter-estuarine Tidal Prism/Cross Section ratio (TP/CS ratio) measured during the reporting cycle using remote sensing (frequency to be determined).	The intra- and inter- estuarine TP/CS relationship should not deviate significantly from an established baseline subject to natural processes (* includes recognition of fixed hard geology formations) *Baseline to be established :-* *Data to be used is Hydrological Office bathymetry data (intertidal and subtidal) and Environment Agency LIDAR survey*	TP = Tidal Prism = total volume of water crossing a given cross section during the flood tide (m^3). CS = Area of a given cross section at high water springs (m^2). The relationship between TP & CS provides a measure of the way the estuary has adjusted to tidal energy. Substantial departures from this characteristic relationship (determined on a regional basis) may indicate the influence of anthropogenic factors and this would trigger more detailed evaluation of potential problems. The identification of a suitable baseline for TP/CS relationship will need to take account of the highly dynamic nature of the Severn and potential impacts of natural processes (including sea level rise) in altering the profile of the estuary – with a view to maintaining or promoting the movement of the estuary towards "dynamic equilibrium". *The hard geology formations (headlands, cliffs and rock platforms) have a major role in influencing the characteristic physical form and flow of the estuary (many are protected in their own right as geological SSSI).

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A3	***SAC interest feature 1:*** **Estuaries**		**Tidal regime and flows** (saline water and freshwater contributions) *(characteristic physical form and flow - section 4.1.1.ii of the conservation objectives)*	Tidal range, measured from tide gauges at specified locations, and flows measured from current estuary and river meters . Locations and frequency to be determined	No decrease in tidal range subject to natural processes. Tidal currents should not deviate significantly from an established baseline subject to natural processes Riverine flows (Rivers Wye, Usk and Severn) and estuarine flows must be sufficient to ensure Water Framework Directive target of Good Ecological Status (GES) is met. *Baseline to be established :-* *Data to be used is existing tide gauge and current meter data from EA ca 2000, and agreed WFD monitoring measures.*	

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A4			**Sediment budget** *(characteristic range and relative proportions of sediment sizes and sediment budget - section 4.1.1.iii of the conservation objectives)*	Evaluation of the sediment fluxes, sources and sinks, using a variety of measures including bathymetry, suspended sediment concentrations, fluvial and marine influx/efflux, man-made changes (e.g. navigational dredging/marine minerals extraction), cliff erosion etc)	No decrease in sediment budget from the established baseline *Baseline to be established :-* *Data to be used is Severn Estuary Coastal Habitat Management Plan (CHaMP) Part F- Sediment Budget Analysis*	A sediment budget is a balance of the sediment volume entering and exiting a particular section of the coast or an estuary. Sediment budget analysis consists of the evaluation of sediment fluxes, sources and sinks from different processes that give rise to additions and subtractions within a control volume (e.g. a section of coast or an estuary) in order to gain a better understanding of the estuary system. An estuary provides a readily defined control volume, where point sources and sinks exist in the form of rivers, other terrestrial outfalls and the open sea. Line sources and sinks may be defined in terms of erosion from cliffs and transfers to or from saltmarshes, wetlands or other intertidal areas. The subtidal beds also needs consideration as an important source/sink as does material stored in suspension within the volume of water that moves back and forth under tidal action within the estuary. Identification and quantification of all the mechanisms giving rise to sediment transfers can be difficult, and for the most part are approximate estimates of sediment exchange between sources and sinks. Reference ; ABPmer and HR Wallingford (2007).
A5	***SAC interest feature 1:*** **Estuaries**		**Sediment size, range and distribution** *(characteristic range and proportions of sediment sizes and sediment budget - section 4.1.1.iii of the conservation objectives)*	Sediment size distribution characterised and measured by particle size analysis (PSA) at a series of locations across the estuary during the reporting cycle (locations and frequency to be determined)	Sediment size distribution should not deviate from an established baseline. *Baseline to be established :-* *Data to be used is* BGS seabed sediment data and other relevant datasets ?	PSA measures parameters including percentage sand/silt/gravel, mean and median grain size and sorting co-efficient, used to characterise sediment type. Sediment character is key to the structure of the features and reflects the physical processes acting on it – it may vary across the estuary and can be used to indicate the spatial distribution of sediment types reflecting the stability of the features and the processes supporting it..
A6		Subtidal sandbanks	**Extent, variety and spatial distribution of estuarine habitat communities** *(section 4.1.1.iv of the conservation objectives)*	*For information on the attributes of the subtidal sandbank communities sub-feature see the sections of this table which relate to the subtidal sandbanks which are covered by seawater all the time feature, see Table 9*		

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A7		Intertidal mudflat and sandflat communities	**Extent, variety and spatial distribution of estuarine habitat communities** *(section 4.1.1.iv of the conservation objectives)*	*For information on the attributes of the intertidal mudflat & sandflat communities sub-feature see the sections of this table which relate to the intertidal mudflats and sandflats not covered by seawater at low tide feature, see Table 10*		
A8		Atlantic salt meadow (and associated transition habitats)	**Extent, variety and spatial distribution of estuarine habitat communities** *(section 4.1.1.iv of the conservation objectives)*	*For information on the attributes of the Atlantic salt meadow communities sub-feature see the sections of this table which relate to Atlantic salt meadow feature, see Table 11*		
A9		Reefs of *Sabellaria alveolata*	**Extent, variety and spatial distribution of estuarine habitat communities** *(section 4.1.1.iv of the conservation objectives)*	*For information on the attributes of the Reef sub-feature see the sections of this table which relate to the Reef feature, see Table 12*		

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A10	***SAC interest feature 1:*** **Estuaries**	Hard substrate habitats and their notable communities	**Extent & variety** *(extent, variety, spatial distribution and community composition of hard substrate habitats and their notable communities - section 4.1.1.v of the conservation objectives)*	Area (ha) and range of types of hard substrate habitats and their notable communities, measured periodically during the reporting cycle along sampling transects or grids (frequency to be determined).	No decrease in extent or range of types of hard substrate habitats and their notable communities from the established baseline subject to natural processes. *Baseline is the CCW and English Nature Intertidal Biotope Surveys 2006.*	Loss of hard substrate habitats and their notable communities is likely to be detrimental to the structure of the interest feature, e.g. associated with a change in estuary processes and may indicate long term changes in the physical conditions of the estuaries interest feature. Notable communities of the Severn Estuary comprise the following • *Sabellaria alveolata reefs on sand-abraded eulittoral rock* (MLR.Sab.Salv) • *Hydroids, ephemeral seaweeds and Littorina littorea in shallow eulittoral mixed substrata pools.* **(**LR.RkpH) • *Balanus crenatus and Tubularia indivisa on extremely tide-swept circalittoral rock.*(ECR.BS.BalTub) • *Fucus serratus* and piddocks on lower eulittoral soft rock (MLR.Fser.Pid) • *Mytilus edulis* and piddocks on eulittoral firm clay (MLR.MytPid) • *Balanus crenatus, Halichondrea panicea* and *Alcyonidium diaphanum* on extremely tide-swept sheltered circalittoral rock (ECR.BalHpan) • *Sertularia cupressina and Hydrallmania falcate* on tide-swept sublittoral cobbles or pebbles in coarse sand (IGS.ScupHyd). • *Corralina officinalis* and coralline crusts in shallow eulittoral rockpools (LR.rkp.Cor) • Eel grass (*Zostera*) beds • Any other notable hard substrata communities that may be identified.
A11			**Spatial distribution** *(extent, variety, spatial distribution and community composition of notable communities - section 4.1.1.v of the conservation objectives)*	Spatial distribution of notable communities measured periodically during the reporting cycle using a combination of remote sensing and ground truthing using GPS (frequency to be determined).	Macroscale distribution of notable communities should not deviate significantly from the established baselines, subject to natural processes. *Baseline is the CCW and English Nature Intertidal Biotope Surveys 2006.*	Changes in the variety or distribution of notable estuarine communities may indicate long term changes in the physical conditions of the estuary interest feature or individual subfeatures.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A12	***SAC interest feature 1:*** **Estuaries**	Hard substrate habitats and their notable communities	**Community composition** *(extent, variety, spatial distribution and community composition of notable communities - section 4.1.1.v of the conservation objectives)*	Assessment of community quality through survey of species composition (presence of typical species) within the notable communities measured periodically	No decline in community quality due to changes in species composition or loss of typical species from an established baseline *Baseline to be established :* *Data to be used : CCW and English Nature Intertidal Biotope Surveys 2006 and future surveys*	Different associations of plants, animals and their habitat are an important structural and functional aspect of the feature. Changes in the communities present within an area of a particular type may indicate long-term changes in physical conditions at the site. Typical species of the notable communities to be determined.
A13		Notable estuarine species assemblages : **Assemblage of fish species**	**Abundance** *(abundance of notable estuarine species assemblages - section 4.1.1.vi of the conservation objectives)*	Numbers of species and population estimates	No significant reduction in overall diversity of species or in individual populations against an established baseline *Baseline to be established :* *Data to be used : Environment Agency and relevant Sea Fisheries Committee data*	Loss of notable communities may indicate long term changes in the physical conditions of the estuaries interest feature or individual subfeatures. **Assemblage of fish species:** (Refer to section 4.1.1 note 7) • Migratory species (see also section of this table which relates to the river lamprey, sea lamprey and twaite shad features) • Estuarine species • Marine species • Freshwater species Refer also to section 4.3.2 in relation to the assemblage of migratory fish species of the Ramsar Site.
A14		Notable estuarine species assemblages : **Assemblage of waterfowl species**	**Abundance** *(abundance of notable estuarine species assemblages - section 4.1.1.vi of the conservation objectives)*	Numbers of species and individual population sizes	No significant reduction in overall diversity of species or in individual populations against an established baseline *Baselines are identified in the SPA section of this advice – see section 4.2*	Loss of notable communities may indicate long term changes in the physical conditions of the estuaries interest feature or individual subfeatures. Refer also to section 4.2.7 in relation to the Internationally important **assemblage of waterfowl** of the Severn Estuary SPA and section 4.3.9 in relation to the Internationally important assemblage of waterfowl of the Severn Estuary Ramsar Site
A15		Notable estuarine species assemblages : **Assemblage of vascular plant species**	**Abundance of saltmarsh species** *(abundance of notable estuarine species assemblages - section 4.1.1.vi of the conservation objectives)*	Number of species and population sizes	No significant reduction in overall diversity of species or in individual populations against an established baseline *Baselines to be established:* *Data to be used is 1998 NVC Scarce plant survey, county botanical records and CCW/NE site records*	Loss of notable communities may indicate long term changes in the physical conditions of the estuaries interest feature or individual subfeatures. **Assemblage of vascular plant species includes**: • Salt marsh species Note : maintaining the conditions necessary for these species are covered by the Atlantic salt meadows table attributes Table 11

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A16	***SAC interest feature 1:*** **Estuaries**	Notable estuarine species assemblages : **Assemblage of vascular plant species**	**Abundance of Eel grass**	Extent and density of Eel grass species	No significant reduction in overall extent and density against as established baseline *Baseline is CCW and English Nature Intertidal Biotope Surveys 2006 plus Severn Second Crossing monitoring data 1989-95/6*	**Assemblage of vascular plant species includes**: • Eel grass *(Zostera)* species.
A17		All sub-features	**Water quality – physico-chemical parameters** (Including temperature, salinity, oxygen, nutrients, pH and turbidity etc) *(physico chemical characteristics of the water column - section 4.1.1.vii of the conservation objectives)*	Physico-chemical parameters measured periodically throughout the reporting cycle (frequency to be determined).	Physico-chemical parameters should not pose a risk to the ecology* of the habitats and species of the SAC, SPA or Ramsar Site. Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive.	Changes in any of the physico-chemical parameters in the water column can impact on the quality of the estuary habitat and hence could lead to changes in the presence and distribution of species (along with recruitment processes and spawning behaviour) and those at the edge of their geographic ranges and non-natives. *ie does not compromise the quality, extent, distribution or species composition of habitats or their ability to support species features (eg feeding, breeding, resting) – the outcome sought is the healthy functioning of the estuary.
A18			**Phytoplankton** *(physico chemical characteristics of the water column - section 4.1.1.vii of the conservation objectives)*	Average **phytoplankton biomass and characteristic species** in summer, measured periodically during the reporting cycle.	Growth of phytoplankton does not cause an undesirable disturbance to the estuary habitats and species Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive.	
A19			**Macroalgae**	Average **macroalgal cover and density** in summer, measured periodically during the reporting cycle.	Average macroalgal cover and density should not compromise the ecology * of the estuary habitats and species Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive.	*ie does not compromise the quality, extent, distribution or species composition of habitats or their ability to support species features (eg feeding, breeding, resting) – the outcome sought is the healthy functioning of the estuary.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A20	***SAC interest feature 1:*** **Estuaries**		**Toxic contaminants** *(toxic contaminants in water column and sediment - section 4.1.1.viii of the conservation objectives)*	Toxic contaminants measured periodically throughout the reporting cycle (frequency to be determined).	Toxic contaminants in water column and sediment should be below levels which would pose a risk to the ecology* of the estuary habitats and species Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive	Elevated concentrations of toxic contaminants in the water column and sediment have the potential to cause lethal or sub-lethal harm to any features and sub-features. *ie does not compromise the quality, extent, distribution or species composition of habitats or their ability to support species features (eg feeding, breeding, resting) – the outcome sought is the healthy functioning of the estuary.
A21			**Airborne nutrient and contaminants** *(airborne contaminants - section 4.1.1.ix of the conservation objectives)*	Airborne contamiants measured periodically throughout the reporting cycle (frequency to be determined)	No exceedence of critical loads for: Sulphur dioxide - 20µg/m³ Nitrous Oxides - 30µg/m³ Ozone - 3000 ppb Ammonia - 3µg/m³ Nutrient Nitrogen - 30-40 kg/ha/yr.	Critical loads have been defined where possible (www.apis.ac.uk) for the conservation features of the European site. Where the critical load is exceeded features are at risk. As more in depth studies are undertaken critical loads will be altered to reflect best available scientific knowledge. The impacts of air pollution on the vegetation need further investigation. If particularly damaging, point sources (or groups of point sources) can be identified, then emissions should be regulated toreduce the impacts. It will also be very important for wider measures to be taken, at Government and international levels, to reduce air pollution. There is currently insufficient knowledge to make a judgment of the impacts on specific species. Decisions should be made at a site specific level."

Table 9 – Favourable condition table for the "subtidal sandbanks" feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
B1	***SAC interest feature 2:*** **Subtidal Sandbanks**	All sub-features	**Extent of feature** *(total extent of subtidal sandbanks - section 4.1.2.i of the conservation objectives)*	Total extent assessed periodically against baseline map (using bathymetry data, and other geophysical techniques (e.g. sidescan sonar), and sediment grain-size data)	No decrease in extent of subtidal sandbanks features from an established baseline, subject to natural processes. *Baseline is taken from 1994 admiralty charts, BGS seabed sediment data and sediment environments defined in the Bristol Channel Marine Aggregates Study (Posford Duvivier and ABP Research Consultancy, 2000).* *Refer also to Map in Appendix 3*	Extent is an attribute on which reporting is required by the Habitats Directive. Within the Severn the subtidal sandbanks feature includes both relatively permanent and stable banks (shown in Appendix XX as subtidal sandbanks) and more ephemeral banks which contribute sediment to the sandbanks (shown in Appendix XX as associated sediments) and which are therefore considered to be an integral part of the feature In the long term loss of subtidal sandbank feature communities is likely to be detrimental to the structure of this interest feature and the intertidal mudflats and sandflats features, e.g. associated with a change in sediment budget or geomorphological regime, and may indicate long term changes in the physical conditions of the estuaries interest feature.
B2		All sub-features	**Extent of the subtidal sandbank communities** *(extent of subtidal sandbank communities -section 4.1.2.ii of the conservation objectives)*	Extent of subtidal sandbank communities within the site assessed periodically (method and frequency to be determined).	No decrease in extent of the communities from an established baseline subject to natural processes. *Baseline is data held on Marine Recorder*	The subtidal sandbanks feature comprises two sub-features **Sublittoral sands and muddy sand** : This sub-feature comprises the following four communities: • Infralittoral mobile sand in variable salinity • Infralittoral mobile clean sands with sparse fauna • Nephtys cirrosa and Macoma balthica in variable salinity infralittoral mobile sand • Neomysis integer and Gammarus spp in fluctuating low salinity infralittoral mobile sand **Sublittoral cohesive mud and sandy mud communities** This sub-feature comprises the following four communities: • Capitella capitata in enriched sublittoral muddy sediments • Nephtys hombergii and Tubificiodes spp. In variable salinity infralittoral soft mud • Capitella capitata and Tubificiodes spp. In reduced salinity infralittoral muddy sediment • Nephtys hombergii and Macoma balthica in infralittoral sandy mud

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
B3	***SAC interest feature 2:*** **Subtidal Sandbanks**		**Distribution of subtidal sandbank communities** *(extent of subtidal sandbank communities -section 4.1.2.ii of the conservation objectives)*	Spatial distribution of subtidal sandbank communities measured periodically (frequency to be determined).	No significant change in the macro scale distribution of the communities from an established baseline subject to natural processes *Baseline is data held on Marine Recorder*	Some biotopes occur in a natural cycle linked to the dynamism of the prevailing conditions, and these may naturally appear and disappear over time. The feature should not be considered in unfavourable condition due to the short-term disappearance of such ephemeral biotopes
B4			**Community composition** *(community composition of the subtidal sandbank communities -section 4.1.2.iii of the conservation objectives)*	Assessment of community quality through survey of species composition within the subtidal sandbank feature measured periodically	No decline in community quality due to changes in species composition or loss of typical species from an established baseline subject to natural processes *Baseline is data held on Marine Recorder and EA WFD benthic sampling data*	Different associations of plants, animals and their habitat are an important structural and functional aspect of the feature. Changes in the communities present within an area of a particular type of sediment may indicate long-term changes in physical conditions at the site. Typical species of the subtidal sandbanks communities include: *Aricidea minuta, Capitella capitata, Diastylis rathkei typical, Eurydice pulchra, Gammarus salinus, Harpinia pectinata, Mediomastus fragilis, Nephtys cirrosa, Nephtys hombergii, Oligochaeta, Pygospio elegans, Pontocrates arenarius, Pseudocuma longicornis, Retusa obtuse, Tubificoides amplivasatus*
B5		All sub-features	**Sediment character** *(variety & distribution of sediment types - section 4.1.2.iv of the conservation objectives)*	Distribution of sediment types/grain sizes assessed across the site	No major change in composition of sediment type across the feature against an established baseline subject to natural processes *Baseline to be established* *Data to be used is BGS seabed sediment data and other relevant datasets*	

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
B6	***SAC interest feature 2:*** **Subtidal Sandbanks**	All sub-features	**Topography** *(gross morphology – depth distribution and profile of subtidal sandbank feature - section 4.1.2.v of the conservation objectives)*	Depth distribution/profile of the sandbank feature measured across the site	No major alteration of topography of the subtidal sandbank feature against an established baseline *Baseline to be established* *Data to be used is Hydrographic Office bathymetric data and other relevant bathymetric datasets*	

Table 10 – Favourable condition table for the "intertidal mudflats and sandflats" feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
C1	***SAC interest feature 3:*** **Mudflats and sandflats**	All sub-features	**Extent of the feature** *(total extent of the mudflats and sandflats feature - section 4.1.3.i of the conservation objectives)*	Total area (ha) of the intertidal mudflat and sandflat feature measured periodically during the reporting cycle using a combination of remote sensing and ground truthing of boundaries between communities using GPS (frequency to be determined).	No decrease in extent of intertidal mudflats and sandflats from an established baseline, subject to natural processes. *Baseline is aerial photography dated 1999 and CCW/English Nature Intertidal Biotope Surveys 2006.* *(Note air photo coverage from 1988 gives data for assessing trends in change of this attribute.) Refer also to maps in Appendix 4*	Extent is an attribute on which reporting is required by the Habitats Directive. In the long term loss of intertidal mudflat / sandflat communities is likely to be detrimental to the structure of the interest feature, e.g. associated with a change in sediment budget or geomorphological regime, and may indicate long term changes in the physical conditions of the estuaries interest feature. Some fluctuations in extent may occur which are directly attributable to natural coastal processes. These include reduced extent following storms or due to a change to another feature habitat such as saltmarsh. Such types of change in extent would form under the umbrella of 'natural change'
C2		All sub-features	**Extent and variety of the mudflats and sandflats communities comprising each sub-feature** *(variety and extent of the mudflat and sandflats communities – section 4.1.3.ii of the conservation objectives)*	Extent and range of types of intertidal mudflat and sandflat communities assessed along a sampling transect or grid and rapid phase 1 survey techniques using GPS (frequency to be determined).	No decrease in the extent or range of types of intertidal mudflat and sandflat communities from an established baseline, subject to natural processes *Baseline is CCW/English Nature Intertidal Biotope Surveys 2006.*	Intertidal mudflat and sand flat feature comprises three sub-features: **Intertidal gravel and clean sand communities** • Barren coarse sand shores; • Burrowing amphipods and *Eurydice pulchra* in well drained clean sand shores; • Burrowing amphipods and polychaetes in clean sand shores. • Talitrid amphipods in decomposing seaweed on the strandline • Dense *Lanice conchilega* in tide-swept lower shore sand • Barren shingle or gravel shores **Intertidal muddy sand communities** • Polychaetes and *Cerastoderma edule* in fine sand or muddy sand shores • *Bathyporeia pilosa* and *Corophium* spp. in upper shore slightly muddy fine sand shores • *Macoma balthica* and *Arenicola marina* in muddy sand shores. • *Arenicola marina*, *Macoma balthica* and *Mya arenaria* in muddy sand shores. • *Echinocardium cordatum* and *Ensis* sp. in lower shore or shallow sublittoral muddy fine sand **Intertidal mud communities** • *Hediste diversicolor* and *Macoma balthica* in sandy mud shores • *Hediste diversicolor*, *Macoma balthica* and *Arenicola marina* in muddy sand or sandy mud shores • *Hediste diversicolor*, *Macoma balthica* and *Mya arenaria* in sandy mud shores • *Hediste diversicolor* and *Scrobicularia plana* in reduced salinity mud shores • *Hediste diversicolor* and oligochaetes in low salinity mud shores

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
C3	***SAC interest feature 3:*** **Mudflats and sandflats**	All subfeatures	**Distribution of mudflats and sandflats communities** *(distribution of communities - section 4.1.3.iii of the conservation objectives)*	Spatial distribution of mudflat and sandflat communities assessed along a sampling transect or grid and rapid phase 1 survey techniques using GPS (frequency to be determined).	Macro scale distribution of communities should not deviate significantly from an established baseline, subject to natural processes. *Baseline is CCW/English Nature Intertidal Biotope Surveys 2006.*	Changes in the spatial distribution of biotopes within an area of a particular type of sediment may provide the first indications of long-term changes in physical conditions at the site. Some biotopes occur in a natural cycle linked to the dynamism of the prevailing conditions, and these may naturally appear and disappear over time. The feature should not be considered in unfavourable condition due to the short-term disappearance of such ephemeral biotopes.
C4		All subfeatures	**Community composition** *(community composition of the feature - section 4.1.3.iv of the conservation objectives)*	Assessment of community quality through survey of species composition (presence of typical species) within the intertidal mudflats and sandflats feature measured periodically	No decline in community quality due to changes in species composition or loss of typical species from an established baseline, subject to natural processes. *Baseline is CCW/English Nature Intertidal Biotope Surveys 2006.*	Different associations of plants, animals and their habitat are an important structural and functional aspect of the feature. Changes in the communities present within an area of a particular type of sediment may indicate long-term changes in physical conditions at the site. Typical species of the intertidal mudflats and sandflats communities include: *Aphelochaeta marioni, Arenicola marina, Bathyporeia pelagica, Corophium volutator, Enchytraeidae, Eurydice pulchra, Hediste diversicolor, Hydrobia ulvae, Macoma balthica, Nephtys cirrosa, Nephtys hombergii, Oligochaeta indet, Pygospio elegans, Scoloplos armiger, Scrobicularia plana, Streblospio shrubsolii, Tubificoides benedii*
C5			**Topography** *(Topography and morphology of the intertidal flats -section 4.1.3v of the conservation objectives)*	Tidal elevation and intertidal slope, measured along a series of transects across the estuary periodically during the reporting cycle using remote sensing or traditional surveying techniques (transect locations and survey frequency to be determined).	Intertidal profile should not deviate significantly from an established baseline, subject to natural processes. *Baseline to be established:* *Data to be used is Environment Agency LIDAR survey*	In the intertidal zone topography reflects the energy conditions and stability of the sediment, which is key to the structure of the interest feature. Topography is a major influence on the distribution of communities throughout the intertidal flats. Assessing topography also provides information on the position of channels through the interest feature. .
C6			**Sediment character**	**Particle size analysis** (PSA). measured at a series of locations across the estuary. Locations and frequency to be determined	Average PSA parameters should not deviate significantly from an established baseline. *Baseline to be established* Data to be used *CCW/English Nature Intertidal Biotope Surveys 2006, BGS seabed sediment data and other relevant data sources*	Parameters include percentage sand / silt / gravel, mean and median grain size, and sorting coefficient, used to characterise sediment type Sediment character defined by particle size analysis is key to the structure of the feature, and reflects all of the physical processes acting on it. Particle size composition varies across the feature and can be used to indicate spatial distribution of sediment types thus reflecting the stability of the feature and the processes supporting it.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
C7	***SAC interest feature 3:*** **Mudflats and sandflats**			**Sediment penetrability** (degree of sinking) measured at a series of locations across the estuary (methodology, locations and frequency to be determined).	Average measure should not deviate significantly from an established baseline. *Baseline to be established by future survey*	Penetrability is an indicator of sediment stability and degree of compaction; it indicates the shear strength of the sediment and thus the susceptibility of that sediment type to erosion. Compaction of the sediment influences the biological community within the sediment. Penetrability of the sediment is determined by a combination of grain size and water content, which may provide a surrogate index of the penetrability of the sediments.
C8				**Sediment organic content** (% carbon) measured at a series of locations across the estuary (sampling locations and frequency to be determined).	Average organic carbon content should not deviate significantly from an established baseline. *Baseline to be established by future survey*	Organic content critically influences the infaunal community and can cause deoxygenation of the feature, which can be detrimental to the biota. However, a balance needs to be struck as organic content provides a measure of the material available to detritivores. A reduction in organic content could lead to a reduction in detritivores, with subsequent knock on effects throughout the food chain.
C9				**Oxidation - reduction potential** (depth of black anoxic layer) measured at a series of locations across the estuary (sampling locations and frequency to be determined).	Average black layer depth should not deviate significantly from an established baseline. *Baseline to be established by future survey*	Degree of oxidation / reduction, reflecting oxygen availability within the sediment, critically influences the infaunal community and the mobility of chemical compounds. It is an indicator of the structure of the feature.

