











Appendix I: The Severn Estuary SPA and Ramsar site citations





## **NATURA 2000**

## **STANDARD DATA FORM**

FOR SPECIAL PROTECTION	AREAS	(SPA)
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FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

#### 1. Site identification:

**1.2 Site code** 

UK9015022

**1.3 Compilation date** 199507

1.4 Update

199902

#### 1.5 Relationship with other Natura 2000 sites

U	Κ	0	0	1	2	6	4	2
U	Κ	0	0	1	3	0	0	7
U	Κ	0	0	1	3	0	3	0
U	Κ	0	0	3	0	2	0	3

J

**1.6 Respondent(s)** 

International Designations, JNCC, Peterborough

#### 1.7 Site name

#### **1.8** Site indication and designation classification dates

**Severn Estuary** 

date site proposed as eligible as SCI					
date confirmed as SCI					
date site classified as SPA	199507				
date site designated as SAC					

#### 2. Site location:

#### 2.1 Site centre location

longitude	latitude	
03 02 57 W	51 13 29 N	
2.2 Site area (ha)	24662.98	2.3 S

2.3 Site length (km)

#### 2.5 Administrative region

NUTS code	Region name	% cover
UK611	Avon	25.04%
UK612	Gloucestershire	21.03%
UK921	Gwent	26.04%
UK632	Somerset	24.04%
UK923	South Glamorgan	4.01%

#### 2.6 Biogeographic region

	X				
Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranear

## **3.** Ecological information:

#### 3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representati vity	Relative surface	Conservation status	Global assessment

## 3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

		Population		Site assessment					
		Resident		Migratory					
Code	Species name		Breed	Winter	Stage	Population	Conservation	Isolation	Global
A051	Anas strepera			282 I		В		С	
A041a	Anser albifrons albifrons			2664 I		А		В	
A149	Calidris alpina alpina			44624 I		В		С	
A037	Cygnus columbianus bewickii			280 I		В		С	
A048	Tadorna tadorna			3330 I		В		С	
A162	Tringa totanus			2330 I		В		С	

## 4. Site description:

#### 4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	89.0
Salt marshes. Salt pastures. Salt steppes	6.0
Coastal sand dunes. Sand beaches. Machair	4.0
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	
Bogs. Marshes. Water fringed vegetation. Fens	
Heath. Scrub. Maquis and garrigue. Phygrana	
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	1.0
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	100%

#### 4.1 Other site characteristics

#### Soil & geology:

Biogenic reef, Clay, Cobble, Gravel, Limestone/chalk, Mud, Peat, Sand, Sandstone/mudstone, Sedimentary, Shingle

#### Geomorphology & landscape:

Cliffs, Estuary, Intertidal rock, Intertidal sediments (including sandflat/mudflat), Islands, Open coast (including bay), Pools, Subtidal rock (including rocky reefs), Subtidal sediments (including sandbank/mudbank), Tidal rapids

#### 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)

Anser albifrons albifrons (North-western Siberia/North-eastern & Northwestern Europe)

Calidris alpina alpina (Northern Siberia/Europe/Western Africa)

*Tadorna tadorna* (North-western Europe)

*Tringa totanus* (Eastern Atlantic - wintering)

0.9% of the population 5 year peak mean 1991/92-1995/96

0.4% of the population 5 year peak mean 1991/92-1995/96

3.3% of the population 5 year peak mean 1991/92-1995/96

1.1% of the population 5 year peak mean 1991/92-1995/96

1.3% of the population5 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 01/04/1998)

Including:

Cygnus columbianus bewickii, Anser albifrons albifrons, Tadorna tadorna, Anas strepera, Calidris alpina alpina, Tringa totanus.

### 4.3 Vulnerability

The conservation of the site features is dependent on the tidal regime. The range is the second highest in the world and the scouring of the seabed and strong tidal streams result in natural erosion of the habitats. The estuary is therefore vulnerable to large scale interference, including human actions. These include land-claim, aggregate extraction/dredging, physical developments such as barrage construction flood defences, pollution (industrial, oil spillage), eutrophication and tourism based activities and disturbance. These issues are being addressed through existing control measures and as part of the Severn Estuary Strategy.