Table 11 – Favourable condition table for the "Atlantic salt meadows" feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D1	***SAC interest feature 4:* Atlantic salt meadows**	All sub-features	**Extent of Atlantic salt meadow (and transitional habitats) feature** *(extent of Atlantic salt meadow (and transitional habitats) feature - section 4.1.4.i of the conservation objectives)*	Total area (ha) of the Atlantic salt meadow feature (and associated transitional habitats) within the site measured periodically during the reporting cycle using a combination of remote sensing and ground truthing of boundaries between communities using GPS (frequency to be determined).	No decrease in total extent of Atlantic salt meadow and associated transitional habitats from the established baseline. *Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998* *Refer also to maps in Appendix 5*	Extent is an attribute on which reporting is required by the Habitats Directive. Monitoring will need to take account of the dynamic nature of these habitats and seasonal and periodic random variations in vegetation types. Coastal squeeze may result in the replacement of Atlantic salt meadows with pioneer saltmarsh. A reduction in extent could be further evaluated by a ground survey to assess for signs of erosion such as toppled vegetation blocks, signs of roots in intertidal mud, signs of stress/damage to plants. Extent needs to be measured at low tide.
D2		All sub-features	**Extent of the Atlantic salt meadow communities and associated transitional vegetation communities** *(extent and distribution of atlantic salt meadow and associated transitional vegetation communities - section 4.1.4.ii of the conservation objectives)*	Area (ha) of Atlantic salt meadow and associated transitional vegetation communities within the site measured periodically during the reporting cycle using a combination of remote sensing and ground truthing of boundaries between communities using GPS (frequency to be determined).	No decrease in extent of Atlantic salt meadow and associated transitional vegetation communities from the established baseline subject to natural processes *Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998*	Assessment against this target will take account of the effects of the natural process of cyclical development and breakdown of saltmarshes within the Severn which results in the natural succession of saltmarsh communities over time ie the continued presence of all types in proportions reflecting the natural processes operating. Some individual salt marsh communities occur in a natural cycle linked to the dynamism of the prevailing conditions, and these may naturally appear and disappear over time. The feature should not be considered in unfavourable condition due to the short-term disappearance of transient communities. The outcome sought is the maintenance of the general character of the saltmarshes of the Severn in terms of the continued presence, abundance and variation of communities with local differences reflected – it is not to seek the retention of saltmarsh types in situ but to allow them to shift and evolve in line with natural processes The Atlantic salt meadow feature comprises four sub-features: **Low to mid marsh communities** NVC communities: SM10, SM12, SM13a, SM13b, SM13c,SM13d, SM13x, SM13y,SM14a, SM15. **Mid to upper marsh communities** NVC communities: SM16a, SM16b, SM16c, SM16d, SM16e, SM16x, SM17, SM18c. **Transitional high marsh communities** NVC communities: SM23, SM24, SM28, MG11, MG12, MG13, S4a, S21a, S21c. **Pioneer saltmarsh communities** NVC communities: SM6, SM8, SM9

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D3	***SAC interest feature 4:*** **Atlantic salt meadows**	All sub-features	**Distribution of the Atlantic salt meadow communities and associated transitional vegetation communities** *(extent and distribution of atlantic salt meadow and associated transitional vegetation communities - section 4.1.4.ii of the conservation objectives)*	Spatial distribution of Atlantic saltmeadow and associated transitional vegetation communities measured along a series of fixed transects (or other suitable method to be agreed) periodically during the reporting cycle using GPS (transect locations and frequency of survey to be determined).	The macro scale distribution of communities should not deviate significantly from an established baseline subject to natural processes. *Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998*	The distribution of the Atlantic salt meadow communities refers to the macro spatial pattern in which these are distributed around the estuary. This statement does not require micro-distribution of communities (i.e. the exact mapped positions of specific communities to be maintained) but does require the distribution of some saltmarsh types which reflect the differences in estuary structure and function (eg in outer versus inner parts of the estuary, or the influence of freshwater inputs from the rivers) be taken into account. Consideration of this attribute needs to take account of the wider scale and long-term changes and development of saltmarshes in the Severn Estuary which shows a pattern of episodic erosion and accretion evident in a series of saltmarsh terraces. This attribute is also linked with attributes covering zonation and morphology below.
D4		All sub-features	**Extent of *Spartina anglica*** *(areas of Spartina anglica - section 4.1.4.viii of the conservation objectives)*	Total extent of Spartina anglica measured along a series of transects (or other suitable method to be agreed) around the estuary, periodically during the reporting cycle, using a combination of remote sensing and ground survey (transect locations and frequency of survey to be determined).	No increase in total extent of more than 10% over monitoring period; *Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998*	*Spartina anglica* acts as a pioneer species in the Severn and can undergo succession to other saltmarsh habitats over time. As a consequence, although it may be colonising new areas in one part of the estuary, in others it may be developing into more mixed saltmarsh communities. There will be differences in the density, height and cover of the vegetation depending on where it is in the succession. These changes will need to be monitored to establish a baseline and rates of any gross change. An increase in *Spartina* at the expense of other saltmarsh could indicate changes in the sediment regime and/or tidal levels both in response to natural or anthropogenic processes. Monitoring will only focus on areas of gross expansion of *Spartina* into intertidal mudflat and saltmarsh communities.
D5		All sub-features	**Zonation of vegetation** *(zonation of Atlantic salt meadow communities - section 4.1.4.iii of the conservation objectives)*	Width of pioneer, low-mid marsh, mid-upper marsh, and transitional high marsh saltmarsh zones, measured along a series of transects (or other suitable method to be agreed) around the estuary, periodically during the reporting cycle, using a combination of remote sensing and ground survey (transect locations and frequency of survey to be determined).	The range of variation of zonation of saltmarsh communities around the estuary should not deviate significantly from an established baseline, subject to natural processes. *Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998 (and English Nature condition assessment data collected in 2002 for Gloucestershire section of the estuary.*	Assessment against this target will take account of the effects of the natural process of cyclical development and breakdown of saltmarshes within the Severn which results in the natural succession of saltmarsh communities and changes to the zonation over time . ie the continued presence of all zones in proportions reflecting the natural processes operating. The outcome sought is the maintenance of the general character of the saltmarshes of the Severn in terms of the continued presence and variation of the saltmarsh zones with local differences reflected – it is not to seek the retention of zones in situ but to allow them to shift and evolve in line with natural processes

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D6	***SAC interest feature 4:*** **Atlantic salt meadows**	Low to mid marsh communities	**Species composition** *(abundance of typical species - section 4.1.4.iv of the conservation objectives)*	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic low to mid marsh communities should not deviate significantly from an established baseline. *Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998*	The typical species for these communities include: *Puccinellia maritima, Salicornia spp., Suaeda maritima, Aster tripolium, Spergularia marginata, Glaux maritima, Plantago maritima, Atriplex glabriuscula, Atriplex prostrata, Triglochin maritima, Limonium vulgare, Armeria maritima and Juncus maritimus* *This target should not however prevent the enhancement of the diversity of swards where possible eg through the encouragement of a wider range of herbs through relaxation of grazing pressure in heavily grazed areas.
D7		Mid to upper marsh communities	**Species composition** *(abundance of typical species - section 4.1.4.iv of the conservation objectives)*	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic mid to upper marsh communities should not deviate significantly from an established baseline. *Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998*	The typical species for these communities include : *Puccinellia maritima, Aster tripolium, Glaux maritima, Plantago maritima, Festuca rubra, Juncus gerardii, Triglochin maritima, , Agrostis stolonifera, Juncus maritimus , Spergularia marginata, Parapholis strigosa, Elymus pycnanthus,, Hordeum secalinum, Trifolium fragiferum and Atriplex glabriuscula,* *(see note above)
D8		Transitional high marsh communities	**Species composition** *(abundance of typical species - section 4.1.4.iv of the conservation objectives)*	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic high marsh communities should not deviate significantly from an established baseline. *Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998*	The typical species for these communities include: *Puccinellia distans, Puccinellia maritima, Puccinellia rupestris, Plantago coronopus, Parapholis strigosa, Atriplex glabriuscula, Spergularia marina, Festuca rubra, Agrostis stolonifera, Aster tripolium, Hordeum secalinum, Elymus pycnanthus, Elymus repens, Potentilla anserina, Lolium perenne, Alopecurus geniculatus, Phragmites australis, Bolboschoenus maritimus, Festuca arundinacea,* *(see note above)
D9		Pioneer saltmarsh communities	**Species composition** *(abundance of typical species - section 4.1.4.iv of the conservation objectives)*	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic pioneer marsh communities should not deviate significantly from an established baseline. *Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998*	The typical species for these communities include : *Spartina anglica, Salicornia sp, Suaeda maritima*

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D10	***SAC interest feature 4:*** **Atlantic salt meadows**		**Abundance of locally occurring scarce and notable plant species** *(abundance of notable species - section 4.1.4v of the conservation objectives)*	Number of discrete locations within the estuary where scarce and notable species are found and their abundance at each location.	No decrease in abundance of scarce and notable species from an established baseline. *Baseline : CCW/English Nature saltmarsh rare/scarce plant survey survey by Dargie 1998* *Individual county based records from plant recorders/record centres*	Nationally scarce and notable species within the Atlantic salt meadow and associated transitional vegetation communities comprise: **Nationally scarce species:** *Alopecurus bulbosus, Althaea officinalis, Bupleurum tenuissimum, Hordeum marinum, Trifolium squamosum, Puccinellia rupestris, Polygonum raii.* **Other notable species occurring*:*** *Allium oleraceum, Lepidium latifolium, Petroselinum segetum* Note that some of the nationally scarce and notable plants require levels of ground disturbance (resulting in openings in the sward) to establish. Localised tight grazing and /or poaching may provide sward openings for such species as well as the wider range of herbs and unless widespread and persistent should not necessarily regarded as a problem.
D11		All sub-features	**Sward structure** *(structural variation of the salt marsh sward - section 4.1.4 vi of the conservation objectives)*	Sward height of Atlantic salt meadow communities measured periodically during the reporting cycle in late summer using a combination of remote sensing and field visits.	The extent and distribution of vegetation communities exhibiting different sward heights should not deviate significantly from an established set of limits. The limits will be defined to ensure that the requirements of the typical and notable plants species and birds species designated within the Severn Estuary SPA and Ramsar, can be met *Baselines are to be established from Nature Conservancy Council SSSI owner/occupier consent records dating from 1988 Severn Estuary SSSI notification (and subsequent consent reviews)* *CCW and EN/NE site monitoring records*	Vegetation structure is largely affected by the impact of grazing (of wild or domesticated herbivores) interacting with different vegetation communities and ground hydrological conditions. Not all Atlantic salt meadow within the Severn Estuary is grazed, but it is a widespread and long established practice and stocking levels need to be appropriate to the interest of the site. Over grazing can lead to a loss of structural diversity of rare plant species and affect bird use of these habitats while under grazing can lead to a loss of plant diversity by competitive exclusion. Introduction of grazing to previously ungrazed sites can result in deleterious changes to plant community composition and its value for wider conservation interests such as invertebrates. Note that some of the nationally scarce and notable plants require levels of ground disturbance (resulting in openings in the sward) to establish. Localised tight grazing and /or poaching may provide sward openings for such species as well as the wider range of herbs and unless widespread and persistent should not necessarily regarded as a problem. Disturbance is also provided in areas where natural tidal debris accumulates scattered across the salt marsh and in driftlines (often at the base and on the seaward slope of the floodbank). As well as providing seed establishment points for scarce plants the debris also plays a role in creating variation in sward structure particularly in the mid/upper and transition high marsh zones and in supporting important populations of invertebrates (notable deadwood beetles). The continued presence of tidal debris and driftlines in some locations is therefore a desirable aspect of the saltmarsh management which delivers this attribute . They may also be of value for the bird populations which roost and feed on saltmarshes of the SPA and Ramsar Site. (see sections 4.2 and 4.3)

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D12	***SAC interest feature 4:*** **Atlantic salt meadows**		**Morphology** *(characteristic stepped morphology and associated structural features - section 4.1.4.vii of the conservation objectives)*	Location and extent of established morphological features (saltmarsh terracing, creeks, pills, drainage ditches and pans) measured during the reporting cycle using remote sensing and field survey	No anthropogenic alteration of established morphological features from an established baseline. *Baselines is taken from 1999 air photos , CCW/English Nature Saltmarsh NVC survey by Dargie 1998 and English Nature condition assessment data collected in 2002 for Gloucestershire section of the estuary.*	This target relates to features which have developed naturally as a result of the evolution of the saltmarshes or the presence of freshwater drainage systems entering the estuary and which have established conservation value (eg pill sides of value botanically, pills used for shelter, feeding and roosting by birds). The baseline dataset will establish the location and extent of these features and identify man made features which do not need to meet this target.

Table 12 – Favourable condition table for the "reefs" feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
E1	***SAC interest feature 4:*** **Reefs**		**(Total) Extent and distribution** *(total extent and distribution of reef - section 4.1.5.i of the conservation objectives)*	Measurement of the extent and distribution of the purely subtidal part of this feature in the Severn Estuary is challenging. Remote sensing methods (such as side scan sonar) and drop down video are unreliable in these conditions. Therefore limited grab sampling may be required. Measurement of the subtidal component at the subtidal/intertidal interface may be possible by direct observation at very low tides. Extent and distribution of the intertidal *Sabellaria* reef measured using Phase 1 mapping survey techniques	No reduction in the extent and distribution of the reef from an established baseline *Baseline is comprised of grab sampling surveys by Mettam 1988 supplemented by Environment Agency data 1999 and data from Warwick et al.2001 which provide subtidal reef records.* *CCW/English Nature Intertidal Biotope Surveys 2006 identify the distribution of intertidal Sabellaria alveolata and indication of locations for further survey for subtidal Sabellaria contiguous with these intertidal areas.*	Known occurrences of subtidal and subtidal contiguous with intertidal reefs are largely limited to the outer parts of the estuary (area seaward of a line drawn between Portishead and Newport). See appendix 6. Samples show that reef formation is not continuous within this area and is in varying stages of growth. Further work is required to establish the distribution of this feature particularly with respect to the subtidal and the intertidal/subtidal interface. A further upstream zone of intertidal *Sabellaria* populations is recorded up to the old Severn Bridge (Beachley to Aust) . While not part of the reef feature the extent of solely intertidal *Sabellaria* is relevant as these areas will also contribute larvae to the estuary wide populations of this species. The populations of *Sabellaria* within the Severn (subtidal,and intertidal) should be regarded as a metapopulation. New technologies that may allow the measurement of *Sabellaria* reef in a non destructive way should be investigated if they present themselves.
E2			**Community composition** *(community composition - section 4.1.5.ii of the conservation objectives)-*	Measurement of the community composition of this feature in the Severn Estuary is challenging. Remote sensing methods (such as side scan sonar) and drop down video are difficult. Therefore limited grab sampling may be required.	New samples of reef show no significant decline in community composition from baseline records *Baseline is survey by Mettam 1988 supplemented by Environment Agency data 1999 and data from Warwick et al.2001*	The reefs feature comprise two communities : *Sabellaria alveolata* on variable salinity sublittoral mixed sediment SS.SBR.PoR.SalvMx *Sabellaria alveolata* reefs on sand-abraded eulittoral rock. LS.LBR.Sab.Salv The typical species associated with subtidal and intertidal reefs in the Severn Estuary, derived from known samples, are listed in section 4.15.1 note 4

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
E3	***SAC interest feature 4:*** **Reefs**		**Age structure** *(full range of age structures - section 4.1.5.iii of the conservation objectives)*	Measurement of the community composition of this feature in the Severn Estuary is challenging. Remote sensing methods (such as drop down video) are difficult. Therefore limited grab sampling may be required.	Different phases from newly settled worms through vigorous fast growing reef to older hummocks are present *Baseline yet to be established.*	*Sabellaria alveolata* reefs cycle through different phases from newly settled worms through vigorous fast-growing reef to older hummocks. In a stable or increasing population all age phases are likely to be present . The presence of areas of variable stages of growth is important in ensuring larval supply and also enhances the species diversity of the reef
E4			**Physical & ecological processes** *(physical and ecological processes - section 4.1.5.iv of the conservation objectives)*	**Abundance of coarse sediments** Presence of suitable sediment grades in subtidal and intertidal sediments within the defined reefs zone (see comment on extent and distribution above) measured periodically.	No change in the abundance of suitable sediment grades within the defined reefs zone against an established baseline *Baseline yet to be established.*	An abundance of suitable coarse sediments (0.5-1mm sand) are required to support reef growth (tube building)
E5				**Availability of suitable substrates** Extent of available suitable (hard or long-term consolidated) substrates within the defined reef zone measured periodically	No change in overall extent of available suitable substrates within the defined reefs zone against an established baseline *Baseline yet to be established – data from the BGS and the CCW/English Nature intertidal biotope survey 2006 may assist*	Within the Severn reefs have been recorded both on solid geology and on smaller rocks and cobbles.
E6				**Supply of larvae** Abundance of *Sabellaria* larvae within the water column measured through plankton sampling	No decrease in the abundance of *Sabellaria* larvae against an established baseline *Baseline yet to be established – data may be available from existing plankton sampling surveys*	Area of sampling for this attribute should include both the reef zone and areas where intertidal populations are known as all areas supporting *Sabellaria alveolata* formations will be supplying larvae to the water column and hence may seed the reef feature. Recruitment is likely to be variable between years.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
E7				**Abundance of food in water column** Methods to be determined .	No decrease in the abundance of suspended detritus within the water column of the defined reef zone against an established baseline *Baseline yet to be established*	Area of sampling of the water column should include both the reef zone and intertidal populations (the estuary-wide metapopulation of *Sabellaria alveolata*)

Table 13 – Favourable condition table for the "river lamprey" and "sea lamprey" features of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
F1	***SAC interest feature 5:*** **River lamprey** ***Lampetra fluviatilis*** **and** ***SAC interest feature 6:*** **Sea lamprey** ***Petromyzon marinus***		**Migratory access (Barriers to migration)** *(migratory passage not impeded - sections 4.1.6.i and 4.1.7.i of the conservation objectives)*	**Water quality** measured regularly throughout the reporting cycle in the Bristol Channel, Severn Estuary, River Wye SAC, River Usk SAC and River Severn. *(see also Table 8, lines A17-20 relating to general water quality requirements for the estuary feature (and dependant sub features)*	Water quality is sufficient to support migratory passage. Levels (for temperature, salinity, turbidity, pH, and dissolved oxygen) should comply with targets established under the EA Review of Consents and the Water Framework Directive. *Baseline is water quality sampling data collected by the Environment Agency*	Significant variation in these physico-chemical parameters may act as barriers to migration. For example, the timing, duration and consistency of their upstream migration are believed to be closely related to temperature changes as well as pheromone triggers from the juveniles during periods of high water flow. Peak migration usually coincides with river temperatures that remain above 10^{o}C and continues until temperatures reach 18^{o}C. Dissolved oxygen can also be significantly reduced in stretches receiving significant BOD inputs, or through the re-suspension of organic rich sediments. Toxic contaminants may act as a barrier to migration. Environmental Quality Standards (EQSs) are set for dangerous substances as defined under the Dangerous Substances Directive or Government Policy for freshwater and marine environments
F2				**Water flows** measured regularly throughout the reporting cycle (frequency to be determined) in the River Wye SAC, River Usk SAC and River Severn *(see also Table 8 line A3 relating to general tidal and water flow requirements for the estuary feature (and dependant sub features)*	Flows from the river into the estuary must be sufficient to allow migration. *Baseline is water flow sampling data collected by the Environment Agency provides a baseline. Severe low flow conditions that affect these species yet to be defined*	
F3				**Physical barriers** Mapping and quantification of potential obstructions in relation to height, type and water depth below obstruction once during the reporting cycle.	No artificial barriers significantly impairing, adults from reaching existing and historical spawning grounds, or juveniles from moving downstream. *Baseline is the Environment Agency data on structures and flood defences*	Dams, navigation and other weirs may prevent lamprey from reaching their spawning grounds. In particular, sea lamprey is known to be poor at ascending obstacles.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
F4	***SAC interest feature 5:*** **River lamprey** ***Lampetra fluviatilis*** **and** ***SAC interest feature 6:*** **Sea lamprey** ***Petromyzon marinus***		**Population size** (returning adults) *(size of populations - sections 4.1.6.ii and 4.1.7.ii of the conservation objectives)*	Number of returning adults measured using fish counters on the feeding rivers (Wye , Usk and Severn) during the migratory period.	No decline in number of returning adults from established baseline. *Baseline is yet to be established - fish counter data may be able to provide a baseline in future years.*	(Note that this attribute will not be able to be measured until the technological solutions are developed.) Fish counter technology is being developed to monitor adult lampreys but is not yet installed on the feeding rivers of the Severn Estuary. Fish counter technology should be further developed to monitor migrating adult river and sea lamprey.
F5			**Ammocoete population in tributary rivers** *(size of populations - sections 4.1.6.ii and 4.1.7.ii of the conservation objectives)*	Electrofishing surveys in $1m^2$ quadrats at a series of locations in the Rivers Usk, Wye (and Severn)	River population targets for the Usk and Wye must be met *Baseline is the survey of ammocoete abundance and distribution in the Rivers Usk and Wye commissioned by CCW in 2005 (Harvey et al. 2007).*	(Note that this attribute will not be able to be measured until the technological solutions are developed.) During the electrofishing survey all ammocoetes should be identified as *Lampetra* or *Petromyzon* and measured (mm). Surveys should be undertaken at the earliest in July but preferably between August and October. The rivers fauna CSM state three targets which must be met for the population attribute. These are; 1. Ammocoete population age structure For samples of 50 ammocoetes or less, at least 2 distinct size classes should normally be present. If more than 50 ammocoetes are collected, at least 3 size classes should be present. 2. Ammocoete distribution within catchment Lampreys should be present at not less than 2/3 of sites surveyed. 3. Ammocoete density; a. For *lampetra*; Optimal habitat $>10m^{-2}$ Overall catchment mean $>5m^{-2}$ b. For sea lamprey - Ammocoetes should be present in at least sampling sites each not less than 5km apart

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
F6			**Prey species** *(abundance of prey species - sections 4.1.6.iii and 4.1..7.iii of the conservation objectives))*	The abundance of key prey species measured periodically	No significant reduction in abundance of key prey species against an established baseline *Baseline is yet to be established Data to be used is EA monitoring of river and fish populations and future surveys*	River and sea lamprey require a variety of other fish species to act as hosts throughout their lifecycle. Their principal host species are part of the estuarine fish assemblage which has measures and targets included within the "estuaries" feature – Table 8

Table 14 – Favourable condition table for the "twaite shad" feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
G1	***SAC interest feature 7:*** **Twaite shad (*Alosa fallax*)**		**Migratory access (Barriers to migration)** *(migratory passage not impeded - section 4.1.8.i of the conservation objectives)*	**Water quality** measured regularly throughout the reporting cycle in the Bristol Channel, Severn Estuary, River Wye SAC, River Usk SAC and River Severn. *(see also Table 8 line A 17-20 relating to general water quality requirements for the estuary feature (and dependant sub features)*	Water quality is sufficient to support migratory passage. Levels (for temperature, salinity, turbidity, pH, and dissolved oxygen) should comply with targets established under the EA Review of Consents and the Water Framework Directive. *Baseline is water quality sampling data collected by the Environment Agency*	Significant variation in these physico-chemical parameters may act as barriers to migration. For example, the timing, duration and consistency of their upstream migration are believed to be closely related to temperature changes . Peak migration usually coincides with river temperatures that remain above 10^{o}C and continues until temperatures reach 18^{o}C. Dissolved oxygen can also be significantly reduced in stretches receiving significant BOD inputs, or through the resuspension of organic rich sediments. Toxic contaminants may act as a barrier to migration. Environmental Quality Standards (EQSs) are set for dangerous substances as defined under the Dangerous Substances Directive or Government Policy for freshwater and marine environments.
G2				**Water flows** measured regularly throughout the reporting cycle (frequency to be determined) in the River Wye SAC, River Usk SAC and River Severn *(see also Table 8 line A3 relating to general tidal and water flow requirements for the estuary feature (and dependant sub features)*	Flows from the river into the estuary must be sufficient to allow migration *Baseline is water flow sampling data collected by the Environment Agency provides a baseline. Severe low flow conditions that affect these species yet to be defined*	
G3				**Physical barriers** Mapping and quantification of potential obstructions in relation to height, type and water depth below obstruction once during the reporting cycle.	No artificial barriers significantly impairing, adults from reaching existing and historical spawning grounds, or juveniles from moving downstream. *Baseline is Environment Agency data on structures and flood defences*	Dams, navigation and other weirs may prevent shad reaching their spawning grounds. In particular, shad are known to be poor at ascending obstacles.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
G4	***SAC interest feature 7:*** **Twaite shad (*Alosa fallax*)**		**Population size (returning adults)** *(size of populations - section 4.1.8.ii of the conservation objectives)*	Number of returning adults measured using fish counters on the Usk and Wye rivers during the migratory period.	No drop in the annual run size greater than would be expected from variations in natural mortality alone. *Baseline is yet to be established - fish counter data may be able to provide a baseline in future years. Noble et al. (2007) provides historical information on returning adults for the River Wye.*	(Note that this attribute will not be able to be measured until the technological solutions are developed.) Fish counter technology is being developed to monitor adult shad but is not yet installed on the feeding rivers of the Severn Estuary. Fish counter technology should be further developed to monitor migrating adult shad.
G5			**River population** *(size of populations - section 4.1.8.ii of the conservation objectives)*	Seine netting for juveniles in the lower rivers and upper estuaries and monitoring of shad eggs by kick sampling	River population targets for the Usk and Wye must be met *Baseline yet to be established. Noble et al. (2007) provides some information on juvenile densities.*	(Note that this attribute will not be able to be measured until the technological solutions are developed.) Seine netting should occur in lower rivers and upper estuaries. Netting should be carried out in late summer early autumn (July-October). For each river, juvenile densities should exceed a specified minimum target at least two years in six. The extent of spawning should be monitored by kick sampling for eggs at a proportion of known spawning sites. A reduction in the spawning distribution of more than 50 % compared with the baseline will indicate an adverse change. Kick sampling should occur during May and June.
G6			**Prey species** *(abundance of prey species – section 4.1.8.iii of the conservation objectives))*	The abundance of key prey species measured by EA in their routine monitoring of the rivers and estuary	No significant reduction in abundance of key prey species against an established baseline *Baseline is yet to be established through fish surveys in estuary and rivers*	Twaite shad require a variety of invertebrates including crustacean, mysids and copepods, small fish and fish eggs particularly in that section of the estuary where saline and freshwaters meet.

4.2 Conservation objectives for SPA European Marine Site interest features

The protection and management of the SPA in accordance with Article 6 of the Habitats Directive, including in particular the consideration of plans and projects under Article 6(3) and 6(4), should be carried out in view of the conservation objectives in this section.

Note : The conservation objectives for areas of the SPA which lie outside the European Marine Site boundary are provided in separate documents by CCW and Natural England which are currently in preparation and will soon be available on request.

4.2.1 SPA Interest feature 1: Internationally important population of regularly occurring Annex 1 species : Bewick's swan

The conservation objective is to maintain the Bewick's swan population and its supporting habitats[1]in **favourable condition**, as defined below

The interest feature Bewick's swan will be considered to be in favourable condition when, subject to natural processes[2], each of the following conditions are met:

(i) the 5 year peak mean population size for the Bewick's swan population is no less than 289 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh at the Dumbles (Appendix 8: Map 1) is maintained;

(iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose (Appendix 8: Map 1) is maintained;

(iv) the extent of vegetation with an effective field size of >6 ha and with unrestricted bird sightlines > 500m at feeding, roosting and refuge sites (Appendix III) are maintained;

(v) greater than 25% cover of suitable soft leaved herbs and grasses[3] in winter season throughout the transitional saltmarsh at the Dumbles (Appendix 8: Map 1) is maintained;

(vi) aggregations of Bewick's swan at feeding, roosting and refuge sites are not subject to significant disturbance.

4.2.1.1 Explanatory information for the Bewick's swan conservation objective

[1] Key supporting habitats for the Annex I species

- **Intertidal mudflats and sandflats**
- **Saltmarsh**

[2]Natural processes in respect of the SPA

Each interest feature is subject to both natural processes and human influences. Human influence on the interest features is acceptable provided that it is compatible with the achievement of the conditions set out under the definition of favourable condition for each interest feature. A failure to meet these conditions which is entirely a result of natural processes will not constitute unfavourable condition, but will trigger a review of the definition of favourable condition. This qualification is necessary because:

(a) the bird populations themselves are subject to natural factors, many of which arise outside the SPA, such as breeding success and winter temperatures;

(b) the supporting habitats of the birds are influenced by the evolution of the estuary. Natural adjustments within estuaries can take many forms. One important example is the tendency of estuaries to accumulate sediment, thereby changing their form from their original Holocene morphology to a state where tidal energy is dissipated by subtidal and intertidal sediment banks or features. This, with other natural processes, will therefore cause the width and depth of the estuary to change over time, moving towards a state of dynamic equilibrium or 'most probable state'. As part of this process, the location and extent of saltmarshes and mudflats may change, provided there is capacity to accommodate readjustment. However, where this process is constrained, the capacity of habitats to accommodate readjustment may be affected.

[3]Key food plants of Bewick's swan

eg *Agrostis stolonifera, Alopecurus geniculatus, Glyceria geniculatus.* (This list contains examples and is not exhaustive)

4.2.2 SPA interest feature 2: Internationally important population of regularly occurring migratory species: wintering European white-fronted goose

The conservation objective is to maintain the European white-fronted goose population and its supporting habitats[1] in **favourable condition**, as defined below.

The interest feature European white-fronted goose will be considered to be in favourable condition[2] when, subject to natural processes[2], each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering European white fronted goose population is no less than 3,002 individuals (ie the 5 year peak mean between 1988/9-1992/3);

(ii) the extent of saltmarsh at the Dumbles (Appendix 8: Map 1) is maintained;

(iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose (Appendix 8: Map 1) is maintained;

(iv) greater than 25% cover of suitable soft-leaved herbs and grasses[3] is maintained during the winter on saltmarsh areas (Appendix 8: Map 1);

(v) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(vi) aggregations of European white-fronted goose at feeding or roosting sites are not subject to significant disturbance.

4.2.2.1 Explanatory information for the wintering European white-fronted goose objective

[1]Key supporting habitats for the migratory bird species

- **Intertidal mudflats and sandflats**
- **Saltmarsh**

[2]Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

[3]Key food plants of European white-fronted goose

eg *Alopecurus bulbosus, Festuca rubra, Hordeum marinum, Lolium perenne; Puccinellia maritima*. (This list contains examples and is not exhaustive)

4.2.3 SPA interest feature 3: Internationally important population of regularly occurring migratory species: wintering dunlin

The conservation objective is to maintain the dunlin population and its supporting habitats[1] in **favourable condition**, as defined below:

The interest feature dunlin will be considered to be in favourable condition when, subject to natural processes[2], each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering dunlin population is no less than 41,683 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix 8)and associated strandlines is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;

(iv) the extent of hard substrate habitats (Appendix 8) is maintained;

(v) the extent of vegetation with a sward height of <10cm is maintained throughout the saltmarsh (Appendix 8);

(vi) the abundance and macro-distribution of suitable invertebrates[3] in intertidal mudflats and sandflats (Appendix 8) is maintained;

(vii) the abundance and macro-distribution of suitable invertebrates[3] in hard substrate habitats (Appendix 8) is maintained;

(viii) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(ix) aggregations of dunlin at feeding or roosting sites are not subject to significant disturbance.

4.2.3.1 Explanatory information for the wintering dunlin objective

[1]Key supporting habitats for the migratory bird species

- **Intertidal mudflats and sandflats**
- **Saltmarsh**
- **Hard substrate habitats (rocky shores)**

[2]Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

[3]Key intertidal invertebrate prey species of dunlin

eg *Carcinus, Crangon, Hydrobia, Macoma, Hediste,* and *Talitrus* spp.
(This list contains examples and is not exhaustive)

4.2.4 SPA interest feature 4: Internationally important population of regularly occurring migratory species: wintering redshank

The conservation objective is to maintain the redshank population and its supporting habitats[1] in **favourable condition**, as defined below

The interest feature redshank will be considered to be in favourable condition when, subject to natural processes[2] each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering redshank population is no less than 2,013 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix 8) and associated strandlines is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;

(iv) the extent of hard substrate habitats (Appendix IV) is maintained;

(v) the extent of vegetation with a sward height of <10cm throughout the saltmarsh (Appendix 8) is maintained;

(vi) the abundance and macro-distribution of suitable invertebrates[3] in intertidal mudflats and sandflats (Appendix 8) is maintained;

(vii) the abundance and macro-distribution of suitable invertebrates[3] in hard substrate habitats (Appendix 8) is maintained;

(viii) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(ix) aggregations of redshank at feeding or roosting sites are not subject to significant disturbance.

4.2.4.1 Explanatory information for the wintering redshank objective

[1]Key supporting habitats for the migratory bird species

- **Intertidal mudflats and sandflats**
- **Saltmarsh**
- **Hard substrate habitats (rocky shores)**

[2]Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

[3]Key intertidal invertebrate prey species of redshank

eg *Carcinus, Crangon, Hydrobia, Macoma, Hediste,* and *Talitrus* spp.
(This list contains examples and is not exhaustive)

4.2.5 SPA interest feature 5: Internationally important population of regularly occurring migratory species: wintering shelduck

The conservation objective is to maintain the shelduck population and its supporting habitats[1] in **favourable condition**, as defined below:

The interest feature shelduck will be considered to be in favourable condition when, subject to natural processes[2], each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering shelduck population is no less than 2,892 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix 8) is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;

(iv) the extent of hard substrate habitats (Appendix 8) is maintained;

(v) the abundance and macro-distribution of suitable invertebrates[3] in intertidal mudflats and sandflats (Appendix 8) is maintained;

(vi) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(vii) aggregations of shelduck at feeding or roosting sites are not subject to significant disturbance.

4.2.5.1 Explanatory information for the wintering shelduck objective

[1]Key supporting habitats for the migratory bird species

- **Intertidal mudflats and sandflats**
- **Saltmarsh**
- **Hard substrate habitats (rocky shores)**

[2]Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

[3]Key intertidal invertebrate prey species of shelduck

eg *Carcinus, Corophium* , *Hydrobia, Macoma, Mytilus,* and *Hediste* spp
(This list contains examples and is not exhaustive)

4.2.6 SPA interest feature 6: Internationally important population of regularly occurring migratory species: wintering gadwall

The conservation objective is to maintain the gadwall population and its supporting habitats[1] in **favourable condition**, as defined below:

The interest feature gadwall will be considered to be in favourable condition when, subject to natural processes[2], each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering gadwall population is no less than 330 (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;

(iii) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(iv) aggregations of gadwall at feeding or roosting sites are not subject to significant disturbance.

4.2.6.1 Explanatory information for the wintering gadwall objective

[1]Key supporting habitats for the migratory bird species

- **Intertidal mudflats and sandflats**

  Note : It is currently unclear what use this species is making of the estuary – they are clearly present in intertidal areas particularly around areas freshwater streams and pills enter the estuary. Although primarily freshwater plant feeders they do also take animal material including insects, molluscs, annelids and even small fish and small amphibians – it is possible that they are feeding on such matter in the freshwater influenced mud and sands. Recent evidence indicates this species is changing it general habits as it extends its range westwards. As a result the conservation objective for this species does not include a condition in respect of the key food sources as for other species at this time.

[2]Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

4.2.7 SPA interest feature 7: Internationally important assemblage of waterfowl

The conservation objective is to maintain the waterfowl assemblage and its supporting habitats[1] in **favourable condition**, as defined below:

The interest feature waterfowl assemblage will be considered to be in favourable condition when, subject to natural processes[2] , each of the following conditions are met:

(i) the 5 year peak mean population size for the waterfowl assemblage is no less than 68,026 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix 8) and their associated strandlines is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;

(iv) the extent of hard substrate habitats (Appendix 8) is maintained;

(v) extent of vegetation of <10cm throughout the saltmarsh (Appendix 8) is maintained;

(vi) the abundance and macroscale distribution of suitable invertebrates[3] in intertidal mudflats and sandflats (Appendix 8) is maintained;

(vii) the abundance and macroscale distribution of suitable invertebrates[3] in hard substrate habitats (Appendix IV) is maintained;

(viii) greater than 25% cover of suitable soft leaved herbs and grasses[4] during the winter on saltmarsh areas (Appendix 8) is maintained;

(ix) unrestricted bird sightlines of >500m at feeding and roosting sites are maintained;

(x) waterfowl aggregations at feeding or roosting sites are not subject to significant disturbance.

4.2.7.1 Explanatory information for the internationally important assemblage of waterfowl

[1]Key supporting habitats for the waterfowl assemblage[1]

- **Intertidal mudflats and sandflats**
- **Saltmarsh**
- **Hard substrate habitats (rocky shores)**

[2]Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.1.1**.

[3]Key intertidal invertebrate prey species of the waterfowl assemblage

eg *Arenicola, Carcinus, Corophium, Crangon, Gammarus, Hydrobia, Macoma, Hediste, Notomastus and Talitrus* spp. - these lists are examples and are not exhaustive

[4]Key saltmarsh food plants

eg *Puccinellia maritima, Salicornia* spp., *Agrostis stolonifera, Atriplex* spp., *Hordeum marinum, Festuca rubra, Alopecurus bulbosus, Lolium perenne* - these lists are examples and are not exhaustive

4.2.8 Favourable Condition Tables for SPA interest features of the Severn Estuary European Marine Site

Background information on the role of favourable condition tables and the information provided in each column is provided in section 1.8 of this document, and a concise glossary of terms used is provided in Section 7.

The favourable condition table is intended to supplement the conservation objectives, including with respect to the management of established and ongoing activities, future requirements of monitoring and reporting on the condition of the features of the site and, together with the conservation objectives, informs the scope and nature of any appropriate assessment that may be needed. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under the Habitats Regulations. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

These tables set out all the attributes that **may** be used to monitor the condition of the features of the SPA. Where possible we will seek available information from others which can inform our assessment process.

It will be possible to monitor many of the attributes at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the initial monitoring events in order to characterise the site and establish the baselines. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Severn Estuary and may well be missed by routine monitoring.

Comprising :

Table 15 – Favourable condition table for the supporting habitats of the bird interest features in the Severn Estuary SPA

Table 16 – Favourable condition table for the qualifying bird features of the Severn Estuary SPA

Reference should also be made to Tables 8,10 and 11 - Favourable Condition Tables for the SAC habitat features relevant to the supporting habitats (intertidal mudflats and sandflats, saltmarsh and hard substrate habitats (rocky shores)) .

Table 15 Favourable Condition Table for the supporting habitats of the bird interest features in the Severn Estuary SPA European Marine Site (information on the populations of bird species using these habitats are given in Table 4)

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
SPA interest feature 1: **Internationally important Annex 1 species: Bewick's swan**	Saltmarsh	Habitat extent	Area (ha) measured once per reporting cycle.	At The Dumbles, no decrease in extent from 76 ha.	Saltmarsh provides an important feeding and roosting habitat for Bewick's swans on The Dumbles - saltmarsh/transition wet grassland in front of sea defences.
		Vegetation characteristics	Abundance of suitable soft leaved herbs and grasses - % cover (frequency to be determined)	Greater than 25% cover during the winter season.	Bewick's swans graze on soft wet meadow grasses such as *Agrostis stolonifera, Glyceria fluitans* and *Alopecurus geniculatus* which are found in the transition of saltmarsh to grassland.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines. Areas of vegetation with an effective field size of >6ha	Bewick's swan require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	At Frampton Sands, Waveridge Sands and the Noose, no decrease in extent from 980 ha.	The intertidal mudflats and sandflats at The Noose, Frampton Sand and Waveridge Sand are used as disturbance refuge for Bewick's swan. The extent and distribution of this sub-feature are important to maintain the population in favourable condition.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Bewick's swan require unrestricted views >500m to allow early detection of predators when feeding and roosting.

Table 15 - continued

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
SPA interest features 2 - 6: **Internationally important populations of regularly occurring migratory species** and *SPA interest feature 7:* **Internationally important assemblage of waterfowl**	Saltmarsh	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 1,400 ha. At The Dumbles, no decrease in extent from 76 ha.	Saltmarsh and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable saltmarsh food plants measured periodically (frequency to be determined).	Presence and abundance of suitable saltmarsh food plants should not deviate significantly from an established baseline[1]	European white-fronted geese graze on a range of saltmarsh grasses and herbs. Wigeon feed on well-grazed saltmarsh with *Puccinella maritiae*, *Salicornia* and *Agrostis*. Teal and pintail feed on seeds from *Salicornia* and *Atriplex*.
		Vegetation characteristics	Range of vegetation heights measured periodically (frequency to be determined).	Sward height and density throughout areas used for roosting should not deviate significantly from an established baseline[1].	Vegetation of <10 cm is required throughout areas used by roosting waders. This is managed by grazing.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

Table 15 - continued

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
SPA interest features 2 - 6: **Internationally important populations of regularly occurring migratory species** and *SPA interest feature 7:* **Internationally important assemblage of waterfowl**	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 15,000 ha. At Frampton Sands, Waveridge Sands and The Noose no decrease in extent from 980 ha.	Intertidal mudflats and sandflats and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable prey species measured periodically (frequency to be determined).	Presence and abundance of suitable prey species should not deviate significantly from an established baseline. [1]	Most of the waders and waterfowl within the assemblage including the internationally important regularly occurring migratory birds feed on invertebrates within and on the sediments. Diet includes *Arenicola, Crangon, Hydrobia,Hediste, Corophium, Macoma, Gammarus,* small molluscs and strandline plankton and seeds.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Shingle and rocky shores	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 1,500 ha.	This habitat is used for feeding and roosting, particularly by waders.
		Food availability	Presence and abundance of suitable intertidal invertebrates, measured periodically (frequency to be determined).	Presence and abundance of suitable food species should not deviate significantly from an established baseline[1]	Waders feed on worms, crustaceans and molluscs.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

[1] Baselines to be established

Table 16 Favourable Condition Table for the qualifying bird features in the Severn Estuary European Marine Site

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
SPA interest feature 1: **Internationally important Annex 1 species: Bewick's swan**		Population size	5 year peak mean number of individuals	No less than 289 individuals [ie the 5 year peak mean between 1988/9 - 1992/3]	Mainly found in the Upper Severn Estuary at Slimbridge
		Proportion of biogeographic population	% of NW European population	1 % of NW European population	WeBS counts provide this information
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline[1]	WeBS low tide counts display distribution information by sector (not annual counts) Birds use certain sectors to a greater or lesser degree from year to year
		Disturbance in feeding and roosting areas	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline[1]	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.
SPA interest features 2 - 6: **Internationally important populations of regularly occurring migratory species** and *SPA interest feature 7:* **Internationally important assemblage of waterfowl**		Population size	5 year peak mean number of individuals	No less than 68,026 individuals in the assemblage [ie the 5 year peak mean between 1988/9 - 1992/3] For individual species - no less than the 5 year peak mean between 1988/9 - 1992/3 detailed in Table 4	Figures derived from WeBS counts. The 5 year peak means for this period for each of the internationally important populations and species with nationally important populations which make up the internationally important assemblage are detailed in Table 4
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline[1]	In some years birds use certain sectors to a greater or lesser degree. WeBS low tide counts display distribution information by sector (not annual counts).

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
		Disturbance in feeding and roosting areas.	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline[1].	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

[1] Baselines to be established

4.3 Conservation objectives for the Severn Estuary / Môr Hafren Ramsar Site

The protection and management of the Ramsar in accordance with Article 6 of the Habitats Directive, including in particular the consideration of plans and projects under Article 6(3) and 6(4), should be carried out in view of the conservation objectives in this section.

4.3.1 Ramsar interest feature 1: Estuaries

The conservation objective for the "estuaries" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC "estuaries" feature" (refer to section 4.1.1 and Table 8 of this document), in so far as these objectives are applicable to the area designated as Ramsar Site and as defined below.

4.3.1.1 Explanatory information for the Ramsar Site "estuaries" conservation objective

The area of the estuarine ecosystem designated as Ramsar Site is smaller than that of the SAC as it is restricted to the terrestrial and intertidal areas and excludes all subtidal areas. There are therefore aspects of the SAC "estuaries" conservation objective that are not applicable to the Ramsar Site "estuaries" feature. The following Table 17 identifies the limits and restrictions, if any, that apply in respect of the Ramsar Site. The table layout follows the numbering of the SAC "estuaries" objective conditions given in section 4.1.1.

Table 17 - Limits of the Ramsar "estuaries" feature

SAC "estuaries" objective conditions to be met		Limits, if any, of the Ramsar
i.	the total extent of the estuary is maintained;	Limited to the lesser area of the Ramsar Site – excludes all subtidal areas - refer also to Appendix 2
ii.	the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained;	These requirements are related to the estuary regime, structure and function at a whole ecosystem level
iii.	the characteristic range and relative proportions of sediment sizes and sediment budget[3] within the site is maintained;	
iv.	the extent, variety and spatial distribution of estuarine habitat communities within the site is maintained;	Within the Ramsar Site this is limited to the habitats listed as Ramsar "estuarine habitats communities"[1] below
v.	the extent, variety, spatial distribution and community composition of hard substrate habitats and their notable communities is maintained;	Within the Ramsar Site this is limited to the habitats listed as Ramsar "hard substrate communities "[2] below
vi.	the abundance of the notable estuarine species assemblages is maintained or increased;	Within the Ramsar Site this is limited to the species listed as Ramsar "notable estuarine species assemblages"[3] below
vii.	the physico-chemical characteristics of the water column support the ecological objectives described above;	These requirements apply estuary wide at a whole ecosystem level
viii.	Toxic contaminants in water column and sediment are below levels which would pose a risk to the ecological objectives described above.	

[1]Ramsar "estuarine habitat communities"

a. Intertidal mudflats and sandflats (refer also to maps in Appendices 4 and 4a)
   - Intertidal gravel and clean sands
   - Intertidal muddy sands
   - Intertidal muds

b. Saltmarshes (equivalent to the Atlantic saltmeadows feature of the SAC) (refer also to maps in Appendices 5 and 5a)
   - Low – mid marsh communities
   - Mid – upper marsh communities
   - Transitional high marsh communities
   - Pioneer marsh communities

[2]Ramsar "hard substrate communities"

These include all hard substrate (rocky shore) communities within the Ramsar Site boundary shown in the map in Appendix 7 which includes the following notable communities:

- *Sabellaria alveolata reefs on sand-abraded eulittoral rock* (MLR.Sab Salv) *****
- *Hydroids, ephemeral seaweeds and Littorina littorea in shallow eulittoral mixed substrata pools.* **(**LR.RkpH)
- *Balanus crenatus and Tubularia indivisa on extremely tide-swept circalittoral rock* ECR.BS.BalTub)
- *Fucus serratus* and piddocks on lower eulittoral soft rock (MLR.Fser.Pid)
- *Mytilus edulis* and piddocks on eulittoral firm clay (MLR.MytPid)
- *Balanus crenatus, Halichondrea panicea* and *Alcyonidium diaphanum* on extremely tide-swept sheltered circalittoral rock (ECR.BalHpan) .
- *Sertularia cupressina and Hydrallmania falcate* on tide-swept sublittoral cobbles or pebbles in coarse sand (IGS.ScupHyd).
- *Corralina officinalis* and coralline crusts in shallow eulittoral rockpools (LR.Rkp.Cor)
- Eel grass (*Zostera*) beds
- Any other notable hard substrata communities that may be identified.

*****Note : where this community is contiguous with the occurrence of subtidal *Sabellaria alveolata* reefs it forms part of the SAC reefs feature. Within the Ramsar it is regarded as a component of the hard substrates subfeature of the Ramsar estuaries feature .

[3]Ramsar "notable estuarine species assemblages"

i. Assemblage of fish species:
   - Migratory species
     - River and Sea Lamprey and Twaite shad and Allis shad
     - Sea trout, salmon, eel,
   - Estuarine species
     - Species typically occurring and breeding in estuaries (Bird, 2008)
     - Marine species occurring in large numbers in estuaries (Bird, 2008)
   - Marine species
     - Predominantly marine species occurring infrequently in the Severn (Bird, 2008)
   - Freshwater species
     - Species typically occurring and breeding in freshwater and recorded within the Severn (Bird, 2008)

ii Assemblage of waterfowl species (refer also to section 4.3.9)

Internationally important populations of waterfowl comprising :
- Regularly occurring Annex 1 species - Bewicks' swan
- Regularly occurring migratory species - European white-fronted goose, dunlin, redshank, shelduck, and gadwall

Internationally important assemblage of waterfowl comprising above species plus the following :
- Nationally important bird populations - wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew, whimbrel and spotted redshank, lesser black-backed gull

iii. Assemblage of vascular plant species:

- Salt marsh species (refer to notes 5 and 6 in section 4.1.4.1 - explanatory information on the conservation objective for the Atlantic salt meadows feature)
- Eel grass *(Zostera)* species.

4.3.2 Ramsar interest feature 2: Assemblage of migratory fish species[1]

The conservation objective for the "assemblage of migratory fish species" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes[2], each of the following conditions are met:

i. the migratory passage of both adults and juveniles of the assemblage of migratory fish species through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;

ii the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;

iii. the abundance of prey species[3] forming the principle food resources for the assemblage species within the estuary, is maintained.

iv. Toxic contaminants in the water column[4] and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms [1-4] above is explained in **section 4.3.2.1**

Note : The populations of three of the assemblage species (river lamprey, sea lamprey and twaite shad) are designated as features of the SAC for which separate specific objectives have been written (refer to sections 4.1.6 to 4.1.8 of this document). The populations of these species depend on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore these features can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC are also met in full and there is a continued recorded presence of these species in the River Severn.

4.3.2.1 Explanatory information for the assemblage of migratory fish species conservation objective

[1] Assemblage of migratory fish species

Species which are designated features of the SAC and for which individual conservation objectives have been written (refer to sections 4.1.6, 4.1.7 and 4.1.8)

Sea lamprey *Petromyzon marinus*
River lamprey *Lampetra fluviatilis*
Twaite shad *Alosa. fallax*

Other migratory species in the assemblage

Allis shad *Alosa alosa*
Salmon *Salmo salar*
Sea trout *S. trutta*
Eel *Anguilla anguilla*.

[2]Natural processes in respect of the Ramsar fish features

Assemblage populations :
The size of the populations is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food / host availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats
The general meaning of 'natural processes' with respect to the supporting habitats of the migratory fish assemblage within the estuary is explained in **section 4.1.1.1**.

[3]Prey species

Assemblage Species	Key prey species
Sea lamprey	Eel *Anguilla anguilla*, cod *Gadus morhua*, and haddock *Melanogrammus aeglefinus* are all potential prey species for the sea lamprey found within the Severn Estuary (Bird 2008)
River lamprey	Sea trout *Salmo trutta*, shad *Alosa fallax/Alosa alosa*, herring *Clupea harengu*s, sprat *Sprattus sprattu*s, flounder *Platichthys flesu*s and small gadoids such as whiting *Merlangius merlangu*s and pout *Trisopterus luscu*s are all potential prey species for the river lamprey found within the Severn Estuary (Bird 2008).
Twaite shad	Small custaceans, especially mysids and copepods, small fish, especially sprats and anchovies, and fish eggs (Maitland, P.S. & Hatton-Ellis 2003).
Allis shad	Small custaceans, especially mysids and copepods, small fish, especially sprats and anchovies, and fish eggs (Maitland, P.S. & Hatton-Ellis 2003).
Salmon	While at sea, salmon feed on a variety of fish (e.g. herring, sprat, sand eel, mackerel, and various gadoids) and crustaceans (e.g. euphausiid shrimps, prawns, gammarid amphipods and various crabs). (Bird, 2008)
Sea trout	The diet of this species at sea has not been much studied but is believed to include a range of fish species including sprat, young herring and sand eels as well as crustaceans such amphipods (e.g. Corophium), gammarids, decapods such as Crangon and mysid shrimps. Many of these prey items also occur in estuaries where sea trout are known to feed extensively. (Bird, 2008)
Eel	A range of benthic organisms that include crustaceans and small fish. (Bird, 2008)

[4]Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.3.3 Ramsar interest feature 3: Internationally important populations of waterfowl : Bewick's swan

The conservation objective for the "Bewick's swan" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "Bewick's swan " feature (refer to section 4.2.1)

4.3.4 Ramsar interest feature 4 : Internationally important populations of waterfowl : European white-fronted goose

The conservation objective for the "European white-fronted goose" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "wintering European white-fronted goose" feature (refer to section 4.2.2)

4.3.5 Ramsar interest feature 5: Internationally important populations of waterfowl : dunlin

The conservation objective for the "dunlin" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "wintering dunlin " feature (refer to section 4.2.3)

4.3.6 Ramsar interest feature 6: Internationally important populations of waterfowl : redshank

The conservation objective for the "redshank" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "wintering redshank" feature (refer to section sections 4.2.4)

4.3.7 Ramsar interest feature 7: Internationally important populations of waterfowl :shelduck

The conservation objective for the "shelduck" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "wintering shelduck" feature (refer to section 4.2.5)

4.3.8 Ramsar interest feature 8: Internationally important populations of waterfowl : gadwall

The conservation objective for the "gadwall" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "wintering gadwall" feature (refer to section sections 4.2.6)

4.3.9 Ramsar interest feature 9: Internationally important assemblage of waterfowl

The conservation objective for the "internationally important assemblage of waterfowl" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "internationally important assemblage of waterfowl" feature (refer to section sections 4.2.7) – with special reference to the individual species listed and their population figures given in Table 6

Note : This Ramsar Site feature incorporates both wintering and passage populations of some birds and hence some species are included more than once in lists given in Table 6

4.3.10 Favourable Condition Tables for the Ramsar Site interest features of the Severn Estuary European Marine Site

Background information on the role of favourable condition tables and the information provided in each column is provided in section 1.8 of this document, and a concise glossary of terms used is provided in Section 7.

The favourable condition table is intended to supplement the conservation objectives, including with respect to the management of established and ongoing activities, future requirements of monitoring and reporting on the condition of the features of the site and, together with the conservation objectives, informs the scope and nature of any appropriate assessment that may be needed. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under the Habitats Regulations. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

These tables set out all the attributes that **may** be used to monitor the condition of the features of the Ramsar Site. Where possible we will seek available information from others which can inform our assessment process.

It will be possible to monitor many of the attributes at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the initial monitoring events in order to characterise the site and establish the baselines. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Severn Estuary and may well be missed by routine monitoring.

Comprising :

Table 18 – Favourable condition table for the “estuaries” feature of the Severn Estuary Ramsar Site

Table 19 – Favourable condition table for the migratory fish assemblage of the Severn Estuary Ramsar Site

Table 20 – Favourable condition table for the supporting habitats of the bird interest features (Ramsar features 3 to 9) in the Severn Estuary Ramsar Site

Table 21 – Favourable condition table for the qualifying bird interest features in the Severn Estuary Ramsar Site
Favourable condition table for the “estuaries” feature of the Severn Estuary Ramsar Site

Reference should also be made to Tables 8,10 and 11 - Favourable Condition Tables for the SAC habitat features relevant to the supporting habitats (intertidal mudflats and sandflats, saltmarsh and hard substrate habitats (rocky shores)) .

Table 18 Favourable Condition Table for the "estuaries" feature of the Severn Estuary Ramsar Site

Ramsar interest feature	**Comments**
Ramsar Interest feature 1: **Estuaries**	**The Favourable Condition Table for the "estuaries" feature of the Severn Estuary Ramsar Site is largely the same as that for the Severn Estuary SAC "estuaries" feature (see section 4.1 : Table 8).** However the area of the estuarine ecosystem designated as Ramsar Site is smaller than that of the SAC as it is restricted to the terrestrial and intertidal areas and excludes all subtidal areas. Table 17 identifies the limits and restrictions that apply in respect of the Ramsar Site Conservation Objective. **There are therefore aspects of the SAC "estuaries" Favourable Condition Table that are not applicable to the Ramsar Site "estuaries" feature as follows :** • All attributes other than those referred to below - apply only in respect of the area within the Ramsar Boundary (as shown in Appendix 2) • Line A6 - which relates to the subtidal sandbanks subfeature of the estuaries feature - this does not apply as these habitats lie outside the boundary of the Ramsar Site • Line A9 - which relates to the reefs subfeature of the estuaries feature - this only applies in respect of areas where intertidal *Sabellaria alveolota* occurs contiguously with the subtidal reefs (yet to be fully defined).

Table 19 Favourable Condition Table for the Migratory fish assemblage feature of the Severn Estuary Ramsar Site

Ramsar interest feature	Sub-feature	Attribute	Measure	Target	Comments
Ramsar Interest feature 2 : **Migratory fish assemblage**		**Migratory access (Barriers to migration)** *(migratory passage not impeded - sections 4.6.i and 4.7.i of the conservation objectives)*	**Water quality** measured regularly throughout the reporting cycle in the Bristol Channel, Severn Estuary, River Wye SAC, River Usk SAC and River Severn. *(see also lines A17- A20 of Table 8 relating to general water quality requirements for the estuary feature (and dependant sub features)*	Water quality is sufficient to support migratory passage. Levels (for temperature, salinity, turbidity and pH, and dissolved oxygen) should comply with targets established under the EA Review of Consents and the Water Framework Directive. *Baseline is water quality sampling data collected by the Environment Agency*	Significant variation in these physio-chemical parameters may act as barriers to migration. For example, the timing, duration and consistency of their upstream migration are believed to be closely related to temperature changes as well as pheromone triggers from the juveniles during periods of high water flow. Peak migration usually coincides with river temperatures that remain above 10^{o}C and continues until temperatures reach 18^{o}C. Dissolved oxygen can also be significantly reduced in stretches receiving significant BOD inputs, or through the re-suspension of organic rich sediments. Toxic contaminants may act as a barrier to migration.
			Water flows measured regularly throughout the reporting cycle (frequency to be determined) in the River Wye SAC, River Usk SAC and River Severn *(see also line A3 of Table 8 relating to general tidal and water flow requirements for the estuary feature (and dependant sub features)*	Flows from the rivers into the estuary must be sufficient to allow migration *Baseline is water flow sampling data collected by the Environment Agency provides a baseline. Severe low flow conditions that affect these species yet to be defined*	
			Physical barriers Mapping and quantification of potential obstructions in relation to height, type and water depth below obstruction once during the reporting cycle.	No artificial barriers significantly impairing, adults from reaching existing and historical spawning grounds, or juveniles from moving downstream. *Baseline is the Environment Agency data on structures and flood defences*	Dams, navigation and other weirs may prevent fish from reaching their spawning grounds. In particular, sea lamprey is known to be poor at ascending obstacles.

Ramsar interest feature	Sub-feature	Attribute	Measure	Target	Comments
		Population sizes (returning adults) *(size of populations - sections 4.6.ii and 4.7.ii of the conservation objectives)*	Number of returning adults measured using fish counters on the feeding rivers (Wye , Usk and Severn) during the migratory period.	No decline in number of returning adults from established baseline. *Baseline is yet to be established - fish counter data may be able to provide a baseline in future years.*	(Note that this attribute will not be able to be measured until the technological solutions for monitoring some species (notably lampreys and shad) are developed.)
		River populations *(size of populations - sections 4.6.ii and 4.7.ii of the conservation objectives)*	Survey through various methods (Electrofishing, seine netting , line fishing records, licencing returns) at a series of locations in the Rivers Wye, Usk and Severn	No decline in populations of the Rivers Wye and Usk *Baseline is yet to be established - fish counter data may be able to provide a baseline in future years.*	Details of methods for river and sea lamprey are outlined in section 4.1.9, Table 13 and for Twaite shad in Table 14 - the individual FCT for these species within the SAC section of this document
		Prey species *(abundance of prey species - sections 4.6.iii and 4.7.iii of the conservation objectives))*	The abundance of key prey species measured by EA in their routine monitoring of the rivers and estuary	No significant reduction in abundance of key prey species against an established baseline *Baseline is yet to be established through fish surveys in estuary and rivers*	River and sea lamprey require a variety of other fish species to act as hosts throughout their lifecycle. Their principal host species are part of the estuarine fish assemblage which has measures and targets included within Table 8. Twaite shad require a variety of invertebrates including crustacean, mysids and copepods, small fish and fish eggs particularly in that section of the estuary where saline and freshwaters meet. While at sea, salmon feed on a variety of fish (e.g. herring, sprat, sand eel, mackerel, and various gadoids) and crustaceans (e.g. euphausiid shrimps, prawns, gammarid amphipods and various crabs). (Bird, 2008) The diet of sea trout at sea is believed to include a range of fish species including sprat, young herring and sand eels as well as crustaceans such amphipods (e.g. Corophium), gammarids, decapods such as Crangon and mysid shrimps. Eeels feed on a range of benthic organisms that include crustaceans and small fish. (Bird, 2008)

Table 20 Favourable Condition Table for the supporting habitats of the bird interest features (Ramsar interest features 3 to 9) in the Severn Estuary Ramsar Site (Numbers of bird species using these habitats are given in Table 6)

Ramsar interest features	Supporting Habitat	Attribute	Measure	Target	Comments
Ramsar Interest features 3-8 : **Internationally important populations of waterfowl** and *Ramsar Interest feature 9 :* **Internationally important assemblage of waterfowl**	Saltmarsh	Habitat extent	Area (ha) measured once per reporting cycle.	No decrease in extent from 1,400 ha. At The Dumbles, no decrease in extent from 76 ha.	Saltmarsh and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable saltmarsh food plants measured periodically (frequency to be determined).	Presence and abundance of suitable saltmarsh food plants should not deviate significantly from an established baseline[1].	European white-fronted geese graze on a range of saltmarsh grasses and herbs. Wigeon feed on well-grazed saltmarsh with *Puccinella maritiae*, *Salicornia* and *Agrostis*. Teal and pintail feed on seeds from *Salicornia* and *Atriplex*.
		Vegetation characteristics	Abundance of suitable soft leaved herbs and grasses - % cover (frequency to be determined)	Greater than 25% cover during the winter season.	Bewick's swans graze on soft wet meadow grasses such as *Agrostis stolonifera*, *Glyceria fluitans* and *Alopecurus geniculatus* which are found in the transition of saltmarsh to grassland.
		Vegetation characteristics	Range of vegetation heights measured periodically (frequency to be determined).	Sward height and density throughout areas used for roosting should not deviate significantly from an established baseline[1].	Vegetation of <10 cm is required throughout areas used by roosting waders. This is managed by grazing.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines. Areas of vegetation with an effective field size of >6ha at the Dumbles (Bewicks swan)	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

Table 20 continued

Ramsar interest features	Supporting Habitat	Attribute	Measure	Target	Comments
Ramsar Interest features 3-8 : **Internationally important populations of waterfowl** and *Ramsar Interest feature 9 :* **Internationally important assemblage of waterfowl**	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 15,000 ha. At Frampton Sands, Waveridge Sands and The Noose no decrease in extent from 980 ha.	Intertidal mudflats and sandflats and their communities are important habitats as they provide both roosting and feeding areas. The intertidal mudflats and sandflats at The Noose, Frampton Sand and Waveridge Sand are used as disturbance refuge for Bewick's swan. The extent and distribution of this sub-feature are important to maintain the population in favourable condition.
		Food availability	Presence and abundance of suitable prey species measured periodically (frequency to be determined).	Presence and abundance of suitable prey species should not deviate significantly from an established baseline[1]..	Most of the waders and waterfowl within the assemblage including the internationally important population of waterfowl feed on invertebrates within and on the sediments. Diet includes *Arenicola, Crangon, Hydrobia,Hediste, Corophium, Macoma, Gammarus,* small molluscs and strandline plankton and seeds.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Shingle and rocky shores	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 1,500 ha.	This habitat is used for feeding and roosting, particularly by waders.
		Food availability	Presence and abundance of suitable intertidal invertebrates, measured periodically (frequency to be determined).	Presence and abundance of suitable food species should not deviate significantly from an established baseline[1].	Waders feed on worms, crustaceans and molluscs.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

[1] Baselines to be established

Table 21 Favourable Condition Table for the qualifying bird features in the Severn Estuary Ramsar Site

Ramsar interest features	Supporting Habitat	Attribute	Measure	Target	Comments
Ramsar Interest features 3-8 : **Internationally important populations of waterfowl** and *Ramsar Interest feature 9 :* **Internationally important assemblage of waterfowl**		Population size	5 year peak mean number of individuals	No less than 68,026 individuals in the assemblage [ie the 5 year peak mean between 1988/9 - 1992/3] For individual species - no less than the 5 year peak mean between 1988/9 - 1992/3 detailed in Table 6	Figures derived from WeBS counts. The 5 year peak means for this period for each of the internationally important populations and species with nationally important populations which make up the internationally important assemblage are detailed in Table 6
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline[1].	WeBS low tide counts display distribution information by sector (not annual counts) Birds use certain sectors to a greater or lesser degree from year to year
		Disturbance in feeding and roosting areas.	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline[1].	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

[1] Baselines to be established

5. Advice on Operations

CCW and Natural England have a duty under Regulation 33(2)(b) of The Conservation (Natural Habitats &c.) Regulations 1994 to advise other relevant authorities as to any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated. Information on how CCW and Natural England have developed this advice is given in section 5.2, and on how it may be reviewed and updated in the future in section 5.3.

The Advice on Operations concerning the SAC are provided in detail in Table 22 and section 5.6. The Advice on Operations concerning the SPA is provided in Table 23 and section 5.7. These include recommendations regarding specific interest features and their supporting habitats. The Advice on Operations concerning the Ramsar Site is provided by cross reference to the subsections of the advice for the SAC and SPA which are relevant to the Ramsar Site interest features.

5.1. Purpose of advice

The aim of this advice is to provide CCW and Natural England's Advice on Operations as required by Regulation 33 (2)(b)for the Severn Estuary European Marine Site and thereby enable all relevant authorities to direct and prioritise their work on the management of activities that pose the greatest potential threat to the favourable condition of interest features on the Severn Estuary European Marine Site. The advice should be read in conjunction with the Conservation Objectives for the SAC, SPA and Ramsar Sites interest features given in sections 4.1, 4.2 and 4.3 respectively and it is intended to provide the basis for detailed discussions to formulate and agree a management scheme for the European Marine Sites.

General advice on sensitivity, exposure (and therefore vulnerability) contained within this document is presented against broad categories of operation which may cause the deterioration of natural habitats or the habitats of species, or the disturbance of species (refer to section 5.2). It reflects activities and plans and projects. Generic examples of some of the types of operation that are covered under the broad category headings are given for illustration.

The advice is based on best available information at the time of preparation of the Regulation 33 advice for the Severn Estuary in 2008/09. For a current assessment of levels of disturbance of specific types of activity across the Severn Estuary (relevant solely to the SPA interest features), reference should be made to the SPA Scheme of Management, available at the ASERA website (http://www.severnestuary.net/asera/). It should be noted, however, that the frequency, intensity, effects and level of risk to the SPA features that certain activities may have are still being investigated under the existing Severn Estuary Scheme of Management.

5.2 Methods for assessment

The advice provided here is within six broad categories of operation which may cause the deterioration of natural habitats or the habitats of species, or the disturbance of species. These categories are:

- Physical loss
- Physical damage
- Non-physical disturbance
- Toxic contamination
- Non-toxic contamination
- Biological disturbance

Within these categories are environmental impacts that may result from operations. Example sources of activities are provided in the MarLIN *Maritime and coastal activities to environmental factors matrix* (see Appendix 10), although these are by no means inclusive of all potentially damaging activities.

Given current knowledge of the nature and extent of activities taking place within the Severn Estuary European Marine Site, this approach therefore:

- enables links to be made between human activities and the ecological requirements of the habitats or species, as required under Article 6 of the Habitats Directive;
- provides a consistent framework to enable relevant authorities in England and Wales to assess the effects of activities and identify priorities for management within their areas of responsibility; and
- is appropriately robust to take into account the development of novel activities or operations which may cause deterioration or disturbance to the interest features of the site and should have sufficient stability to need only infrequent review and updating by the CCW and Natural England.

These broad categories provide a clear framework against which relevant authorities can assess activities or operations under their responsibility. The more detailed information in Tables 22 and 23 (covering both the SAC and SPA) provides competent authorities with a context against which to consider an assessment of 'significant effect' of any plans or projects which may affect the site and a basis to inform on the scope and nature of appropriate assessments required in relation to plans and projects. It is important to note that this advice is only a starting point for assessing impacts. It does not remove the need for the relevant or competent authorities to consult CCW or Natural England formally over individual plans and projects where required to do so under the Regulations.

This Advice on Operations for the site is based on a three-step process involving:

- an assessment of the **sensitivity** of the interest features or their component supporting habitats to operations;
- an assessment of the **current exposure** of each interest feature or their component supporting habitats to operations; and
- a final assessment of **current vulnerability** of interest features or their component supporting habitats to operations.

Note that in respect of the SPA, sensitivity, exposure and vulnerability have been assessed largely in relation to the use of habitats by birds, but may also take into account direct effects on the bird species themselves (such as 'shooting' or 'disturbance').

This three-step process builds up a level of information necessary to manage activities in and around the European Marine Site in an effective manner and to identify to competent and relevant authorities those operations which pose the most immediate threats to the favourable condition of the interest features of the European Marine Site.

The assessment of relative sensitivity, exposure and vulnerability is derived using best available scientific information and informed scientific interpretation and judgement. The process uses sufficiently coarse categorisation to minimise uncertainty in information, reflecting the current state of knowledge and understanding of the marine environment. Where possible, the sensitivity, exposure and vulnerability are assessed on a three-point scale of 'Low', 'Moderate' or 'High'. To assist with interpretation, these levels have been colour-coded in Tables 22 & 23.

5.2.1 Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features or the component supporting habitats of the Severn Estuary European Marine Site to the effects of six broad categories of human activities. In relation to this assessment, **sensitivity** has been defined as **'the intolerance of a habitat, community or individual (or individual colony) of a species to damage, or death, from an external factor and the time taken for its subsequent recovery'** (MarLIN, 2003). For

example, a very sensitive species or habitat is one that is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, 'high' intolerance) and is expected to recover over a very long period of time, i.e. >10 or up to 25 years ('low' recoverability).

The sensitivity assessments are based on current information but may develop with improvements in scientific knowledge and understanding. The sensitivity of interest features (and scientific understanding of sensitivity) may change over time; hence an operation which is not currently considered to have a negative effect, may do so in the future.

English Nature (now Natural England) and Scottish Natural Heritage commissioned the Marine Biological Association of the UK, through its Marine Life Information Network (MarLIN) to provide detailed sensitivity information to underpin this advice. Detailed sensitivity information at a biotope or species level is available via MarLIN's website (www.marlin.ac.uk). The sensitivity assessments are indicative qualitative judgements based on the best available scientific information. They represent the most likely (probable) result of a given change in a factor. The sensitivity assessments of the interest features or their component supporting habitats of the Severn Estuary SAC, SPA and Ramsar Site are based upon MarLIN sensitivity assessments for biotopes (components of the Annex I habitats) and species supplemented by local knowledge and professional judgement to provide a site specific assessment that reflect the unusual and extreme character of the Severn Estuary.

The sensitivities of each of the SAC Annex I habitat features have been assessed on the component biotopes represented within each of the habitats (where information is available). Where information has not been available, such as for subtidal *Sabellaria alveolata* reefs or for Atlantic saltmeadow communities, a number of scientific review documents have been consulted, including reports produced for the UK Marine SAC LIFE project (see Bibliography section for a full list of these).

Assessments for the Annex II migratory fish have been based on current knowledge (best available scientific knowledge), which is limited for the life phase that shad and lamprey spend in estuarine waters. Given the paucity of information, it has not been possible to assess the level of sensitivity on a three-point scale; they have been assessed to be either 'sensitive' or 'not sensitive'.

For the SPA, the sensitivities have been assessed in relation to the use of habitats by birds and the sensitivities of the individual species themselves to certain activities. For example, wintering birds are highly sensitive to the loss of their roosting or feeding grounds; and they are highly sensitive to the noise of shooting. The sensitivity assessments of the interest features or their component supporting habitats of the Severn Estuary SPA are based on a number of scientific review documents. These include reports produced for the UK Marine SAC LIFE project (Davison & Hughes 1998; Elliott *et al.*, 1998), the Countryside Council for Wales Science Report (Holt *et al.*, 1995) and the Marine Habitats Review (Jones *et al.*, 2000.).

The magnitude or scale of the effect of an activity and the resultant change in environmental factors are site specific. For the purpose of this advice, the assessments of sensitivity have been adjusted for *changes in suspended sediments* and *turbidity* to reflect the particular conditions affecting the site. As a result of the high tidal energy of the site, the concentration of suspended sediment and turbidity are naturally very high. The marine fauna, including the migratory fish, are adapted to such high concentrations of suspended sediment and thus they are unlikely to have any significant effect. Consequently the sensitivities relating to *changes in suspended sediments* and *turbidity* have been downgraded.

Table 22 shows the sensitivity assessments for the SAC features and sensitivity assessments for the SPA can be seen in Table 23.

5.2.2 Exposure assessment

Exposure assessment has been undertaken for the Severn Estuary European Marine Site by assessing the relative exposure of the interest features or their component supporting habitats to the effects of broad categories of operations, resulting from human activities currently occurring on the site. Exposure has been assessed against a matrix which relates activities to operation pressures (see Appendix 10). The

matrix has been used as a guide and interpreted to assess the exposure to current activities known to be present within the site.

In assigning a three-point score (High, Moderate or Low) to the exposure, each activity is considered for:

- Spatial extent of the pressure
- Frequency of the pressure and
- Intensity of the pressure

For the SPA, the exposure has been assessed in relation to the use of habitats by birds and on the bird species themselves. As an example, the feeding and roosting grounds of wintering birds may be considered highly exposed to toxic contamination from synthetic compounds due to the locations and intensity of discharges into an area.

5.2.3 Vulnerability assessment

The third step in the process is to determine the vulnerability of interest features or their component supporting habitats to operations. This category results from an integration of sensitivity and exposure. Only if a feature is both sensitive and exposed to a human activity will it be considered vulnerable. In this context therefore, 'vulnerability' has been defined as **'the exposure of a habitat, community or individual (or individual colony) of a species to an external factor to which it is sensitive'** (Hiscock, 1996).

Tables 22 and 23 show the vulnerability assessments for the SAC features and the SPA features respectively.

5.3 Update and review of advice

Information as to the categories of operations which may cause the deterioration of natural habitats or the habitats or disturbance of species for which the site has been designated, is provided in light of what CCW and Natural England know about current activities and patterns of usage within the Severn Estuary European Marine Site. The general information on current activities and patterns of usage (which was used in part to derive Table 23) has been refined at the local level in producing the management scheme for the SPA and through further discussion with the relevant authorities. This management scheme is available at the ASERA website (http://www.severnestuary.net/asera/) although this will require review following this more detailed analysis of impacts on the estuarine habitats that are supporting habitats for the birds of the SPA.

The information provided in this advice on the sensitivity of interest features or their supporting habitats (Table 23) will change as a result of an improvement in our scientific knowledge, which will be a relatively long term process. It is suggested that advice for sites be kept under review and is periodically updated through discussion with relevant authorities and others to reflect significant changes in our understanding of sensitivity together with the potential effects of plans and projects on the marine environment.

5.4 Plans and Projects

Under Regulation 48(1), an appropriate assessment must be undertaken by competent authorities in respect of any plan or project which:

a. either alone or in combination with other plans or projects is likely to have a ***significant effect*** on a European site; and
b. is not directly connected with or necessary to the management of the site for nature conservation.

This legal requirement applies to all European sites (SACs and SPAs). Regulation 48 is also applied, as a matter of Government policy, to proposed SPAs and listed Ramsar sites.

Tables 22 and 23 provides competent authorities with a guide against which to initiate an assessment of the 'significance' of any plans or projects (and on-going operations or activities) proposed for the site, although this will only be a starting point for assessing impacts and does not remove the need for competent authorities to consult CCW or Natural England formally over individual plans and projects where required under the Regulations.

5.5 Review of consents

Regulation 50 of the Conservation (Natural Habitats, &c.) Regulations 1994 requires a competent authority to undertake a review of any existing consent or permission to which Regulation 48(1) would apply if it were to be reconsidered as of the date on which the site became a European site. Where a review is required under these provisions it must be carried out as soon as reasonably practicable after classification of the European Marine Site. Consents will need to be reviewed in the light of these objectives.

5.6 Specific Advice on Operations for the Severn Estuary SAC

This section provides information to help relate general advice to each of the specific interest features of the Severn Estuary SAC. Where specific examples are given they are provided to aid understanding of possible impacts and are not intended to be a comprehensive list of all relevant operations.

This advice relates to the vulnerability of the interest features and supporting habitats of the Severn Estuary SAC as set out in more detail in Table 22. A brief explanation of the sensitivity of the interest features or supporting habitats follows, with an explanation of their exposure and consequently their vulnerability to damage or disturbance from the listed categories of operations is also given. This enables links between the categories of operation and the ecological requirements of the European Marine Site and Ramsar Site interest features to be made.

The precise impact of any category of operation occurring on the site will be dependent upon the nature, scale, location and timing of events. In accordance with Government policy guidance, the Advice on Operations provided here, is feature and site specific, and provided in the light of current activities and patterns of usage at the site.

As such, it is important that future consideration of this advice by relevant authorities, and others, takes account of changes in usage patterns that have occurred at the site over the intervening period. Advice for sites should be kept under review: it is suggested that periodic discussions with relevant authorities and others be undertaken to reflect significant changes in the understanding of sensitivities, as well as the potential effects of future plans or projects on the marine environment.

5.6.1 Estuaries feature

(Note : this advice is also relevant to the "estuaries" feature of the Ramsar Site – refer also to section 5.8)

5.6.1.1 Sensitivity

The **estuary** and its associated biological communities are **moderately to highly sensitive** to:

- **physical loss**
- **physical damage**
- **toxic contamination**
- **non-toxic contamination** and
- **biological disturbance**

These result from a range of activities known to occur in the estuary. Further details are provided in points i) to xiv) below, with details of the level of sensitivity set out in Table 22.

5.6.1.2 Exposure

The **estuary** and its associated biological communities are **moderately to highly exposed** to:

- **substratum loss**
- **smothering**
- **changes in suspended sediment**
- **changes in water flow rate**
- **changes in wave exposure**
- **abrasion and physical disturbance**
- **noise and visual disturbance**
- **toxic contamination (introduction of synthetic & non synthetic compounds)**
- **changes in nutrient loading**
- **changes in thermal regime**
- **changes in turbidity**
- **changes in salinity**
- **changes in oxygenation**
- **introduction of microbial pathogens**
- **introduction of non-native species**
- **selective extraction of species**

5.6.1.3 Vulnerability

The **estuary** and its associated biological communities are **moderately to highly vulnerable** to:

i. Substratum loss

The estuary feature is considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to substratum loss.

The physical loss of areas of intertidal habitats may be caused directly through a change in land use, or indirectly as a consequence of changes to sedimentation processes (e.g. resulting from the construction of groynes or of seawalls). Subtidal sedimentary habitats will be directly affected by the removal of material during maintenance dredging and aggregate extraction in particular. These activities, coupled with strong current flows, result in material being suspended in the water column and removed away from their point of origin. Removal of the substratum will lead to partial loss of faunal diversity, exposure of the underlying sediment and changes in the topography of the area. Intertidal seagrass beds will be adversely affected by substratum loss, with recoverability depending upon recruitment from other populations.

ii. Smothering

The estuary feature is considered to have **high sensitivity** and **moderate exposure** and therefore **high vulnerability** to smothering

Smothering of organisms is likely to occur as a result of the direct deposition of material on top of them and/or on their habitat. Examples of activities causing smothering in intertidal areas include beach replenishment, port developments, archaeological activities, coastal farming, industrial effluent discharge, oil spills, land runoff including highways discharge and sewage discharge. In subtidal areas, dumping of spoil from dredging operations is responsible for most smothering events. Both intertidal and subtidal seagrass beds are considered to be highly sensitive to smothering. A seagrass bed close to the second Severn crossing is known to have been adversely affected by smothering as a result of changes to sediment movements due to temporary works associated with the bridge construction in the early 1990's.

iii. Changes in suspended sediment

The estuary feature is considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in suspended sediment

As a result of the high tidal energy of the site, the concentration of suspended sediment and turbidity are naturally very high. This high tidal energy is one of the reasons for site selection as part of the Natura 2000 series. The marine fauna, including the migratory fish, are adapted to high concentrations of suspended sediment. Increase in sediment in suspension is unlikely to cause problems unless it leads to smothering (see smothering). Of greater concern in the Severn estuary would be the decrease in suspended sediments leading to increased light penetration and changes in the habitats and their plant and animal communities.

Activities likely to result in changes in suspended sediment would include those which would affect sediment availability or the water flow rate (coastal defences, development, construction and dredging).

iv. Changes in water flow rate

The estuary feature is currently considered to have be **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in water flow rate.

The estuary is considered to have high exposure due to its highly constrained nature (by man made hard defences). Increases or decreases to the water flow rate are likely to lead to, respectively, increased sediment erosion or accretion in certain areas. Seagrass beds in particular are intolerant to any activity that changes the sediment regime. Activities/structures responsible for changing the water flow rate could include in-estuary construction; groynes, beach replenishment, sea walls/breakwaters, port developments and aggregate extraction.

v. Changes in wave exposure

The estuary feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in wave exposure.

The estuary is considered to have high exposure due to its highly constrained nature (coastal defence structures; groynes, seawalls, breakwaters and beach replenishment) and presence of significant aggregate extraction which can cause changes in wave exposure. Storms and intense wave action may move or remove substrata from shallow subtidal sandbanks. Increased wave action will disrupt feeding and burrowing, and reduce species abundance, richness and biomass. Decreased wave exposure will result in increased food availability, but suspension feeders are intolerant of sediment increases in silt/clay content and therefore the proportion of suspension feeders may decrease in favour of deposit feeders. Both intertidal and subtidal seagrass beds are highly sensitive to changes in wave exposure, with an increase leading to loss of substrata and exposure of rhizomes, and a decrease causing deposition of fine particles on leaves which may result in smothering.

vi. Abrasion and physical disturbance

The estuary feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to physical disturbance and abrasion.

This factor includes mechanical interference, crushing, trampling, rubbing or erosion of the organism or habitat of interest. The activities most likely to cause abrasion include beach replenishment, development of port facilities, maintenance dredging, aggregate extraction, fixed netting, benthic trawls, sea-based recreation (including anchoring, power boat and jet ski wash), archaeology, coastal farming, educational visits, shipping, litter and debris. Habitats/communities that are moderately sensitive to abrasion include saltmarsh - see section 4.4 (at risk from overgrazing, erosion from moored boats or from trampling or vehicles), intertidal mudflats and sandflats (see section 4.3), and seagrass beds in particular.

vii. Toxic contamination

The estuary feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to toxic contamination. (Note that there is currently insufficient scientific information on the sensitivities of the estuarine habitats to radionuclides to determine any vulnerability).

This category includes contamination from synthetic compounds (including pesticides and herbicides), non-synthetic compounds (including heavy metals) and hydrocarbons (oil related products). As a result of the predominance of physical conditions within the Estuary, for the majority of biological communities there is little unequivocal evidence of additional impact due to contaminants across the Estuary as a whole. Individual populations may have been impacted close to major discharges however.

A number of synthetic compounds may be present locally in elevated concentrations. Riverine inputs are probably responsible for the majority of these compounds entering the Estuary. The concentration of metals in sediments (cadmium, arsenic, chromium, silver, copper, zinc and nickel in particular) are commonly above interim sediment quality guidelines over much of the Estuary, but only occasionally exceed probable effects levels (Langston et al., 2003). Bioaccumulation of metals occurs widely in invertebrates, though the ecological significance is still uncertain. Hydrocarbon compounds may also be present locally in elevated concentrations. Sources include a combination of fossil fuel combustion, shipping, urban run-off, sewage treatment works and various point-source and diffuse discharges from industrialised areas. Moderately high levels of poly-aromatic hydrocarbons (PAHs) are present in sediments across much of the Estuary. Overall vulnerability to all toxic contamination is considered 'high' (due to the exposure from sewage inputs being classed as 'high' and also with 'moderate' levels from industrial inputs etc.).

Note that there is currently insufficient scientific information on the sensitivities of the estuarine habitats to radionuclides to determine any vulnerability. However despite the presence of several potential sources of radionuclides (Berkeley, Oldbury and Hinkley Nuclear Power Plants, a manufacturer of radiopharmaceuticals in Cardiff and a number of other smaller sources) the accumulation of radionuclides in the Severn Estuary is generally low compared with samples from the Irish Sea. The exceptions to this are Tritium and Carbon 14, which have been found locally at significant levels. This is thought to be related to discharges from the radiopharmaceutical company in Cardiff, for which remedial action is being taken. (Langston et al, 2003).

viii. Changes in nutrient loading

The estuary feature is considered to have **high sensitivity** and **high exposure** to changes in nutrient loading but **is *not* considered vulnerable to changes in nutrient loading due to the high natural turbidity.**

Whilst nutrient levels and loadings within the Estuary are considered significant in UK terms (and thus have been scored as high for sensitivity and high for exposure), the high natural turbidity of the system negates these high levels, with algal productivity being generally low except in localised hotspots. Where these do occur, nutrient enrichment may lead to significant shifts in community composition on/in subtidal sandbanks (see section 5.2) and on/in intertidal mudflats and sandflats (see section 5.3), but recoverability is likely to be high. Should there be a decrease in natural turbidity levels, then the overall associated 'masking effect' would be lessened and there would be a higher risk of nutrient enrichment.

At the present time, despite the high sensitivity and high exposure scores discussed above, the high natural turbidity levels across most of the estuary lead to a conclusion that the estuary is not considered vulnerable to changes in nutrient loading.

ix. Changes in thermal regime

The estuary feature is considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in thermal regime

Temperature can affect many biological, physical and chemical geochemical processes within the water column including stratification, mixing and turbidity, nutrients, oxygenation, salinity and pH. For example, activities which can cause short or longterm changes in temperature can include thermal discharges (eg from power station cooling waters and other discharges). Thermal discharges are likely to be between 2 and 10 degrees above ambient temperature and a long term duration of changes may impact on the larval forms and breeding cycles of marine organisms.

x. Changes in salinity

The estuary feature is considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in salinity.

Decreases in salinity within the Estuary are likely to result from heavy rain events and associated land/waterfront run-off and riverine inputs. The vast floodplain and catchment area of the Severn Estuary results in annual extreme flooding events and prolonged periods of freshwater input the estuary so the exposure is considered to be high. Localised salinity changes may also result around discharges. Certain biotopes associated with subtidal sandbanks occur in conditions of reduced salinity and these biotopes are considered to be moderately vulnerable to any long-term increases in salinity levels.

xi. Changes in oxygenation

The estuary feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in oxygenation.

A cycle of changes in oxygenation occurs within the Severn as a result of both seasonal and tidal cycles and is linked to fluctuating sediment regimes. In addition occasional, intermittent oxygen sags occur in low salinity regions of the Severn and in some of the principal rivers feeding the Estuary. These probably originate from high densities of suspended solids and associated particulate organic matter, perhaps enhanced by discharge outfalls. Other causes include maintenance dredging, aggregate extraction, spoil dumping, coastal farming and shipping.

Oxygen-deficient marine areas are characterized by a decline in the number and diversity of species. Certain communities occurring within the Estuary's intertidal mudflats and sandflats are moderately sensitive to decreases in dissolved oxygen levels . However, recoverability of these areas should be rapid upon return to normal conditions. The fish assemblage is also likely to be sensitive to decreases in dissolved oxygen levels, although it is unclear what the level of sensitivity is at the present time.

xii. Introduction of microbial pathogens

The estuary feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in microbial pathogens.

Microbial pathogens are most likely to enter the Severn's ecosystem by means of sewage discharges, be these from port facilities, recreational boating, shipping or the outfalls from sewage treatment works. For the majority of biological communities there is insufficient information available to be able to make an assessment of their sensitivity to microbial pathogens. Of the few known impacts, subtidal seagrass beds of *Zostera marina* are known to be highly sensitive to the marine fungus *Labyrinthula macrocystis* which causes 'wasting disease'. The disease causes the death of leaves and, after 2-3 seasons, can lead to the death of regenerative shoots, rhizomes and the loss of up to 90% of the population and its associated

biotope. However, no information has been found which confirms the presence of the wasting disease in the Estuary.

While no infomation has been found which confirms the presence of the wasting disease in the estuary, the potential significant consequences for one of this notable estuarine community in particular has lead to the conclusion that estuary is highly sensitive to microbial pathogens. The exposure is considered to be high due to the high number of sewage discharges.

xiii. Introduction of non-native species

The estuary feature is currently considered to have **high sensitivity** and **moderate exposure** and therefore **high vulnerability** to the introduction of non-native species.

The saltmarsh cordgrass *Spartina anglica* is an invasive pioneer species whose rapid growth consolidates sediment, raises mudflats and reduces sediment availability elsewhere. It is regarded as being a potential threat to intertidal beds of *Zostera noltei* in particular. However, whilst recognising *S. anglica* as an invasive species, it also has a role in saltmarsh formation and the community SM6 in which it features should be allowed to develop into other Atlantic Salt Meadow or transitional communities. The Japanese seaweed *Sargassum muticum* is another non-native species which is thought to compete for space with the subtidal seagrass *Zostera marina*, though evidence for actual competition is conflicting. The presence of another non-native, the slipper limpet *Crepidula fornicata*, in large numbers may alter the species composition within certain soft mud habitats leading to a decline in overall species richness. However, *C. fornicata* has yet to penetrate the Estuary, possibly due to the strong water flows. The exposure to introduction of non-natives to the estuary is considered to be moderate because of the considerable volume of ship traffic, including transport to and from the major ports at Cardiff, Newport and Bristol.

xiv. Selective extraction of species

The estuary feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to the selective extraction of species.

This category refers to the removal of key species within a biotope or of a prey species. Activities which occur within the Estuary which are likely to be implicated bait digging, fixed netting, commercial fishing, recreational angling, wildfowling and educational visits. Whilst the majority of biotopes have a low sensitivity to such activities, intertidal *Zostera noltei* beds are highly sensitive to grazing by species of wildfowl. Significant amounts of dwarf eelgrass can be consumed by wildfowl, particularly during the autumn and winter months. However as these grazers are also part of the natural estuarine ecosystem and designated features in their own right their impact is not judged to be detrimental.

5.6.2 Subtidal sandbanks feature

5.6.2.1 Sensitivity

The **sandbanks** and their associated biological communities are **moderately to highly sensitive** to:

- **physical loss**
- **physical damage**
- **toxic contamination**
- **non-toxic contamination**
- **biological disturbance**

These result from a range of activities known to occur in the vicinity of the sandbanks. Further details are provided in points i) to vii) below, with details of the level of sensitivity set out in Table 22.

5.6.2.2 Exposure

The **sandbanks** and their associated biological communities are **moderately to highly exposed** to:

- **substratum loss**
- **smothering**
- **changes in suspended sediment**
- **abrasion and physical disturbance**
- **noise** and **visual disturbance**
- **toxic contamination (introduction of synthetic & non synthetic compounds)**
- **changes in nutrient loading**
- **changes in turbidity**
- **changes in salinity**
- **changes in oxygenation**
- **introduction of microbial pathogens**

5.6.2.3 Vulnerability

The **s**ubtidal sandbanks communities are **moderately to highly vulnerable** to:

i. Substratum loss

The subtidal sandbanks feature is currently considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to substratum loss.

The physical loss of subtidal sandbanks will occur through the removal of material during maintenance dredging and aggregate extraction in particular. These activities, coupled with strong current flows, result in material being suspended in the water column and removed away from their point of origin. Removal of the substratum will lead to partial loss of faunal diversity, exposure of the underlying sediment and changes in the topography of the area. Recolonisation of the biotope might occur within a few months, but the biotope would be unlikely to be recognized until after six months. Cohesive mud and sandy mud communities are considered to be moderately sensitive to substratum loss.

ii. Changes in suspended sediment

The subtidal sandbanks feature is currently considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in suspended sediment.

Increase in sediment in suspension are unlikely to cause problems unless it leads to smothering (see smothering). A decrease in suspended sediments may lead to increased light penetration and changes in the sandbank communities.

Activities likely to result in changes in suspended sediment would include those which would affect sediment availability or the water flow rate (coastal defences, development, construction and dredging).

iii. Toxic contamination

The subtidal sandbanks feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to toxic contamination. (Note that there is currently insufficient scientific information on the sensitivities of subtidal sandbank communities to radionuclides to determine their vulnerability).

This category includes contamination from synthetic compounds (including pesticides and herbicides), non-synthetic compounds (including heavy metals) and hydrocarbons (oil related products). As a result of the domination of physical conditions within the Estuary, for the majority of biological communities there is little unequivocal evidence of additional impact due to contaminants across the Estuary as a whole. Individual populations may have been impacted close to major discharges however.

Moderately high levels of poly-aromatic hydrocarbons (PAHs) are present in sediments across much of the Estuary (Langston et al., 2003). Generally speaking however, subtidal sediments are less likely to be at risk from oil spills than intertidal sediments unless oil dispersants are used or if wave action causes dispersion of oil into the water column and sediment mobility drives oil into the sediment. Certain species such as amphipods which occur within the Estuary's infralittoral mobile clean sand community have been found to be moderately sensitive to oil pollution. (See also section 5.1).
Despite the presence of several potential sources of radionuclides (Berkeley, Oldbury and Hinkley Nuclear Power Plants, a manufacturer of radiopharmaceuticals in Cardiff and a number of other smaller sources) the accumulation of radionuclides in the Severn Estuary is generally low compared with samples from the Irish Sea. The exceptions to this are Tritium and Carbon 14, which have been found at locally at significant levels. This is thought to be related to discharges from the radiopharmaceutical company in Cardiff, for which remedial action is being taken. The exposure for subtidal sandbanks is therfore thought to be low.

iv. Changes in nutrient loading

The subtidal sandbanks feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in nutrient loading

Whilst nutrient levels and loadings within the Estuary are considered significant in UK terms the high natural turbidity of the system negates these high levels, with algal productivity being generally low except in localised hotspots. Where these do occur, nutrient enrichment may lead to significant shifts in community composition on/in subtidal sandbanks but recoverability is likely to be high.

v. Changes in salinity

The subtidal sandbanks feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in salinity.

Aphelochaeta marioni, a polychaete worm which characterizes the shallow sandbanks' biotope of variable salinity infralittoral mobile sand, is very tolerant of low salinity conditions but would be moderately vulnerable to any long-term increases in salinity levels. This species has a wide distribution throughout the Estuary, being present on subtidal and intertidal sand habitats on both sides of the Estuary.

vi. Changes in oxygenation

The subtidal sandbanks feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in oxygenation.

A cycle of changes in oxygenation occurs within the Severn as a result of both seasonal and tidal cycles and is linked to fluctuating sediment regimes. In addition occasional, intermittent oxygen sags occur in low salinity regions of the Severn and in some of the principal rivers feeding the Estuary.

Decreases in oxygenation levels can result from maintenance dredging, aggregate extraction, industrial effluent discharge, land/waterfront runoff and sewage discharge (Langston et al., 2003). Oxygen-deficient

marine areas are characterized by a decline in the number and diversity of species. Certain communities occurring within the Estuary's subtidal sandbanks are moderately sensitive to decreases in dissolved oxygen levels. However, recoverability of these areas should be rapid upon return to normal conditions.

vii. Introduction of microbial pathogens

The subtidal sandbanks feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to the introduction of microbial pathogens.

Microbial pathogens are most likely to enter the Severn's ecosystem by means of sewage discharges. For the majority of biological communities there is insufficient information available to be able to make an assessment of their sensitivity to microbial pathogens. However, some research has been undertaken on marine bivalves, several species of which occur within the Estuary's sandbanks. Mass mortalities of bivalves can result from diseases caused by bacteria, viruses (over 20 have been described for marine bivalves) or protozoans. There is a greater likelihood of such events occurring in areas adjacent to outfalls than elsewhere. Recovery of populations is probable.

5.6.3 Mudflats and sandflats feature

(Note : this advice is also relevant to the Ramsar Site as the mudflats and sandflats are both a subfeature of the estuaries feature and a supporting habitat of the birds species, for which the Ramsar Site has been designated – refer also to section 5.8)

5.6.3.1 Sensitivity

The **mudflats and sandflats** and their associated biological communities are **moderately to highly sensitive** to:

- **physical loss**
- **physical damage**
- **toxic contamination**
- **non-toxic contamination**
- **biological disturbance**

These result from a range of activities known to occur in the vicinity of the mudflats and sandflats. Further details are provided in points i) to xiii) below, with details of the level of sensitivity set out in Table 22.

5.6.3.2 Exposure

The **mudflats and sandflats** and their associated biological communities are **moderately to highly exposed** to:

- **substratum loss**
- **smothering**
- **changes in suspended sediment**
- **changes in water flow rate**
- **changes in wave exposure**
- **abrasion and physical disturbance**
- **toxic contamination(introduction of synthetic & non synthetic compounds)**
- **changes in nutrient loading**
- **changes in thermal regime**
- **changes in turbidity**
- **changes in salinity**
- **changes in oxygenation**
- **introduction of microbial pathogens**

5.6.3.3 Vulnerability

The **intertidal mudflats and sandflats** communities are **moderately to highly vulnerable** to:

i. Substratum loss

The intertidal mudflats and sandflats feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to substratum loss.

Areas of intertidal habitats will be lost as a direct result of land claim or developments, or indirectly as a consequence of changes to sedimentation processes (e.g. resulting from the construction of groynes or of seawalls). Consequently, there is moderate to high exposure of mudflats and sandflats to substratum loss. The sediment infauna reside in the uppermost layers of the substratum and the removal of this layer would cause a major decline in species richness as they would have been removed with it. Thus the sensitivity of the biotopes in question is high. Fortunately, recovery of the community is also regarded as being high as recolonisation is likely following deposition of suitable substrata.

ii. Smothering

The intertidal mudflats and sandflats feature is considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to smothering

Smothering of organisms is likely to occur as a result of the direct deposition of material on top of them and/or on their habitat. Examples of activities causing smothering in intertidal areas include beach replenishment, port developments, archaeological activities, coastal farming, industrial effluent discharge, oil spills, land runoff including highways discharge and sewage discharge.

iii. Changes in suspended sediment

The intertidal mudflats and sandflats feature feature is considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in suspended sediment

Changes in suspended sediments could change the extent and nature of intertidal habitats including affecting estuary-wide erosion and accretion patterns. Increase in sediment in suspension are unlikely to cause problems unless it leads to smothering (see smothering) and in some cases the invertebrate communities associated with the sediment may provide additional food resources for feeding birds. A decrease in suspended sediments may lead to increased light penetration and changes in the intertidal mud and sandflat communities.

Activities likely to result in changes in suspended sediment would include those which would affect sediment availability or the water flow rate (coastal defences, development, construction and dredging).

iv. Changes in water flow rate

The intertidal mudflats and sandflats feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in water flow rate.

Increases or decreases to the water flow rate are likely to lead to, respectively, increased sediment erosion or accretion in certain areas. Activities/structures responsible for changing the water flow rate include construction activities, groynes, beach replenishment, sea walls/breakwaters, port developments and aggregate extraction.

v. Changes in wave exposure

The intertidal mudflats and sandflats feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in wave exposure.

Changes in wave exposure result from coastal defence structures (groynes, seawalls, breakwaters and beach replenishment), shipping and possibly aggregate extraction. Increased wave action will disrupt feeding and burrowing, and reduce species abundance, richness and biomass. The strength of wave action determines the topography, steepness and shore width of the intertidal zone.

vi. Abrasion and physical disturbance

The intertidal mudflats and sandflats feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to physical disturbance and abrasion.

The activities most likely to cause abrasion to mudflats and sandflats include beach replenishment, bait digging, maintenance dredging, aggregate extraction, land-based recreation and archaeology. Boating, anchoring, trampling or the use of vehicles are also likely to cause physical disturbance, with compaction of the substratum being of particular concern. For example, the use of vehicles on mudflats or sandflats appears to have a potentially severe impact on gaper clams *Mya arenaria*. Large clams live in permanent burrows and are therefore susceptible to burrow collapse and sediment compaction through trampling and especially vehicle use. Another two key species found in muddy sand, the heart urchin *Echinocardium cordatum* and the razor shell *Ensis ensis*, are probably highly sensitive to physical disturbance. Recovery is likely to be moderate because, although the individual key species may recolonize an area within five years, several of the species are very long-lived and so the biotope may take longer to return to its original age structure and species diversity.

vii. Toxic contamination

The intertidal mudflats and sandflats feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to toxic contamination by synthetic and non-synthetic compounds. (Note that there is currently insufficient scientific information on the sensitivities of communities present on/in intertidal mudflats and sandflats to radionuclides to determine their vulnerability).

This category includes contamination from synthetic compounds (including pesticides and herbicides), non-synthetic compounds (including heavy metals) and hydrocarbons (oil related products). Infaunal populations present within intertidal sediments are likely to have been impacted close to major discharges, with a number of synthetic compounds known to have elevated concentrations locally (Langston et al.,2003). However, because of the energetic hydrodynamic regime in the Severn, and the resultant high turbidity, there is considerable mixing and redistribution of fines and their associated contamination burden, resulting in a fairly homogenous distribution.

Whilst the concentration of metals within the Estuary's sediments (cadmium, arsenic, chromium, silver, copper, zinc and nickel in particular) are commonly above interim sediment quality guidelines, these only occasionally exceed probable effects levels (Langston et al.,2003).. Contamination loadings of metals will be highest where fine particulates predominate (for example between Avonmouth and Severn Beach, Caldicot Flats, the River Parrett and outer Bridgewater Bay, and between the mouths of the Usk and Taff), and lowest on sands (for example the Middle to Welsh Grounds, and Culver Sands). Bioaccumulation of metals is known to occur widely in invertebrates, though the ecological significance is still uncertain. Note also that the toxicity of metals to many invertebrates increases with decreased salinity and elevated temperature (Langston et al.,2003). Thus many benthic invertebrates living within their normal salinity range may be less susceptible to heavy metal pollution than those living in salinities near the lower limit of their salinity tolerance.

Hydrocarbon compounds are present locally in elevated concentrations (Langston et al.,2003).. Sources include a combination of fossil fuel combustion, shipping, urban run-off, sewage treatment works and various point-source and diffuse discharges from industrialised areas. Moderately high levels of poly-aromatic hydrocarbons (PAHs) are present in sediments across much of the Estuary (Langston et al.,2003).

Overall vulnerability to all toxic contamination is considered 'high' (due to the exposure from sewage inputs being classed as 'high' and also with 'moderate' levels from industrial inputs etc.).
Despite the presence of several potential sources of radionuclides (Berkeley, Oldbury and Hinkley Nuclear Power Plants, a manufacturer of radiopharmaceuticals in Cardiff and a number of other smaller sources) the accumulation of radionuclides in the Severn Estuary is generally low compared with samples from the Irish Sea. The exceptions to this are Tritium and Carbon 14, which have been found at locally at significant levels. This is thought to be related to discharges from the radiopharmaceutical company in Cardiff, for which remedial action is being taken. The intertidal mudlfats and sandflats are therefore thought to be moderately exposed to radionuclides (Langston et al, 2003).

viii. Changes in nutrient loading

The intertidal mudflats and sandflats feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in nutrient loading.

The most obvious sign of an increase in nutrient loading (or organic enrichment) on mudflats is the lush growth of green seaweeds on the surface. Such increases coupled with reduced oxygenation typically lead to anaerobic conditions predominating within the sediment. Moderate organic enrichment does provide food which can enhance species diversity but with greater enrichment, the diversity declines and the community becomes increasingly dominated by a few, pollution tolerant, opportunistic species such as the polychaete *Capitella capitata*. In sandier sediments where particle size is greater, the effects of an increase in organic enrichment are less dramatic. However, the structure of the community is still likely to change from one dominated by suspension feeders to one favouring deposit feeders, accompanied by an increase in the abundance of opportunistic species and a decrease in species richness. Note, however,

that the high natural turbidity of the system negates many of these effects, and algal productivity is generally low except in localised hotspots.

ix. Changes in thermal regime

The intertidal mudflats and sandflats feature is currently considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in thermal regime

Temperature can affect many biological, physical and chemical geochemical processes within the water column including stratification, mixing and turbidity, nutrients, oxygenation, salinity and pH. For example, activities which can cause short or longterm changes in temperature can include thermal discharges (eg from power station cooling waters and other discharges). Thermal discharges are likely to be between 2 and 10 degrees above ambient temperature and a long term duration of changes may impact on the larval forms and breeding cycles of marine organisms.

x. Changes in salinity

The intertidal mudflats and sandflats feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in salinity

Decreases in salinity are likely to result from heavy rain events and associated land/waterfront run-off and riverine inputs. Localised salinity changes may also result around discharges. The vast floodplain and catchment area of the Severn Estuary results in annual extreme flooding events and prolonged periods of freshwater input to the intertidal areas so the exposure is considered to be high. However the metabolism of intertidal communities cope with vast extremes of conditions which result from the dynamic nature of the estuary's tidal regime and so are considered to have low sensitivity.

xi. Changes in oxygenation

The intertidal mudflats and sandflats feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in oxygenation.

A cycle of changes in oxygenation occurs within the Severn as a result of both seasonal and tidal cycles and is linked to fluctuating sediment regimes. In addition occasional, intermittent oxygen sags occur in low salinity regions of the Severn and in some of the principal rivers feeding the Estuary.

Decreases in oxygenation levels will result from maintenance dredging, aggregate extraction, industrial effluent discharge, land/waterfront runoff and sewage discharge. Oxygen-deficient marine areas are characterized by a decline in the number and diversity of species. Certain communities occurring within the Estuary's intertidal mudflats and sandflats are moderately sensitive to decreases in dissolved oxygen levels. However, recoverability of these areas should be rapid upon return to normal conditions.

xii. Introduction of microbial pathogens

The intertidal mudflats and sandflats feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to the introduction of microbial pathogens.

Microbial pathogens are most likely to enter the Severn's ecosystem by means of sewage discharges. For the majority of biological communities there is insufficient information available to be able to make an assessment of their sensitivity to microbial pathogens. However, some research has been undertaken on marine bivalves, several species of which occur within the Estuary's intertidal sandbanks. Mass mortalities of bivalves can result from diseases caused by bacteria, viruses (over 20 have been described for marine bivalves) or protozoans. There is a greater likelihood of such events occurring in areas adjacent to outfalls than elsewhere. Recovery of populations is probable.

xiii. Introduction of non-native species

The intertidal mudflats and sandflats feature is currently considered to have **high sensitivity** and **low exposure** and therefore **moderate vulnerability** to the introduction of non-native species.

The saltmarsh cordgrass *Spartina anglica* is an invasive pioneer species whose rapid growth consolidates sediment, raises mudflats and reduces sediment availability elsewhere. It is regarded as being a potential threat to intertidal beds of *Zostera noltei* in particular. However, whilst recognising *S. anglica* as an invasive species, it also has a role in saltmarsh formation and the community SM6 in which it features should be allowed to develop into other Atlantic Salt Meadow or transitional communities. The presence of another non-native, the slipper limpet *Crepidula fornicata*, in large numbers may alter the species composition within certain soft mud habitats leading to a decline in overall species richness. However, *C. fornicata* has yet to penetrate the Estuary, possibly due to the strong water flows.

*Note, in relation to '**noise and visual disturbance'**, that while mudflats and sandflats communities have **moderate exposure** to both noise and visual disturbance, these habitats are **not sensitive** to these factors but they do provide a vitally important role as supporting habitats for waterfowl that use these areas for roosting and feeding and these are considered **highly sensitive to** both noise and visual disturbance – see sections 5.7.1 & 5.7.2). So while the habitats themselves have **low vulnerability** their dependant bird species have high vulnerability.*

5.6.4 Atlantic salt meadow feature

(Note : this advice is also relevant to the Ramsar Site as the Atlantic saltmeadows are both a subfeature of the estuaries feature and a supporting habitat of the birds species, for which the Ramsar Site has been designated – refer also to section 5.8)

5.6.4.1 Sensitivity

The **Atlantic salt meadow** and its associated biological communities are **moderately or highly sensitive** to:

- **physical loss**
- **physical damage**
- **toxic contamination**
- **non-toxic contamination**

These result from a range of activities known to occur on or in the vicinity of the salt meadows. Further details are provided in points i) to xiii) below, with details of the level of sensitivity set out in Table 22.

5.6.4.2 Exposure

The **Atlantic salt meadow** and its associated biological communities are **moderately to highly exposed** to:

- **substratum loss**
- **smothering**
- **changes in suspended sediment**
- **changes in water flow rate**
- **changes in wave exposure**
- **abrasion and physical disturbance**
- **changes in grazing management**
- **noise and visual disturbance**
- **toxic contamination(introduction of synthetic & non synthetic compounds)**
- **changes in nutrient loading**
- **changes in salinity**
- **changes in oxygenation**
- **introduction of microbial pathogens**

5.6.4.3 Vulnerability

The **saltmarsh** communities are **moderately to highly vulnerable** to:

i. Substratum loss

The Atlantic salt meadows and their associated communities feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to substratum loss

Saltmarshes, cordgrass and *Salicornia* are highly sensitive to physical loss. This can occur mostly through one-off developments such as infrastructure construction and modification involving land claim and changes in land management and coastal farming, and also as a result of coastal squeeze. This is a process by which coastal features such as saltmarshes and *Salicornia* are eroded as they become trapped between man-made structures such as sea walls and rising sea levels. Where this occurs on saltmarshes, it may result in the replacement of mid-marsh communities by pioneer saltmarsh communities or through erosion changing saltmarsh to intertidal mud and sand. Changes to coastal processes may also affect the sediment budget of estuaries and reduce the supply of sediment to saltmarsh, *Salicornia* and cordgrass areas. Whilst some areas of the Estuary are subject to these pressures, others are not, yet it remains a real

threat as is reflected in the moderate to high exposure score. When combined with high sensitivity this leads to a high vulnerability.

ii. Smothering

The Atlantic salt meadows feature is considered to have **high sensitivity** and **moderate exposure** and therefore **high vulnerability** to smothering.

Smothering of saltmarsh is likely to occur as a result of the direct deposition of material on the surface. This can happen by either direct deposition of materials on land or through silt-laden tides. The saltmarshes of the Severn are subject to spring tides each year which can in some locations deposit a thick layer of sediment on the surface which can persist for some months. Normally the level of this natural deposition is compatible with the speed of vertical accretion and growth of the saltmarsh. Higher levels of sediment deposition which may be associated with development activities (increasing sediment suspension) can cause smothering to occur resulting in loss of vegetation or shifts in community composition and zonation. Examples of activities likely to cause smothering from tidal deposition include coastal defence works, dredging, construction and archaeological works. Examples of direct deposition are fly tipping and accumulation of tidal debris.

iii. Changes in suspended sediment

The Atlantic salt meadows and their associated communities feature is currently considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in suspended sediment

Changes in suspended sediments could change the extent and nature of saltmarsh communities and other intertidal habitats including affecting estuary-wide erosion and accretion patterns. Increases in suspended sediment are unlikely to cause problems unless it leads to smothering (see smothering).

Activities likely to result in changes in suspended sediment would include those which would affect sediment availability or the water flow rate (coastal defences, development, construction and dredging).

iv. Desiccation and changes in emergence regime

The Atlantic salt meadows and their associated communities feature is currently considered to have **high sensitivity** and **low exposure** and therefore **moderate vulnerability** to desiccation and changes in emergence regime

Changes in the emergence regime will result in changes in the time habitats or species spend either covered in water or exposed to the air, one consequence of which is the desiccation (drying) of habitats and species. Examples of activities which may induce these changes are the construction of coastal and flood defences and other developments which change the tidal regime and water flow characteristics of the estuary.

The morphology, zonation and composition of saltmarshes are determined by their position within the tidal frame. They therefore considered highly sensitive to changes in the emergence regime and desiccation in particular.

These changes occurring in saltmarshes may result in either the stranding and exposure of communities or lengthened periods of inundation and lack of drying out with consequent impacts on species composition of swards (through dieback and shifts in community types) and affecting their suitability for species dependant on them. These changes may also cause the expansion of *Spartina* into both saltmarsh habitats and across adjacent mudflats.

The size of the estuary means that most small scale activities will have limited impacts with only large scale or estuary-wide activities likely to be of concern and exposure to this operation is therefore currently considered as low.

v. Changes in water flow rate

The Atlantic salt meadows and their associated communities feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in water flow rate.

A reduction in the rate of water flow over the saltmarsh will result in an increase in the deposition of sediment. The rate at which this occurs will depend on the sediment supply, the duration of the tidal cover and the extent to which the tidal flow is impeded by the vegetation itself to facilitate deposition. Saltmarsh communities actually require a degree of sediment deposition in order to survive and flourish and they have been assessed as having a low to moderate sensitivity. Exposure to changes in water flow rate on saltmarsh communities will vary throughout the Estuary.

vi. Changes in wave exposure

The Atlantic salt meadows and their associated communities feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in wave exposure.

Changes in wave exposure result from the presence of coastal defence structures (groynes, seawalls, breakwaters), beach replenishment and possibly aggregate extraction. Increased wave action can have two opposing effects. On the one hand it is likely to lead to a greater amount of suspended sediment being carried to the saltmarsh, while on the other hand the greater energy regime is likely to prevent the settlement of this material and may even remove material from the saltmarsh through erosion at the saltmarsh edge. A decrease in wave action will lead to greater sediment deposition with the possibility of smothering.

vii. Abrasion and physical disturbance

The Atlantic salt meadows and their associated communities feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to physical disturbance and abrasion.

Physical disturbance or abrasion to saltmarsh communities may result from a wide range of activities including recreational usage (both land-based and water-based), any of which may damage individual saltmarsh plants or areas of saltmarsh. Trampling by foot, and particularly by off-road vehicles, causes localised damage which may impact upon the ecological structure and function of larger areas, and requiring long-term recovery. Saltmarshes are also sensitive to erosion as a result of trampling or overgrazing, with communities that support succulents such as *Limonium* spp. being very susceptible to any form of grazing. In addition, it is widely recognised that shipping and boating can increase saltmarsh erosion from their wash.

viii. Changes in grazing management

The Atlantic salt meadows and their associated communities feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in grazing management.

The presence, duration and intensity of grazing management can alter the vegetation composition and structure of saltmarsh habitats. Abandonment or introduction of grazing can result in changes in the saltmarsh plant and animal communities which are important in their own right and which also provide food resources for passage and wintering birds. Grazing changes may also affect the suitability of saltmarsh areas as resting and roosting sites for birds where open terrain with low vegetation is an important factor. Changes may also affect the presence of specific niches for scarce and notable plants.

ix. Toxic contamination

The Atlantic salt meadows and their associated communities feature is currently considered to have **moderate to high sensitivity** and **high exposure** and therefore **high vulnerability** to toxic contamination from both synthetic and non-synthetic compounds.

Atlantic salt meadows, cordgrass swards and *Salicornia* within the Estuary are considered to have a moderate sensitivity to toxic contamination by synthetic compounds (which includes domestic/industrial effluent, pesticides, anti-foulant paints and PCBs) and a high sensitivity to non-synthetic compounds

(which includes domestic/industrial effluent, heavy metals and hydrocarbons). Although saltmarsh plants may be reasonably tolerant of certain synthetic substances, they can bioaccumulate toxic compounds and act as sinks for them. This could have implications for wildfowl which feed on saltmarsh plants.
Saltmarsh communities are also highly sensitive to oil and oil products, even at relatively low levels. This is mainly by virtue of their ability to trap sediments. Acute events, such as oil spills, can be particularly damaging to saltmarsh plants. Dispersants used to treat oil spills can also have a toxic effect on saltmarsh plants, sometimes to a greater degree that the spilled oil itself. Saltmarshes have been reported to recover from chronic oil pollution, where denuded of vegetation, within ten years, although recovery depends largely on the degree to which oil is retained in the sediment and the clean up procedures used.

x. Changes in nutrient loading

The Atlantic salt meadows and their associated communities feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in nutrient loading.

The Estuary's saltmarshes and associated communities are thought to be more susceptible to nutrient enrichment than was previously realised (Deegan, L. A. et al. 2007), so they have been assessed as being of high sensitivity to increases in nutrient loading and/or organic enrichment. However, increased growth of certain seaweed species may result from elevated levels of nitrates and phosphates and cause local smothering which is known to have a detrimental effect on glasswort (*Salicornia* spp.) in low marsh communities. In addition, the species composition of the plants on the saltmarsh may be altered by changes in nutrient loading leading to a change in the structure of the sward.

xi. Changes in salinity

The Atlantic salt meadows and their associated communities feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in salinity.

Changes to the salinity of water flowing across the saltmarshes as a result of the tides are likely to occur following heavy rain events and associated land/waterfront run-off and riverine inputs. The vast floodplain and catchment area of the Severn Estuary results in annual extreme flooding events and prolonged periods of freshwater input to the intertidal areas so the exposure is considered to be high. The botanical composition of the saltmarshes reflects salinity. The saltmarshes, while capable of tolerating a wide range of salinities, are considered moderately sensitive to changes in salinity particularly prolonged periods of change which can cause shifts in composition and zonation.

xii. Changes in oxygenation

The Atlantic salt meadows and their associated communities feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in oxygenation.

A cycle of changes in oxygenation occurs within the Severn as a result of both seasonal and tidal cycles and is linked to fluctuating sediment regimes. In addition occasional, intermittent oxygen sags occur in low salinity regions of the Severn and in some of the principal rivers feeding the Estuary.

xiii. Introduction of microbial pathogens

The Atlantic salt meadows and their associated communities feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to the introduction of microbial pathogens

For the majority of saltmarsh communities there is insufficient information available to be able to make an assessment of their sensitivity to microbial pathogens.

*Note, in relation to '**noise and visual disturbance'**, that while Atlantic salt meadows and their associated plant communities have **high exposure** to both noise and visual disturbance, these habitats are **not sensitive** to these factors but they do provide a vitally important role as supporting habitats for waterfowl that use these areas for roosting and feeding and these are considered **highly sensitive** to both noise and*

visual disturbance – see sections 5.7.1 & 5.7.2). So while the habitats themselves have ***low vulnerability*** *their dependant bird species have high vulnerability.*

5.6.5 Reefs feature

5.6.5.1 Sensitivity

The **reefs** and their associated biological communities are **moderately to highly sensitive** to:

- **physical loss**
- **physical damage**

These result from a range of activities. Note that there is currently insufficient scientific information to assess the degree of sensitivity of reefs to **toxic** & **non-toxic contamination** and also to **biological disturbance**. In these cases, the precautionary principle has been applied with a **moderate level of sensitivity** being assumed until proven otherwise**.** Further details are provided in points i) to vii) below, with details of the level of sensitivity set out in Table 22.

5.6.5.2 Exposure

The **reefs** and associated biological communities are **moderately to highly exposed** to:

- **changes in suspended sediment**
- **toxic contamination(introduction of synthetic & non synthetic compounds)**
- **changes in nutrient loading**
- **changes in turbidity**
- **changes in salinity**
- **changes in oxygenation**
- **introduction of microbial pathogens**

The reefs of the Severn Estuary are biogenic in origin, that is, they are built by a concretion-forming organism creating elevated structures. The organism in this case is the honeycomb worm *Sabellaria alveolata.* These reefs occur both in the intertidal (where one might expect to find them) and, most unusually, in the subtidal. Indeed, the Severn Estuary has the only extensive subtidal *Sabellaria alveolata* reef in Britain. There has been little research undertaken on these subtidal *Sabellaria alveolata* reefs, so the scientific information on their sensitivities is extremely limited. In the advice given here, much has been drawn on the information known about subtidal reefs of the closely related *Sabellaria spinulosa*.

5.6.5.3 Vulnerability

The **reef** communities are **moderately to highly vulnerable** to:

i. Changes in suspended sediment

The reefs feature is currently considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in suspended sediment

The reduced availability of sand, essential for *S. alveolata* tube building, may lead to the reduced development of *S. alveolata* reefs and the decline of colonies. Increase in suspended sediment is unlikely to cause problems unless it leads to smothering of the reef. Activities likely to result in changes in suspended sediment would include those which would affect sediment availability or the water flow rate (coastal defences, development, construction and dredging).

ii. Toxic contamination

The **sensitivity** of *Sabellaria alveolata* to toxic contaminants (domestic effluent, industrial effluent, heavy metals, hydrocarbons) entering the water is **not known**. The precautionary principle should therefore be applied.

The reefs are considered to have **high exposure** to both synthetic compounds and non-synthetic compounds (industrial effluents, heavy metals, hydrocarbons etc.),

The reefs are therefore **moderately vulnerable** to the introduction of synthetic compounds and non-synthetic compounds .

iii. Changes in nutrient loading

The reefs feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in nutrients.

iv. Changes in salinity

The reefs feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in salinity.

Decreases in salinity within the Estuary are likely to result from heavy rain events and associated land/waterfront run-off and riverine inputs. The vast floodplain and catchment area of the Severn Estuary results in annual extreme flooding events and prolonged periods of freshwater input the estuary so the exposure is considered to be high.

v. Changes in oxygenation

The reefs feature is currently considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in oxygenation.

A cycle of changes in oxygenation occurs within the Severn as a result of both seasonal and tidal cycles and is linked to fluctuating sediment regimes. In addition occasional, intermittent oxygen sags occur in low salinity regions of the Severn and in some of the principal rivers feeding the Estuary.

vi. Introduction of microbial pathogens

Microbial pathogens are most likely to enter the Severn's ecosystem by means of sewage discharges. There is considered to be **high exposure** to microbial pathogens due to the high number of sewage discharges within the estuary.

For the majority of biological communities there is insufficient information available to be able to make an assessment of their sensitivity to microbial pathogens and there is currently no information on the sensitivity of *Sabellaria* reefs to the introduction of microbial pathogens. The vulnerability of the *Sabellaria* reefs therefore remains unknown and the precautionary principle should be applied.

vii. Introduction of non-native species

There is insufficient information on the sensitivity of reefs to introduction of non native species therefore the vulnerability is unknown.

5.6.6 Shad and lamprey features

(Note : this advice is also relevant to the Ramsar Site as these features are also part of the "assemblage of migratory fish species" for which the Ramsar Site has been designated – refer also to section 5.8)

Note that in the explanatory text that follows, the term 'shad and lamprey' refer to three species of migratory fish: twaite shad *Alosa fallax*, river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*.

As the populations of these migratory fish depend upon the freshwater habitats of the Rivers Usk, Wye and Severn as well as the estuarine habitats of the Severn Estuary during their lifetime, the advice presented here should be read in conjunction with the advice given for the River Usk SAC and the River Wye SAC (Management Plans and Conservation Objectives) available from CCW and Natural England on request.

5.6.6.1 Sensitivity

The **shad and lamprey** are considered **sensitive** to:

- **physical damage** of their supporting habitats
- **non-physical disturbance**
- **toxic contamination**
- **non-toxic contamination**
- **biological disturbance**

These result from a range of activities known to occur within the Estuary on which further details are provided in points i) to xi) below.

5.6.6.2 Exposure

The **shad and lamprey** and their supporting habitats (whilst within the Estuary) are **moderately to highly exposed** to:

- **noise** (part of 'noise and visual presence' but latter not applicable)
- **toxic contamination(introduction of synthetic & non synthetic compounds)**
- **changes in nutrient loading**
- **changes in thermal regime**
- **changes in turbidity**
- **changes in salinity**
- **changes in oxygenation**
- **introduction of microbial pathogens**

The Estuary provides an important migration route for these three rare species, to and from their spawning and nursery grounds. Shad and lamprey are known to be present in coastal and estuarine waters throughout the year, though there remains a lack of information on these migratory species during the time they actually spend in the Estuary. More information exists for the rivers where they migrate to spawn and for the subsequent development of juveniles. Little is known of their biology and distribution during the marine part of their life cycle.
In the assessments given below, it is assumed that these species would be capable of avoiding unsuitable areas, that is, given the size of the Estuary, localized activities are unlikely to adversely affect the population.

5.6.6.3 Vulnerability

Assessment of vulnerability of these features is particularly difficult given that there is little or no information to enable the level of sensitivity to be established. In line with the "precautionary principle" **where there is moderate to high exposure the feature is considered vulnerable.**

Therefore the **shad and lamprey** are considered **vulnerable** to:

i. Noise (part of 'noise and visual presence' but latter not applicable)
Research has shown that shad are sensitive to vibration which can arise from noisy activities. High frequency vibration (70 – 300Khtz) can be barrier to migration affecting movement both up and downstream and preventing fish reaching spawning areas. In some circumstances high frequency vibrations can be fatal. Vibration sources need to be assessed at the planning and consent stage and their potential impacts mitigated for, particularly during the key upstream migration phase.

ii. Toxic contamination
A decrease in water quality within the Estuary may impede the migration of these fish to their spawning grounds in the rivers. Poor water quality may also affect their supply of food. Shad require a good supply of small crustacean prey species, especially mysids and small fish (particularly clupeids). At sea, river lamprey feed on a variety of small fish such as clupeids, whilst sea lamprey feed on larger fish including salmon. Pollution tolerance levels of shad and lamprey are unknown, but EA water quality policy is that levels should comply with targets established under the EA Review of Consents and the Water Framework Directive.

iii. Changes in nutrient loading
It is possible that changes in nutrient levels may affect the food supply of the shad and lamprey. However, due to the natural high turbidity of the system and the volumes of water involved, it is thought that any effects would be minimal.
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iv. Changes in thermal regime
Water temperature is believed to act as a trigger for the shad to migrate upstream to spawn in the rivers. There could be changes in water temperature in the vicinity of the power stations (eg Hinkley Point and Oldbury) and from other discharges

v. Changes in turbidity
It is not known whether the migratory fish are sensitive to changes in turbidity within the Estuary. Given the extremely high background levels of turbidity, it is unlikely that any changes in turbidity will have any significant impact on the shad and lamprey whilst in the estuarine waters.

vi. Changes in salinity
Decreases in salinity within the Estuary are likely to result from heavy rain events and associated land/waterfront run-off and riverine inputs. The vast floodplain and catchment area of the Severn Estuary results in annual extreme flooding events and prolonged periods of freshwater input the estuary so the exposure is considered to be high. Within the Estuary, juvenile twaite shad prey on mysids feeding at the salt wedge near the head of the tide. It must be assumed that any activities affecting the salinity regime of the estuary would in turn affect the distribution of these prey species, which may have consequences for the shad.

vii. Changes in oxygenation
A cycle of changes in oxygenation occurs within the Severn as a result of both seasonal and tidal cycles and is linked to fluctuating sediment regimes. In addition occasional, intermittent oxygen sags occur in low salinity regions of the Severn and in some of the principal rivers feeding the Estuary. Shad and lamprey may therefore be vulnerable to changes in oxygenation given the high exposure to changes resulting from operations within the Estuary.

viii. Introduction of microbial pathogens

There is insufficient information available to make any meaningful assessment on the introduction of microbial pathogens to these species of fish, but there is potential for high exposure.

Note regarding 'changes in water flow rate'

It is thought unlikely that changes in water flow rate within the Estuary will affect these fish but they are likely to be affected (and therefore vulnerable) once in the rivers where water abstraction and freshwater flows may have more of a bearing.

Note regarding 'selective estraction of species'

After hatching in the rivers, young shad gradually move downstream into the upper estuary where they feed and mature until the end of their second summer before moving into coastal waters. Young shad feed on estuarine invertebrates while adult shad feed on mysids and other fish (particularly other clupeids such as sprat and herring). Both river and sea lamprey spend several years of development in riverine mud and then, after a relatively rapid metamorphosis, migrate downstream to the estuary. River lamprey feed on a variety of estuarine fish, particularly herring, sprat and flounder. At sea, sea lamprey feed on larger fish including large salmon.

Extraction of target species - it is reported that twaite shad are vulnerable to capture on cooling water intakes, particularly those associated with power stations, where the numbers killed can be considerable.

Extraction on non target species - the shad and lamprey may be vulnerable to the extraction of their prey species (levels unknown) affecting their feeding behavior and patterns and long-term survival.

Table 22 Sensitivity, exposure and vulnerability of the Severn Estuary SAC to physical, chemical and biological pressures

Sensitivity		Exposure		Vulnerability	
High sensitivity	OOO O	High Exposure	××××	High vulnerability	⊗⊗⊗⊗ ⊗⊗⊗O ⊗⊗⊗×
Moderate sensitivity	OOO	Medium Exposure	×××	Moderate vulnerability	⊗⊗OO ⊗⊗×× ⊗⊗⊗
Low sensitivity	OO	Low Exposure	××	Low vulnerability	⊗⊗O ⊗⊗× ⊗⊗ ⊗××× ⊗×× ⊗×
No detectable sensitivity	O	No exposure	×	No vulnerability	⊗O
?S =Insufficient information on sensitivity; ✓ = migratory fish considered to be sensitive, but insufficient information to assess level of sensitivity				Unknown vulnerability	

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Categories of operations which may cause deterioration or disturbance[25]	**Annex I features**					**Annex II species**
	Estuaries	**Subtidal Sandbanks**	**Mudflats & sandflats**	**Atlantic saltmeadow**	**Reefs**	**Fish**[26]
Physical loss						
Removal / substratum loss	⊗⊗⊗⊗	⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗O	⊗×
Smothering	⊗⊗⊗O	⊗⊗×	⊗⊗⊗	⊗⊗⊗O	⊗⊗	⊗×
Physical damage						
Changes in suspended sediment	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗	⊗×
Desiccation & changes in emergence regime	⊗⊗O	⊗O	⊗⊗O	⊗⊗OO	⊗O	✓××
Changes in water flow rate	⊗⊗⊗×	⊗⊗O	⊗⊗⊗×	⊗⊗⊗×	⊗⊗O	✓××
Changes in wave exposure	⊗⊗⊗⊗	⊗⊗O	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗O	⊗×
Abrasion / physical disturbance (of habitats)	⊗⊗⊗×	⊗⊗×	⊗⊗⊗×	⊗⊗⊗×	⊗⊗O	✓××
Changes in grazing management	⊗⊗	Not relevant	Not relevant	⊗⊗⊗⊗	Not relevant	Not relevant
Non-physical disturbance						
Noise & visual presence	⊗××	⊗××	⊗⊗×	⊗×××	⊗×	✓×××
Toxic contamination						
Introduction of synthetic compounds	⊗⊗⊗×	⊗⊗⊗×	⊗⊗⊗⊗	⊗⊗⊗×	⊗⊗××	✓××××
Introduction of non-synthetic compounds	⊗⊗⊗×	⊗⊗⊗×	⊗⊗⊗⊗	⊗⊗⊗⊗	?S××××	✓××××
Introduction of radionuclides	?S××	?S××	?S××	?S××	?S××	✓××
Non-toxic contamination[27]						
Changes in nutrient loading	⊗⊗⊗⊗[28]	⊗⊗××	⊗⊗⊗×	⊗⊗⊗×	⊗⊗××	✓××××
Changes in thermal regime	⊗⊗⊗	⊗⊗	⊗⊗⊗	⊗⊗	⊗⊗	✓××××
Changes in turbidity[29] (light penetration)	⊗⊗×	⊗⊗×	⊗⊗×	⊗×	⊗××	✓×××
Changes in salinity	⊗⊗⊗×	⊗⊗⊗×	⊗⊗××	⊗⊗⊗×	⊗⊗××	✓××××
Changes in oxygenation	⊗⊗⊗×	⊗⊗××	⊗⊗××	⊗⊗××	⊗⊗××	✓××××
Biological disturbance						
Introduction of microbial pathogens	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗××	?S××××	✓××××
Introduction of non-native species	⊗⊗⊗O	⊗⊗O	⊗⊗OO	⊗⊗	?S××	✓××
Selective extraction of species	⊗⊗⊗×	⊗⊗	⊗⊗	⊗⊗	⊗⊗	✓××

[25] For a further explanation of each category see http://www.marlin.ac.uk/sah/baskitemplate.php?benchmarks
[26] River lamprey, sea lamprey & twaite shad
[27] All elements of non toxic contamination are interrelated and also link closely with changes in suspended sediment (physical damage)
[28] The high natural turbidity of the estuary negates these high levels with algal productivity being generally low – the estuary feature is therefore not considered vulnerable – see section 5.6.1.3.(viii)
[29] Turbidity here incorporates light penetration; suspended sediment under 'changes in suspended sediment' and its deposition under 'smothering'

5.7 Specific Advice on Operations for the Severn Estuary SPA

This section provides information to help relate general advice to each of the specific interest features of the Severn Estuary SPA. Where specific examples are given they are provided to aid understanding of possible impacts and are not intended to be a comprehensive list of all relevant operations.

This advice relates to the vulnerability of the interest features and supporting habitats of the Severn Estuary SPA as set out in Table 23. An explanation of the sensitivity of the interest features or supporting habitats follows with an explanation of their exposure and therefore their vulnerability to damage or disturbance from the listed categories of operations. This enables links between the categories of operation and the ecological requirements of the SPA's interest features (as set out in Section 2.2) to be made. It should be noted that sensitivity scorings are a combination of whether the habitat itself is likely to be affected by a particular operation (which is drawn from the SAC scores in Table 22), in combination with an assessment as to whether the outcome is likely to affect the bird's use of that habitat.

Note that this advice for the SPA supercedes that issued to ASERA in February 2005 following reassessment of exposure, sensitivity and vulnerability to take account of availability of new information in the Severn Estuary CHaMP and MarLIN sensitivities and following the more detailed analysis of impacts on the SAC estuarine habitats that are supporting habitats for the birds of the SPA.

5.7.1 Internationally important populations of regularly occurring Annex 1 species (Bewick's swan)

(Note : this advice is also relevant to the Ramsar Site's internationally important population of waterfowl "Bewick's swan" feature and as part of the "internationally important assemblage of waterfowl" feature for which the Ramsar Site has been designated – refer also to section 5.8)

5.7.1.1 Sensitivity

The Annex 1 species is **moderately to highly sensitive** to :

- **Physical loss**
- **Physical damage**
- **Non-physical disturbance**
- **Toxic contamination**
- **Non- toxic contamination**
- **Biological disturbance**

These result from a range of activities known to occur within the Estuary. Further details are provided in points i) to xii) below, with details of the level of sensitivity set out in Table 23.

5.7.1.2 Exposure

The Annex 1 species is **moderately to highly exposed** to:

- **Substratum loss and smothering**
- **Changes in suspended sediment**
- **Desiccation and changes in emergence regime**
- **Changes in water flow**
- **Changes in wave exposure**
- **Changes in grazing regime**
- **Noise and visual disturbance**
- **Toxic contamination**
- **Changes in nutrient loading**
- **Changes in salinity**
- **Changes in oxygenation**
- **Introduction of microbial pathogens**

5.7.1.3 Vulnerability

The Annex 1 species is **moderately to highly vulnerable** to:

i. Substratum loss and smothering

The intertidal habitats and therefore the Bewick's Swan feature which these habitats support are considered to have **moderate to high sensitivity** and **moderate to high exposure** and therefore **moderate to high vulnerability** to physical loss (removal and smothering).

The physical loss of areas of intertidal habitats may be caused directly through change of land use or indirectly as a consequence of changes to sedimentation processes (e.g. coastal defences) as well as via the effects of smothering by artificial structures (e.g. jetties) or the disposal of spoils. Activities or developments resulting in physical loss of the intertidal supporting habitats are likely to reduce the availability of food and roosting habitat and thus be detrimental to the favourable condition of the SPA interest features including the Annex 1 species, Bewick's swan. The intertidal mudflats and sandflats and the saltmarsh are highly sensitive to removal by land reclamation and major construction activities.

ii. Changes in suspended sediment

It is thought unlikely that changes in the suspended sediment within the Estuary will affect the Bewick's Swan directly but such changes may have marked effects on the supporting habitats on which they are dependant for roosting and feeding. The saltmarshes and intertidal mudflats and sandflats are currently considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in suspended sediments . (Refer also to sections 5.6.3 and 5.6.4). Impacts on the suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

iii. Desiccation and changes in emergence regime

It is thought unlikely that changes in the emergence regime within the Estuary will affect the Bewick's Swan directly but such changes may have marked effects on the supporting habitats on which they are dependant for roosting and feeding. The saltmarshes are currently considered to have **high sensitivity** and **low exposure** and therefore **moderate vulnerability** to desiccation and changes in emergence regime. (Refer also to section 5.6.4.) Impacts on the suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

iv. Changes in water flow rate

It is thought unlikely that changes in water flow rate within the Estuary will affect the Bewick's Swan directly but such changes may have marked effects on the supporting habitats on which they are dependant for roosting and feeding. The saltmarshes and intertidal mudflats and sandflats of the estuary are considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in water flow rate . (Refer also to sections 5.6.3 and 5.6.4). Impacts on the suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

v. Changes in wave exposure

It is thought unlikely that changes in wave exposure within the Estuary will affect the Bewick's Swan directly but such changes may have marked effects on the supporting habitats on which they are dependant for roosting and feeding. The saltmarshes and intertidal mudflats and sandflats of the estuary are considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in water flow rate . (Refer also to sections 5.6.3 and 5.6.4). . Impacts on the extent and suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

vi. Changes in grazing management

The Bewicks Swan feature, which is dependent on the saltmarsh habitats, is considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in grazing management.

The vegetation composition of saltmarsh habitats can be altered by changes in grazing management. This can affect the palatability of the sward for grazing Bewick's swans and therefore affect the availability of adequate preferred feeding areas within the SPA. There are critical areas for this species located at the Dumbles in the uppermost part of the estuary all of which are grazed.

vii. Noise and visual presence

Overwintering birds are disturbed by sudden movements and sudden noises. This can displace the birds from their feeding grounds. Disturbance can prevent the birds from feeding and in response they either a) decrease their energy intake at their present (disturbed) feeding site through displacement activity, or b) move to an alternative less favoured feeding site. Such a response affects energy budgets and thus survival. There is intermittent disturbance from both the landward and seaward side of the site. Bewick's swans are mainly affected by disturbance from the landward side and any increase in disturbance should be avoided. At present the Annex 1 species are **moderately vulnerable** to noise and visual disturbance on the intertidal mudflats and sandflats and have a **high vulnerability** to this category of operation on the saltmarsh.

viii. Toxic contamination through the introduction of synthetic and/or non-synthetic compounds

Waterfowl are subject to the accumulation of toxins through the food chain or through direct contact with toxic substances when roosting or feeding. Their ability to feed can also be affected by the abundance or change in palatability of their prey caused by toxic contamination. At the moment there is no evidence to show that this is the case, but the estuary is vulnerable to oil spills and there is a continuous discharge of toxins into the estuary,

some of which bind to the sediments. This is an area which requires further assessment and is likely to be addressed by work arising from both the Water Framework Directive and ongoing Review of Consents by the Environment Agency. The Bewick's swans has a **moderate vulnerability** to toxic contamination.

ix. **Changes in nutrient loading**

Changes in organic or nutrient loading can change the species composition of the plants on the saltmarsh and thus the structure of the sward. This could affect the palatability of the sward for grazing Bewick's swans and therefore affect the availability of adequate preferred feeding areas within the SPA. There are critical areas for this species located at the Dumbles in the uppermost part of the estuary all of which are grazed.

x. Changes in salinity

It is thought unlikely that changes in salinity within the Estuary will affect the Bewicks Swan feature directly but such changes may have marked effects on the supporting saltmarsh habitats on which this species are dependant for feeding. The saltmarshes of the estuary are considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in salinity. Impacts on these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

xi. Changes in oxygenation

It is thought unlikely that changes in oxygenation within the Estuary will affect the Bewicks Swan feature directly but such changes may have an effect on the community composition of supporting saltmarsh habitats on which this species are dependant for feeding. The saltmarshes of the estuary are considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in oxygenation. Impacts on these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

xii. Introduction of microbial pathogens

Bewicks swan is considered to have **low sensitivity** and **high exposure** (due to the high number of sewage discharges) and therefore **moderate vulnerability** to the introduction of microbial pathogens.

Microbial pathogens are most likely to enter the Severn's ecosystem by means of sewage discharges. Bewicks swans on their feeding or roosting grounds may be affected by direct infection by pathogens (bacteria or viruses) present in the water or river sediments and through the release of endo or exotoxins bacterial toxins. Infection may cause mortality, loss of condition and behavioural changes in individuals and within the population using the site through onward contamination.

5.7.2 Internationally important waterfowl assemblage including populations of regularly occurring migratory species

(Note : this advice is also relevant to the Ramsar Site's "internationally important populations of waterfowl" features and the "internationally important assemblage of waterfowl" feature for which the Ramsar Site has been designated – refer also to section 5.8)

5.7.2.1 Sensitivity

The Internationally important waterfowl assemblage including populations of regularly occurring migratory species is **moderately to highly sensitive** to:

- **Physical loss**
- **Physical damage**
- **Non-physical disturbance**
- **Toxic contamination**
- **Non-Toxic contamination**
- **Biological disturbance**

These result from a range of activities known to occur within the Estuary. Further details are provided in points i) to xvi) below, with details of the level of sensitivity set out in Table 23.

5.7.2.2 Exposure

The Internationally important waterfowl assemblage including populations of regularly occurring migratory species is **moderately to highly exposed** to:

- **Substratum loss and smothering**
- **Changes in suspended sediment**
- **Desiccation and changes in emergence regime**
- **Changes in water flow**
- **Changes in wave exposure**
- **Abrasion and physical disturbance**
- **Grazing management**
- **Noise and visual disturbance**
- **Toxic contamination**
- **Changes in nutrient loading**
- **Changes in thermal regime**
- **Changes in salinity**
- **Changes in oxygenation**
- **Introduction of microbial pathogens**
- **Introduction of non-native species**
- **Selective extraction of species**

5.7.2.3 Vulnerability

The Internationally important waterfowl assemblage including populations of regularly occurring migratory species has **moderate to high vulnerability** to:

i. Substratum loss and smothering

The intertidal habitats and therefore the waterfowl assemblage feature which these habitats support are considered to have **moderate to high sensitivity** and **moderate to high exposure** and therefore **moderate to high vulnerability** to physical loss (substratum loss and smothering).

The physical loss of areas of intertidal habitats may be caused directly through change of land use or indirectly as a consequence of changes to sedimentation processes (e.g. coastal defences) as well as via the effects of smothering by artificial structures (e.g. jetties) or the disposal of spoils. Activities or developments resulting in

physical loss of the intertidal supporting habitats are likely to reduce the availability of food and roosting habitat and thus be detrimental to the favourable condition of the SPA interest features including all the migratory species and waterfowl assemblage. The intertidal mudflats and sandflats and the saltmarsh are highly sensitive to removal by land reclamation and major construction activities.

Eelgrass beds (which are a food source for some species of the assemblage) are being affected by siltation due to changes in sediment movement after construction of the Second Severn Crossing which has resulted in smothering.

ii. Changes in suspended sediment

It is thought unlikely that changes in the suspended sediment within the Estuary will affect the waterfowl assemblage directly but such changes may have marked effects on the supporting habitats on which they are dependant for roosting and feeding.. (Refer also to sections 5.6.1, 5.6.3 and 5.6.4). The supporting habitats are all are currently considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to desiccation and changes in emergence regime. Impacts on the suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

iii. Desiccation and changes in emergence regime

It is thought unlikely that changes in the emergence regime within the Estuary will affect the waterfowl assemblage directly but such changes may have marked effects on the supporting habitats on which they are dependant for roosting and feeding.. (Refer also to sections 5.6.1, 5.6.3 and 5.6.4). The saltmarshes are currently considered to have **high sensitivity** and **low exposure** and therefore **moderate vulnerability** to desiccation and changes in emergence regime. Impacts on the suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

iv. Changes in water flow rate

It is thought unlikely that changes in water flow rate within the Estuary will affect the designated bird species of the assemblage directly but such changes may have marked effects on the supporting habitats on which these species are dependant for roosting and feeding. All the supporting habitats are considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability** to changes in water flow rate . (Refer also to sections 5.6.1, 5.6.3 and 5.6.4). Impacts on the suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

v. Changes in wave exposure

It is thought unlikely that changes in wave exposure within the Estuary will affect the designated bird species of the assemblage directly but such changes may have marked effects on the supporting habitats on which these species are dependant for roosting and feeding. All the supporting habitats are considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in water flow rate . (Refer also to sections 5.6.1, 5.6.3 and 5.6.4). Impacts on the extent and suitability of these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

vi. Abrasion and physical disturbance

Saltmarsh may be physically damaged from overgrazing or eroded when boats are moored on it and when paths are worn through it to reach moored boats on foot or via vehicles. Currently all supporting habitats are considered to be moderately vulnerable to abrasion. Intertidal habitats are **highly sensitive** to damage by direct and indirect effects of aggregate dredging. The intertidal mudflats and sandflats and the shingle and rocky shore are therefore considered **highly vulnerable** to selective extraction.

vii. Changes in grazing management

The waterfowl assemblage which is in part dependant on the saltmarsh habitats is considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability** to changes in grazing management.

The vegetation composition of saltmarsh habitats can be altered by changes in grazing management. This can affect the palatability of the sward for grazing wildfowl and availability of invertebrate food sources and therefore affect the availability of adequate preferred feeding areas within the SPA. Grazing changes may also

affect the suitability saltmarsh areas as resting and roosting sites for birds where open terrain with low vegetation is an important factor.

viii. Noise or visual disturbance

Overwintering birds are disturbed by sudden movements and sudden noises. This can have the effect of displacing the birds from their feeding grounds. Disturbance can prevent the birds from feeding and in response they either a) decrease their energy intake at their present (disturbed) feeding site through displacement activity, or b) move to an alternative less favoured feeding site. Such a response affects energy budgets and thus survival. There is intermittent disturbance to the internationally important migratory species and the waterfowl assemblage from both the landward and seaward side of the site which has increased in recent years, due to the estuary becoming more populated and the development of all weather recreational pursuits. All supporting habitats are currently **highly vulnerable** to noise and visual disturbance.

ix. Toxic contamination through the introduction of synthetic and/or non-synthetic compounds

Waterfowl are subject to the accumulation of toxins through the food chain or through direct contact with toxic substances when roosting or feeding. Their ability to feed can also be affected by the abundance or change in palatability of their prey caused by toxic contamination. At the moment there is no evidence to show that this is the case on the Severn Estuary, but the estuary is vulnerable to oil spills and there is a continuous discharge of toxins into the estuary, some of which bind to the sediments. This is an area that requires further assessment. The intertidal mudflats and sandflats and the saltmarsh are currently **highly vulnerable** to the introduction of synthetic and non-synthetic compounds.

x. Changes in nutrient loading

Changes in organic or nutrient loading can change the species composition of the plants on the saltmarsh and thus the structure of the sward. Increases in nutrients can cause excessive algal growth on the mudflats, denying the birds access to their invertebrate prey and changing the invertebrate species composition in the sediment. However, high nutrient loads can also be beneficial to some species of birds by increasing the density and size of prey items. Though the water quality has been improved in recent years there are still local areas of concern. On balance, any increase in nutrient loading should be avoided. At present the intertidal mudflats and sandflats are **moderately vulnerable** to this category of operation.

xi. Changes in thermal regime

It is thought unlikely that changes in the thermal regime within the Estuary will affect the designated bird species of the assemblage directly but such changes may have marked effects on the community composition of supporting habitats on which these species are dependant for feeding. The intertidal mudflats and sandflats of the estuary are considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to changes in thermal regime. Impacts on these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

xii. Changes in salinity

It is thought unlikely that changes in salinity within the Estuary will affect the waterfowl assemblage feature directly but such changes may have marked effects on the supporting habitats on which these species are dependant for feeding. The saltmarshes, intertidal mudfalts and sand flats and hard substrate habitats (rocky shores) of the estuary are considered to have **low to moderate sensitivity** and **high exposure** and therefore **moderate to high vulnerability** to changes in salinity. Impacts on these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

xiii. Changes in oxygenation

It is thought unlikely that changes in oxygenation within the Estuary will affect the waterfowl assemblage feature directly but such changes may have marked effects on the community composition of supporting habitats on which these species are dependant for feeding. The saltmarshes, intertidal mudfalts and sand flats and hard substrate habitats (rocky shores) of the estuary are considered to have **low sensitivity** and **high exposure** and therefore **moderate vulnerability** to changes in oxygenation. Impacts on these habitats may affect the long term survival of individuals (in terms of energy and competition) or alter behavior and patterns of use or distribution.

xiv. Introduction of microbial pathogens

The bird assemblage is considered to have **low to high sensitivity** and **high exposure** (due to the high number of sewage discharges) and therefore **moderate vulnerability** to the introduction of microbial pathogens.

Microbial pathogens are most likely to enter the Severn's ecosystem by means of sewage discharges. Waterfowl may be affected by microbial pathogens (bacteria or viruses) on their feeding or roosting grounds and are considered to be particularly highly exposed when feeding and roosting on the intertidal mudflats and sandflats and hard substrate habitats where there may be bioaccumulation of pathogens within food sources (filter feeding organisms). Birds may also be affected by direct infection by pathogens present in the water or river sediments and through the release of endo or exotoxins bacterial toxins. Infection may cause mortality, loss of condition and behavioural changes in individuals and within the population using the site through onward contamination.

xv. Introduction of non-native species

The birds assemblage is considered to have **high sensitivity** and **low exposure** and therefore **moderate vulnerability** to the introduction of non native species.

The saltmarsh cordgrass *Spartina anglica* is an invasive pioneer species whose rapid growth consolidates sediment, raises mudflats and reduces sediment availability elsewhere. This expansion can affect areas of intertidal habitats (mud and sandflats and hard substrate habitats) which are key habitats for roosting and feeding birds. Such expansion is regarded as being a potential threat to intertidal beds of eelgrass *Zostera noltei* in particular which are a food source for some species within the assemblage (Wigeon and European white-fronted goose). However, whilst recognising *S. anglica* as an invasive species, it also has a role in saltmarsh formation and the community SM6 in which it features should be allowed to develop into other Atlantic Salt Meadow or transitional communities which are also of value as feeding and roosting habitats for birds within the assemblage.

The presence of another non-native, the slipper limpet *Crepidula fornicata*, in large numbers may alter the species composition within certain soft mud habitats leading to a decline in overall species richness and consequent implications on food availability for feeding birds. However, *C. fornicata* has yet to penetrate the Estuary, possibly due to the strong water flows.

xvi. Selective extraction of species

The birds assemblage is considered to have **moderate sensitivity** and **moderate exposure** and therefore **moderate vulnerability** to the selective extraction of species.

Wildfowling is carried out all around the estuary. It is believed that there is currently no direct detrimental effect on the overall bird populations but wildfowling is one of many activities that may be contributing (through disturbance) to the decline in some species on the Severn. Continuing monitoring and regulation of wildfowling is achieved by the countyside agencies and through the management of wildfowling by a British Association of Shooting and Conservation (BASC) affiliated associations, applying the BASC wildfowlers code of conduct.

Bait digging is also carried out in localised areas of the mid and outer estuary. Extensive areas of digging can change the availability of prey in the sediment as the area needs a period of recovery and recolonisation. There is currently no evidence that existing levels of activity is detrimental to the birds on the European Marine Site.

The removal of strandline vegetation by beach cleaning removes an important habitat for invertebrates, as well as many of the invertebrates themselves, reducing the quantity and variety of prey available to the birds. Much of the saltmarsh is managed by grazing and changes in management can alter the availability of prey and suitability of roosting sites.

Table 23 Sensitivity, exposure and vulnerability of the Severn Estuary SPA to physical, chemical and biological pressures *(See note in section 5.7 on changes to this table since version issued in1995.)*

Sensitivity		Exposure		Vulnerability	
High sensitivity	OOOO	High Exposure	××××	High vulnerability	⊗⊗⊗⊗ ⊗⊗⊗O ⊗⊗⊗×
Moderate sensitivity	OOO	Medium Exposure	×××	Moderate vulnerability	⊗⊗OO ⊗⊗× × ⊗⊗⊗
Low sensitivity	OO	Low Exposure	××	Low vulnerability	⊗⊗O ⊗××× ⊗⊗× ⊗×× ⊗⊗ ⊗×
No detectable sensitivity	O	No exposure	×	No vulnerability	⊗O
?S =Insufficient information on sensitivity				Unknown vulnerability	

Categories of operations which may cause deterioration or disturbance	Internationally important populations of regularly occurring Annex 1 species		Internationally important migratory species and waterfowl assemblage		
	Intertidal mudflats and sandflats	Saltmarsh	Intertidal mudflats and sandflats	Saltmarsh	Hard substrates
Physical Loss					
Removal/substratum loss	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗
Smothering	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗
Physical Damage					
Changes in suspended sediment	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗
Desiccation and changes in emergence regime	⊗⊗O	⊗⊗OO	⊗⊗O	⊗⊗OO	⊗⊗O
Changes in water flow	⊗⊗⊗×	⊗⊗⊗×	⊗⊗⊗×	⊗⊗⊗×	⊗⊗⊗×
Changes in wave exposure	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗
Abrasion / physical disturbance (of habitats)	⊗⊗	⊗⊗O	⊗⊗⊗⊗	⊗⊗⊗×	⊗⊗⊗×
Grazing management	Not relevant	⊗⊗⊗⊗	Not relevant	⊗⊗⊗⊗	Not relevant
Non-physical disturbance					
Noise & visual presence	⊗⊗OO	⊗⊗⊗O	⊗⊗⊗O	⊗⊗⊗⊗	⊗⊗⊗O
Toxic contamination					
Introduction of synthetic compounds	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗×	⊗⊗⊗×
Introduction of non-synthetic compounds	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗×
Introduction of radionuclides	**?S××**	**?S××**	**?S××**	**?S××**	**?S××**
Non-toxic contamination					
Changes in nutrient loading	⊗×××	⊗⊗⊗×	⊗⊗⊗×	⊗⊗⊗×	⊗⊗××
Changes in thermal regime	⊗×	⊗⊗	⊗⊗⊗	⊗⊗	⊗⊗
Changes in turbidity (light penetration)	⊗××	⊗×	⊗⊗×	⊗×	⊗⊗×
Changes in salinity	⊗×××	⊗⊗⊗×	⊗⊗××	⊗⊗⊗×	⊗⊗××
Changes in oxygenation	⊗×××	⊗⊗××	⊗⊗××	⊗⊗××	⊗⊗××
Biological disturbance					
Introduction of microbial pathogens	⊗⊗××	⊗⊗××	⊗⊗⊗⊗	⊗⊗××	⊗⊗⊗⊗
Introduction of non-native species	⊗×	⊗⊗	⊗⊗OO	⊗⊗	⊗⊗OO
Selective extraction of species	⊗⊗O	⊗⊗O	⊗⊗⊗	⊗⊗⊗	⊗××

5.8 Specific Advice on Operations for the Severn Estuary Ramsar Site

Separate advice for the Ramsar Site features has not been produced here as it repeats the advice given in the previous sections (5.6 and 5.7) for the SAC and SPA respectively due to the overlapping nature of the Ramsar features. The following table therefore cross references the features of these designations and provides a direct reference to the section where advice relevant to the Ramsar features can be found.

Table 24 Cross reference table relating features of the Ramsar Site to the advice on operations for the SAC and SPA

Ramsar interest features	**Relevant SAC and SPA features and supporting habitats**	**Reference section for advice on operations relevant to the Ramsar features**
Ramsar Interest feature 1 : **Estuaries**	**SAC: Annex I habitats** Estuaries Intertidal mudflats and sandflats Atlantic Salt Meadows	 Section 5.6..1 & Table 22 Section 5.6.3 & Table 22 Section 5.6.4 & Table 22
Ramsar Interest feature 2 : **Migratory fish assemblage**	**SAC : Annex II species** River lamprey *Lampetra fluviatilis*; Sea lamprey *Petromyzon marinus*; Twaite shad *Alosa fallax*	 Section 5.6.6 & Table 22 Section 5.6.6 & Table 22 Section 5.6.6 & Table 22
Internationally important populations of waterfowl *Ramsar Interest feature 3:* **Bewick's swan** *Ramsar Interest feature 4:* **European white-fronted goose** *Ramsar Interest feature 5:* **Dunlin** *Ramsar Interest feature 6:* **Redshank** *Ramsar Interest feature 7:* **Shelduck** *Ramsar Interest feature 8:***Gadwall**	**SPA : Internationally important populations of regularly occurring Annex 1 species (Bewick's swan)** SPA: **Internationally important populations of regularly occurring migratory species (same species as column to left)** **Supporting habitats** Intertidal mudflats and sandflats Saltmarsh Hard substrates .	Section 5.7.1 & Table 23 Section 5.7.2 & Table 23 Section 5.6.3 & Table 22 Section 5.6.4 & Table 22
Ramsar Interest feature 9 **Internationally important assemblage of waterfowl**	SPA: **Internationally important assemblage of waterfowl** **Supporting habitats** Intertidal mudflats and sandflats Saltmarsh Hard substrates	Section 5.7.2 & Table 23 Section 5.6.3 & Table 22 Section 5.6.4 & Table 22

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7. Glossary

Advisory Group	The body of the representatives from local interests, user groups and conservation groups, formed to advise the management group
Annex 1 Bird species	The species listed in Annex 1 of the Birds Directive are the subject of special conservation measures concerning their habitat. These measures ensure the survival and reproduction of the birds in their area of distribution. Species listed on Annex 1 are in danger of extinction, rare or vulnerable
Annex I habitat type(s)	A natural habitat(s) listed in Annex I of the Habitats Directive for which Special Areas of Conservation can be selected.
Annex II species	A species listed in Annex II of the Habitats Directive for which Special Areas of Conservation can be selected.
Annex V	The listing, in the Habitats Directive, of the animal and plant species whose taking in the wild and exploitation may be subject to management measures.
Assemblage	A collection of plants and/or animals characteristically associated with a particular environment.
Attribute	Characteristic of an interest feature or supporting habitat which provides an indication of the condition of the feature or supporting habitat to which it applies.
BASC	British Association of Shooting and Conservation
Benthos	Those organisms attached to, or living on, in or near, the seabed, including that part which is exposed by tides.
Birds Directive	The abbreviated term of *Council Directive* 79/409/*EEC of 1979 on the conservation of wild birds.*
Biodiversity	The total variety of life on earth. This includes diversity within species, between species and ecosystems.
Biotope	The physical habitat with its biological community; a term which refers to the combination of physical environment and its distinctive assemblage of conspicuous species.
BTO	British Trust for Ornithology
CCW	Countryside Council for Wales
Characteristic	Special to, or especially abundant in, a particular situation or biotope. Characteristic species should be immediately conspicuous and easily identified.
Community	A group or organisms occurring in a particular environment, presumably interacting with each other and with the environment, and identifiable by means of ecological survey from other groups.
Competent authority	Any Minister, government department, public or statutory undertaker, public body or person holding a public office that exercises legislative powers.
Conservation objective	A statement of the nature conservation aspirations for a site, expressed in terms of the favourable condition that we wish to see the species and/or habitats for which the site has been selected to attain. Conservation objectives for European Marine Sites relate to the aims of the Habitats Directive.
DEFRA	Department for Environment, Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
Epifauna	Benthic animals living on the seabed.
EN	English Nature (now incorporated into Natural England).
Eulittoral	The main part of the intertidal zone characterised by limpets, barnacles, mussels, fucoid algae and with red algae often abundant on the lower part.

European Marine Site	A European site which consists of, or in so far as it consists of, areas covered intermittently or continuously by seawater.
European Site	A classified SPA, designated SAC, site of Community importance (a site selected as a candidate SAC, adopted by the European Commission but not yet designated), a candidate SAC (in England only) or a site hosting a priority species in respect of which Article 5 of the Habitats directive applies.
Favourable condition	The condition represented by the achievement of the conservation objectives, in other words the desired condition for a designated habitat or a species on an individual site.
Favourable conservation status (FCS)	A range of conditions for a natural habitat or species at which the sum of the influences acting upon that habitat or species are not adversely affecting its distribution, abundance, structure or function throughout the EC in the long term. The condition in which the habitat or species is capable of sustaining itself on a long-term basis.
Habitat	The place in which a plant or animal lives.
Habitats Directive	The abbreviated term of *Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora.* It is the aim of this Directive to promote the conservation of certain habitats and species within the European Union.
Habs Regs	The Conservation (Natural Habitats &c.) Regulations 1994.
HAT	Highest Astronomical Tide.
Infauna	Benthic animals which live within the sediment.
Infralittoral	The subtidal zone in which upward facing rocks are dominated by erect algae, typically kelps.
Interest feature	A natural or semi-natural feature for which a European site has been selected. This includes any Habitats Directive Annex I habitat, or any Annex II species and any population of a bird species for which an SPA has been designated under the Birds Directive.
JNCC	Joint Nature Conservation Committee.
Maintain	The action required for an interest feature when it is considered to be in favourable condition.
Management group	The body of relevant authorities formed to manage the European Marine Site.
Management scheme	The framework established by the relevant authorities at a European Marine Site under which their functions are exercised to secure, in relation to that site, compliance with the requirements of the Habitats Directive.
MNR	Marine Nature Reserve.
Nationally scarce/rare	For marine purposes, these are regarded as species of limited national occurrence.
Natura 2000	The European network of protected sites established under the Birds Directive and the Habitats Directive.
NNR	National Nature Reserve.
Notable species	A species that is considered to be notable due to its importance as an indicator, and may also be of nature conservation importance, and which is unlikely to be a 'characteristic species.'
Operations which may cause deterioration or disturbance	Any activity or operation taking place within, adjacent to, or remote from a European Marine Site that has the potential to cause deterioration to the natural habitats for which the site was designated, or disturbance to the species and its habitats for which the site was designated.
PCB	Polychlorinated Biphenyls.

Peak mean counts (5 yr)	The Severn Estuary is broken down into count sectors. Over the winter months WeBS volunteers count all the birds which are visible within each sector. The yearly figures for each species in the Severn Estuary are then averaged over a five year period to give the 5 yr peak mean count.
Plan or project	Any operation that is within a competent authority's (including relevant authorities) function to control, or over which a competent authority (including relevant authorities) has a statutory function to decide on applications for consents, authorisations, licences or permissions. There is no generally accepted definition of the term "plan or project". This definition may be subject to review and may require further discussion in the context of developing a management scheme for the Severn Estuary SPA.
Ramsar	Site designated under the 1971 Ramsar Convention as a wetland of international importance.
Relevant authority	The specific competent authority which has powers or functions which have, or could have, an impact on the marine environment, or adjacent to, a European Marine Site.
Reporting period	The cycle within which a definitive report on the condition of features protected within the site series will be produced, set as once in every 6 years.
Restore	The action required for an interest feature when it is not considered to be in a favourable condition.
SAC	Special Area of Conservation.
Sensitivity	The intolerance of a habitat, community or individual species to damage from an external force.
SPA	Special Protection Area for birds.
SSSI	Site of Special Scientific Interest.
Strandline	The organic matter particularly rotting seaweed deposited by the tide anywhere along the intertidal.
Supporting Habitats	The key habitats within the European Marine Site necessary to support the interest feature.
TAN 5	Planning Guidance (Wales) Technical Advice Note (TAN)5: Nature Conservation and Planning (Welsh Assembly Government)
TBT	Tri-butyl tin
Vulnerability	The exposure of a habitat, community or individual of a species to an external factor to which it is sensitive.
WeBS	Wetland Bird Survey: a collaborative national surveillance scheme of the UK's waterfowl based on counts undertaken once per month outside of the breeding season.
WWT	Wildfowl & Wetlands Trust

ANNEX 5

Information downloaded from the JNCC website

Resource hub

Natura 2000 summary site details 2019

Freshwater | Marine | Terrestrial | Protected Areas | Natura 2000

Abstract

This spreadsheet contains the latest UK wide data submitted to the EU Commission (in October 2019), as part of the Standard Data Form information completed for all Natura 2000 sites. It contains details of all Special Areas for Conservation (under the Habitats Directive) and Special Protection Areas (under the Birds Directive). Note that Gibraltar information is not included in this spreadsheet. The information in the Standard Data Forms was resubmitted with substantive changes in December 2015. The rationale behind this is explained in the UK Approach Document.

The information provided here follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The content matches exactly the data submitted to the European Commission. Further technical documentation may be found on the Eionet website.

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on JNCC's website. More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on JNCC's website.

This sheet is organised in a series of tabs, corresponding to different sections of the standard data form. On some tabs, SPA and SAC data are separated, whereas on others they are combined. Where they are combined, there is always a column to indicate the type of site (SAC or SPA). All sheets are filterable by Country codes (E, S, W, NI and OF for offshore). Cross border sites take the first letter of each country code (e.g. EW for England/Wales; SO for Scotland/Offshore). The tabs are: *SAC site details* contains summary information about the SACs themselves, including their size, location and date of designation. This tab contains descriptions of the quality/importance of the site and physical characteristics. *SPA site details* - contains summary information about the SPAs themselves, including a brief description, their size, location and date of classification. Most of the data are sourced from the Natura 2000 Data Form, the exceptions are those in 'overview' and 'local authority' which are sourced from the 2001 SPA Review. The list includes all classified SPAs. There is also an indication of which sites contain marine components ie can be considered to be part of the Marine Protected Areas Network. *Admin regions* contains details of the administrative regions for each site using the NUTS Level 2 categories. *SAC interest features* contains a full listing of all Habitats Directive features occurring on SACs in the UK. This includes non-qualifying ('D-grade') features that are not a reason for SAC selection at

a particular site. Note that a feature may not occur on all parts of a site, especially in the case of large SACs. *SPA interest features* shows bird data submitted to the EU - ie the occurrence of each species on each site. The list of species for each site includes only those listed on the Natura 2000 Data Form submitted to the European Commission (specifically those listed in section 3.2 of this form). It does not yet take account of the amendments published in the SPA Review - because in many cases these data have not yet been submitted to the EU as part of an amended Natura 2000 Data Form. This does not include assemblages – these are listed in a separate sheet.SAC interest features contains a full listing of all Habitats Directive features occurring on SACs in the UK. This includes non-qualifying ('D-grade') features that are not a reason for SAC selection at a particular site. Note that a feature may not occur on all parts of a site, especially in the case of large SACs. *Maps* offers a simple mapping facility. If a particular feature or site is selected in the above worksheets using the Autofilter function, a dot map will be displayed showing the location of the site(s). *Habitat classes* indicates the percentage of each SAC/SPA comprised of certain broad habitat types. These are intended to give a general impression of the character of the SAC. They should not be confused with the Annex I habitats, which are listed in the SAC interest feature worksheet. *Threats and pressures* lists the positive and negative factors that impact on the site. These data were collated for the first time in the UK as part of the December 2015 submission to the EU. *Management Body* – indicates the appropriate Statutory Nature Conservation Bodies *Management plan* – indicates whether or not a management plan exists for the site. *Designation type* – this refers to a very limited range of National Designations, specifically SSSI, (ASSI in Northern Ireland), Marine Nature Reserves and National Nature Reserves.

Detail Usage Meta Resources 1

Extent

- Natura 2000 site details - spreadsheet
  XLSX
  2.3MB UK-Natura2000-2019-10-31.xlsx

Resource type NonGeographicDataset

Topic category Environment

Reference date 2019·10·31

Lineage

Each of the tabs in the spreadsheet has been derived from a master SQL server database managed by JNCC. This database is used to provide the official EU submission and also to generate the Standard Data Forms. Prior to December 2015, JNCC published separate spreadsheets for both SAC and SPA. The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU). This is known as the Standard Data Format. As part of the December 2015 submission,

several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document: http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf. More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SPAs in the UK. For all sites other than those in the offshore zone, the Statutory Nature Conservation Body responsible for the site (eg Natural England or Scottish Natural Heritage) has supplied JNCC with the information for the standard data forms.

Natura 2000 Summary Site Details 2019

Qualifying Species

	SITE_CODE	SITE_NAME	Country	LOCAL_AUTHORITY	Site_status	X_coor	Y_coor	Nowak_code	IS_MARINE	Species	Common_name	Season	Pop
621	UK9005012	Upper Solway Flat	ES	Cumbria, South Western Scotland	Designated SPA	308669	557723	A160	1	Numenius arquata	Eurasian curlew	w	
622	UK9005012	Upper Solway Flat	ES	Cumbria, South Western Scotland	Designated SPA	308669	557723	A162	1	Tringa totanus	Common redshank	w	
623	UK9005012	Upper Solway Flat	ES	Cumbria, South Western Scotland	Designated SPA	308669	557723	A169	0	Arenaria interpres	Ruddy turnstone	w	
624	UK9005012	Upper Solway Flat	ES	Cumbria, South Western Scotland	Designated SPA	308669	557723	A672	1	Calidris alpina alpina	Dunlin	w	
625	UK9015022	Severn Estuary	EW	Dorset and Somerset, East Wales, Gloucestershire, Wiltshire and Bristol/Bath area, West Wales and The Valleys	Designated SPA	327741	147013	A037	0	Cygnus columbianus bewickii	Tundra swan	w	
626	UK9015022	Severn Estuary	EW	Dorset and Somerset, East Wales, Gloucestershire, Wiltshire and Bristol/Bath area, West Wales and The Valleys	Designated SPA	327741	147013	A048	1	Tadorna tadorna	Common shelduck	w	
627	UK9015022	Severn Estuary	EW	Dorset and Somerset, East Wales, Gloucestershire, Wiltshire and Bristol/Bath area, West Wales and The Valleys	Designated SPA	327741	147013	A051	1	Anas strepera	Gadwall	w	
628	UK9015022	Severn Estuary	EW	Dorset and Somerset, East Wales, Gloucestershire, Wiltshire and Bristol/Bath area, West Wales and The Valleys	Designated SPA	327741	147013	A162	1	Tringa totanus	Common redshank	w	
629	UK9015022	Severn Estuary	EW	Dorset and Somerset, East Wales, Gloucestershire, Wiltshire and Bristol/Bath area, West Wales and The Valleys	Designated SPA	327741	147013	A394	0	Anser albifrons albifrons	Greater white-fronted goose	w	
630	UK9015022	Severn Estuary	EW	Dorset and Somerset, East Wales, Gloucestershire, Wiltshire and Bristol/Bath area, West Wales and The Valleys	Designated SPA	327741	147013	A672	1	Calidris alpina alpina	Dunlin	w	
631	UK9013011	The Dee Estuary	EW	Cheshire, East Wales, Extra-Regio, Merseyside, West Wales and The Valleys	Designated SPA	321148	378892	A048	1	Tadorna tadorna	Common shelduck	w	
632	UK9013011	The Dee Estuary	EW	Cheshire, East Wales, Extra-Regio, Merseyside, West Wales and The Valleys	Designated SPA	321148	378892	A052	1	Anas crecca	Eurasian teal	w	
633	UK9013011	The Dee Estuary	EW	Cheshire, East Wales, Extra-Regio, Merseyside, West Wales and The Valleys	Designated SPA	321148	378892	A054	1	Anas acuta	Northern pintail	w	
634	UK9013011	The Dee Estuary	EW	Cheshire, East Wales, Extra-Regio, Merseyside, West Wales and The Valleys	Designated SPA	321148	378892	A130	1	Haematopus ostralegus	Eurasian oystercatcher	w	
635	UK9013011	The Dee Estuary	EW	Cheshire, East Wales, Extra-Regio, Merseyside, West Wales and The Valleys	Designated SPA	321148	378892	A141	1	Pluvialis squatarola	Grey plover	w	

	Population_count_min	Population_count_max	Pop_units	SPECIES_DATA_QUALITY	COUNT_PERIOD	IMPORTANCE	SPECIES_POPULATION	SPECIES_CONSERVATION	SPECIES_ISOLATION	SPECIES_GLOBAL
621	5881	5881	individuals	Good	5 year peak mean 91/2 to 95/6	1.7% of JNCC defined international population (wintering)	B	NULL	C	NULL
622	3088	3088	individuals	Good	5 year peak mean 91/2 to 95/6	1.7% of JNCC defined international population (wintering)	B	NULL	C	NULL
623	600	600	individuals	Good	5 year peak mean, 1986/7-1990/	0.9% of Great Britain (Wintering)	C	NULL	C	NULL
624	14566	14566	individuals	Good	5 year peak mean 91/2 to 95/6	2.7% of Great Britain (Wintering)	B	NULL	C	NULL
625	280	280	individuals	Good	5 year peak mean 91/2 to 95/6	3.9% of JNCC defined GB population (wintering)	B	NULL	C	NULL
626	3330	3330	individuals	Good	5 year peak mean 91/2 to 95/6	1.1% of JNCC defined international population (wintering)	B	NULL	C	NULL
627	282	282	individuals	Good	5 year peak mean 91/2 to 95/6	0.9% of JNCC defined international population (wintering)	B	NULL	C	NULL
628	2330	2330	individuals	Good	5 year peak mean 91/2 to 95/6	1.3% of JNCC defined international population (wintering)	B	NULL	C	NULL
629	2664	2664	individuals	Good	5 year peak mean 91/2 to 95/6	0.4% of JNCC defined international population (wintering)	A	NULL	B	NULL
630	44624	44624	individuals	Good	5 year peak mean 91/2 to 95/6	3.3% of JNCC defined international population (wintering)	B	NULL	C	NULL
631	7725	7725	individuals	Good	5 year peak mean 91/2 to 95/6	1.1% of JNCC defined international population (wintering)	B	NULL	C	NULL
632	5251	5251	individuals	Good	NULL	NULL	C	NULL	C	NULL
633	5407	5407	individuals	Good	5 year peak mean 91/2 to 95/6	8.9% of JNCC defined international population (wintering)	A	NULL	C	NULL
634	22677	22677	individuals	Good	5 year peak mean 91/2 to 95/6	2.2% of JNCC defined international population (wintering)	B	NULL	C	NULL
635	1643	1643	individuals	Good	NULL	NULL	C	NULL	C	NULL

Natura 2000 Summary Site Details 2019

Assemblage Species

	SITE_CODE	DESIGNATION_TYPE_CODE	SITE_NAME	COUNTRY_CODE	OTHER_SPECIES_GROUP	OTHER_SPECIES_CODE	OTHER_SPECIES_NAME	OTHER_SPECIES_SENSITIVE	OTHER_SPECIES_NP	OTHER_SPECIES_SIZE_MIN	OTHER_SPECIES_SIZE_MAX	OTHER_SPECIES_UNIT	OTH
42	UK9012011	SPA	The Swale	E	B	WATR	Waterbird assemblage	0	0	65588	65588	individuals	NULL
43	UK9012011	SPA	The Swale	E	B	BBA	Breeding bird assemblag	0	0	NULL	NULL	NULL	NULL
44	UK9008021	SPA	The Wash	E	B	WATR	Waterbird assemblage	0	0	400367	400367	individuals	NULL
45	UK9020296	SPA	Upper Nene V	E	B	WATR	Waterbird assemblage	0	0	23821	23821	individuals	NULL
46	UK9005012	SPA	Upper Solway	ES	B	WATR	Waterbird assemblage	0	0	133440	133440	individuals	NULL
47	UK9015022	SPA	Severn Estuary	EW	B	WATR	Waterbird assemblage	0	0	84317	84317	individuals	NULL
48	UK9013011	SPA	The Dee Estua	EW	B	WATR	Waterbird assemblage	0	0	90518	90518	individuals	NULL
49	UK9020294	SPA	Liverpool Bay /	EWO	B	WATR	Waterbird assemblage	0	0	69687	69687	individuals	NULL
50	UK9020031	SPA	Lough Foyle	NI	B	WATR	Waterbird assemblage	0	0	36599	36599	individuals	NULL
51	UK9020091	SPA	Lough Neagh a	NI	B	WATR	Waterbird assemblage	0	0	99262	99262	individuals	NULL
52	UK9020011	SPA	Rathlin Island	NI	B	SBA	Seabird assemblage	0	0	66000	66000	individuals	NULL

	OTHER_SPECIES_UNIT	OTHER_SPECIES_CATEGORY	OTHER_SPECIES_MOTIVATION	Column1
42	individuals	NULL	NULL	C
43	NULL	NULL	NULL	D
44	individuals	NULL	NULL	C
45	individuals	NULL	NULL	C
46	individuals	NULL	NULL	C
47	individuals	NULL	NULL	C
48	individuals	NULL	NULL	C
49	individuals	NULL	NULL	D
50	individuals	NULL	NULL	C
51	individuals	NULL	NULL	C
52	individuals	NULL	NULL	C

ANNEX 6

Relevant Conservation Objectives

European Site Conservation Objectives for Exmoor and Quantock Oakwoods Special Area of Conservation Site Code: UK0030148

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats and habitats of qualifying species**
- **The structure and function (including typical species) of qualifying natural habitats**
- **The structure and function of the habitats of qualifying species**
- **The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely**
- **The populations of qualifying species, and,**
- **The distribution of qualifying species within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H91A0. Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles; Western acidic oak woodland

H91E0. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*); Alder woodland on floodplains*

S1308. *Barbastella barbastellus*; Barbastelle bat

S1323. *Myotis bechsteinii*; Bechstein`s bat

S1355. *Lutra lutra*; Otter

* denotes a priority natural habitat or species (supporting explanatory text on following page)

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.