Since June 1995 the Severn Estuary Strategy has been working towards the sustainable management of the site, through the involvement of local authorities, interested parties and local people. This integrated approach is being further developed in conjunction with the SAC management scheme for the nature conservation interest of the estuary.

### 5. Site protection status and relation with CORINE biotopes:

#### 5.1 Designation types at national and regional level

Code	% cover
UK01 (NNR)	9.0
UK04 (SSSI/ASSI)	100.2

# **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.
- Further information and guidance in support of Ramsar site designations are provided in the Strategic Framework for 2. 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.
- Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers 3. 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 Joint Nature Conservation Committee Monkstone House City Road Site Reference Number Designation date 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 **Country:** 3. **UK (England/Wales)**

4. Name of the Ramsar site: Severn Estuary

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

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

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

Ramsar Information Sheet: UK11081

Page 1 of 13

#### 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  $\checkmark$  -orno  $\Box$ ;

#### 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 coordinat	es (latitude/longitude):
51 1	3 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):** 

229 individuals, representing an average of 2.8%

#### Species with peak counts in winter:

Tundra swan, *Cygnus columbianus bewickii*, NW Europe

Greater white-fronted goose, *Anser albifrons albifrons*, NW Europe

Common shelduck, *Tadorna tadorna*, NW Europe

Gadwall, Anas strepera strepera, NW Europe

Dunlin, *Calidris alpina alpina*, W Siberia/W Europe

Common redshank, Tringa totanus totanus,

of the GB population (5 year peak mean 1998/9-2002/3) 2076 individuals, representing an average of 35.8% of the GB population (5 year peak mean for 1996/7-2000/01) 3223 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3) 241 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3) 25082 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3)

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,	4167 apparently occupied nests, representing an
W Europe/Mediterranean/W Africa	average of 2.8% of the breeding population
	(Seabird 2000 Census)
Species with peak counts in spring/autumn:	
Ringed plover, Charadrius hiaticula,	740 individuals, representing an average of 1%
Europe/Northwest Africa	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

**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	alluvium basic biogenic reef clay cobble gravel
Son & geology	limestone/chalk mud neutral nutrient rich neat sand
	and detone (mudatone, acdimentary, chingle
	sandstone/mudstone, sedimentary, sningle
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
Η	Salt marshes	4.7
D	Rocky shores	4.7
Е	Sand / shingle shores (including dune systems)	4.4
Тр	Freshwater marshes / pools: permanent	1
В	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	1540 apparently occupied nests, representing an
Europe and Iceland/W Europe )	average of 1.1% of the GB population (Seabird
	2000 Census)

#### Species with peak counts in spring/autumn:

Little egret , <i>Egretta garzetta</i> , 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, <i>Numenius phaeopus</i> , 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, <i>Numenius arquata arquata</i> , 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, <i>Tringa nebularia</i> , 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:

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

#### 24. Land tenure/ownership:

#### 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.

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Appendix II: Waterfowl abundance and distribution within the Study Area and entire Severn Estuary SPA and Ramsar site





	Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
	Bewick's swan	289 (4.1% of the GB population)	205	The only record of this species relates to two birds which were present at Severn Beach in December 2004.	The desk study has not identified any records of Bewick's swan within the Avonmouth area in recent years.
	European white- fronted goose	3,002 (50% of the GB population)	601	The only recent records of this species relate to small flocks of up to 17 birds which were recorded at Severn Beach on a sporadic basis between 2003 & 2006.	The desk study has not identified any records of this species within the Avonmouth area in recent years.
migratory species also listed as qualifying assemblage species	Shelduck	2,892 (3.9% of the GB population)	4,431	The areas of saltmarsh have been found to support up to 44 birds in recent years, with smaller numbers (up to two birds) recorded at a small number of inland sites.	Peak winter counts of up to 44 birds have been recorded from the areas of saltmarsh and intertidal habitat in recent years, with smaller numbers (up to six birds) recorded at a small number of inland sites. In addition, peak counts of up to 29 shelducks have been recorded from intertidal habitats within the southern half of the study area during the 2007 autumn passage period.





Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Gadwall	330 (5.5% of the GB population)	253	Peak counts of up to 21 birds have previously been recorded at Orchard Pools, with smaller numbers in neighbouring fields, Crook's Marsh and a number of estuarine sites.	Counts of up to 62 birds have previously been recorded at a number of estuarine sites (particularly, the saltmarsh 'pills'), as well as Avonmouth Pools and other inland sites. During 2008 spring migration bird surveys, peak counts of 18 birds have previously been recorded within the southern half of the study area.
Redshank	2,013 (2.6% of the GB population)	2,269	Desk study records relate exclusively to estuarine sites, with counts of up to 200 birds at New Pill Gout and nearby areas of saltmarsh.	Desk study records relate exclusively to estuarine sites, with counts of up to 170 birds at Hole's Mouth and intertidal habitat to the south of the study area, as well as smaller concentrations at Chittening Warth.
Dunlin	41,683 (9.6% of the GB population)	19,996	Counts of between 100 and 1100 birds have previously been recorded at Severn Beach and Chittening Warth North on a regular basis. These were identified as roost sites for this species during the Severnside bird surveys in 2001/02 and/or 2006/07	Peak winter counts of between 310 and 1900 birds have been recorded at Chittening Warth and the area of intertidal habitat in the southern half of the study area. Smaller flocks (up to 30 birds) have also been recorded at Hole's Mouth on occasions.





	Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Qualifying assemblage species: Original SPA citation	Wigeon	3,977 birds (1.6% of the GB population)	8,548 birds	No more than six birds have been recorded at any location during the Severnside bird surveys; however, BRERC data and WeBS counts indicate that this survey information for estuarine sites is likely to be an under-estimate.	No more than 22 birds have been recorded at any site in the Avonmouth area, which could represent an under-estimate of this species' abundance and distribution.
	Teal	1,998 birds (2.0% of the GB population)	4,251 birds	At estuarine sites, counts of up to 75 birds have previously been recorded, with New Pill Gout identified as supporting concentrations of (roosting) birds. Low numbers have also been recorded at several inland sites.	The largest concentrations of teal were associated with Hole's Mouth with peak counts of 140 birds previously recorded. Stupp Pill and Mitchell's Salt Rhyne have also been found to support peak counts of between 19 and 70 birds. Furthermore, counts of up to 200 birds have also previously been recorded at a number of inland sites.
	Pintail	523 birds (2.1% of the GB population)	911 birds	The most recent WeBS data covering the Severnside estuarine area (i.e. 2003/04-2007/08) indicate a low abundance of pintail within this part of the Severn Estuary, with a peak count of only three birds in January 2005. These data are consistent with the findings from other desk study sources.	Low numbers of pintail (fewer than 10 birds) have been reported from a small number of estuarine and inland sites on a sporadic basis.





Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Pochard	1,686 birds (3.8% of the GB population)	735 birds	Virtually no records of this species have been identified in the Severnside area.	Historic desk study data include counts of up to 103 pochard at Avonmouth Pools between the late-1980s and early 2000s; however, more recent comparable records have not been identified.
Tufted duck	913 birds (1.5% of the GB population)	554 birds	Low numbers of birds have been identified from all desk study sources, with peak counts of up to 10 birds recorded at Orchard pools and 13 birds at Crook's Marsh (although the reservoir used by these birds at Crook's Marsh has subsequently been drained).	Avonmouth Pools have regularly supported aggregations of up to 68 tufted ducks since the mid- 1980s, with numbers appearing to have increased slightly at this site in recent years. Only small numbers of birds (fewer than five) have been identified from other sites at Avonmouth.





Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Ringed plover	227 birds (1.0% of the GB population)	1,054 birds	Peak numbers of ringed plover occur during the passage periods. WeBS data and Avon Bird Reports indicate that in excess of 175 birds have previously been recorded at Severnside (and its wider surroundings). The Severnside surveys are likely to have under-recorded plover numbers, since they did not coincide with the peak passage periods.	Smaller numbers of plovers have been recorded on passage during WeBS surveys at Avonmouth (up to 26 birds). These count data, as well as the absence of this species from the Severnside surveys are considered to potentially represent an under- estimate of bird abundance in the area. Breeding attempts involving nine pairs of ringed plover have taken place at Avonmouth Docks in recent years.
Grey plover	781 birds (3.7% of the GB population)355 birdsThe desk study include winter counts of betwee 38 birds at estuarine si between 2003 and 200 (suggesting that the corresponding WeBS of birds) may be an under of grey ployer numbers	The desk study includes peak winter counts of between 16 and 38 birds at estuarine sites between 2003 and 2008 (suggesting that the corresponding WeBS data (9 birds) may be an under-estimate of grey plover numbers).	A record of single bird at Hole's Mouth during winter 2007/08 has been identified.	





Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Curlew	3,096 birds (3.4% of the GB population)	2690 birds	Flocks of up to 104 birds have been recorded at Severn Beach and the adjacent area of saltmarsh to the south, as well as Stupp Pill. Flocks of up to 58 curlew have also been recorded at a number of inland sites.	Peak winter counts of between 47 and 120 birds have been recorded within the central section of Chittening Warth (with roost sites for this species identified in this area). Smaller numbers of birds have also been identified at Chittening Warth South, the intertidal habitats in the southern half of the study area (including Holes Mouth) and Hallen Marsh.
Whimbrel	246 birds (4.9% of the GB population)	2 birds (162 birds*)	Peak numbers of whimbrel occur during the passage periods. The Avon Bird Reports indicate that up to 120 birds have previously been recorded at Severnside (and its wider surroundings) since 2003. The findings of the Severnside surveys are likely to have under-recorded whimbrel numbers, since they did not coincide with the peak passage periods.	Smaller numbers of whimbrel have been recorded on passage during WeBS surveys at Avonmouth (up to 2 birds). These count data, as well as the absence of this species from the Severnside surveys are considered to potentially represent an under-estimate of bird abundance in the area.
Spotted redshank	3 birds (1.5% of the GB population)	9 birds	WeBS data indicate a peak count of up to two birds has been recorded in recent years.	WeBS data and the findings of the Severnside bird surveys indicate a peak count of up to two birds has been recorded in recent years





	Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Qualifying assemblage species: 2001 Severn Estuary SPA amendment	Mallard	3,800 birds	2,713 birds (3,338 birds <sup>†</sup> )	Counts of up to 100 birds have previously been recorded at Severn Beach and Chittening Warth North. In addition, counts of up to 40 mallard have also been recorded at a number of inland sites.	Counts of up to 110 birds have previously been recorded on a regular basis at Chittening Warth and the intertidal habitats in the southern half of the study area (including Hole's Mouth). Up to 35 birds have previously been recorded at a number of inland sites. In addition, autumn passage counts of up to 140 birds have previously been recorded at the intertidal habitats in the southern half of the study area during surveys in 2007.
	Lapwing	3,976 birds	12,919 birds	The largest count of lapwing identified during the desk study relates to up 625 birds from the fields to the east of the M49 (winter 2008/09). Smaller numbers of birds (less than 110) have also been recorded from a range of other sites.	Peak counts of up to 630 birds have been recorded at Chittening Warth Central and the intertidal habitats between Stupp Pill and Hole's Mouth. Counts of up to 318 birds have also previously been recorded from a number of inland sites.
	Shoveler	73 birds	518 birds	The only desk study records for this species relate to small numbers of birds (no more than six individuals) at a limited number of sites.	Concentrations of shoveler (up to 90 birds) have previously been recorded at Hole's Mouth, Avonmouth Sewage Works, Avonmouth Pools and Disused Reservoir Pools.





	Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Qualifying assemblage species: Other nationally important populations	Grey heron	n/a	48 birds (59 birds <sup>†</sup> )	There are existing records of small numbers of grey heron (usually no more than two birds) present at sites throughout the study area.	There are existing records of small numbers of grey heron (usually no more than two birds) present at sites throughout the study area.
	Little egret	n/a	41 birds (79 birds <sup>†</sup> )	Peak counts of up to six birds have been recorded in recent years; however, no further site- specific information regarding their distributions has been identified from any of the desk- based sources reviewed for this project.	The desk study findings indicate that small numbers of little egrets (up to two birds) have previously been recorded at Avonmouth Sewage Works and its surroundings.
	Mute swan	n/a	420 birds	Flocks of up to 10 birds have previously been recorded at a small number of sites, most frequently at Orchard Pools.	Flocks of up to 10 birds have previously been recorded at a small number of sites, most frequently at Avonmouth Sewage Works.
	Common snipe	n/a	434 birds	This species is likely to be under- recorded within the study area, with the only site-specific record comprising a count of up to 53 birds from Dyer's Common during winter 2008/09.	This species is likely to be under- recorded within the study area. There are existing records of small numbers of birds (no more than ten individuals) being present at the following inland sites: Chittening Warth; Seabank Power Station; Avonmouth Pools; land to the south of Avonmouth Sewage Works; Merebank; Pools at Brook Farm; and Salt Rhyne Balancing Pool.





Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
Black-tailed godwit	n/a	295 birds (347 birds <sup>†</sup> )	A review of all relevant desk study sources indicates that peak counts of up to 85 birds (Avon Bird Report, 2006) have been recorded in the Severnside area since 2003. The only site-specific wintering records of this species comprise a count of 50 birds recorded at Severn Beach (December 2004) and a single bird at the area of saltmarsh to the south of Severn Beach in February 2006.	A desk study record of a single bird at an area of intertidal habitat between Stupp Pill and Hole's Mouth in autumn 2007 has been identified.
Bar-tailed godwit	n/a	49 birds (76 birds*)	Peak numbers of bar-tailed godwit occur during the passage periods and, therefore (to some extent) this species is likely to be under-recorded. Counts of up to 223 birds have previously been recorded at Salmon Pools, with smaller numbers recorded at a limited number of other estuarine sites.	No site-specific information pertaining to this species' abundance and distribution within the study area has been identified from any of the desk-based sources reviewed as part of this study.
Knot	n/a	2598 birds	Peak counts of up to 170 birds (Avon Bird Report, 2005) have been recorded in the Severnside area since 2003. Site-specific records of up to 30 birds have also been identified for a limited number of other estuarine sites.	No site-specific information pertaining to this species' abundance and distribution within the study area has been identified from any of the desk-based sources reviewed as part of this study.





	Species	SPA population (based upon the 5 year peak mean: 1988/9 - 1992/3)	SPA population (based upon the 5 year peak mean: 2003/4 – 2007/8)	Abundance and distribution at Severnside (Cresswell Associates, 2010)	Abundance and distribution at Avonmouth (Cresswell Associates, 2010)
	Turnstone	n/a	287 birds	Peak counts of up to 170 birds (Avon Bird Report, 2005) have been recorded in the Severnside area since 2003. Site-specific records of up to 30 birds have also been identified for a limited number of other estuarine sites.	No site-specific information pertaining to this species' abundance and distribution within the study area has been identified from any of the desk-based sources reviewed as part of this study.
	Golden plover	n/a	2,859 birds	Severn Beach and its adjacent area of saltmarsh have previously been found to support up to 66 birds, with similar numbers recorded at New Pill Gout.	The Severnside bird surveys have previously recorded peak winter counts of up to 200 birds at Chittening Warth and Hole's Mouth. Furthermore, a count of 75 birds was also recorded at Chittening Warth (2005-2007), during bird surveys associated with Bristol City Council's proposed wind energy development.
	Water rail	n/a	14 birds	A review of all relevant desk study sources indicates that peak counts of at least six birds (Avon Bird Report, 2004) have been recorded at locations through the study area since 2003. However, owing to this species' cryptic nature, the desk-based records are likely to be under- representative of baseline conditions.	A review of all relevant desk study sources indicates that peak counts of at least six birds (Avon Bird Report, 2004) have been recorded at locations through the study area since 2003. However, owing to this species' cryptic nature, the desk-based records are likely to be under- representative of baseline conditions.
i otal waterfowl in	assemblage	68,026	69,803	-	-





- n/a species not listed within the qualifying assemblage on the original SPA designation and, therefore, a SPA population based upon the 5 year peak mean (1989/9-1992/3) is not presented.
- \* derived from a 5 year peak mean for the spring migratory period.
- <sup>†</sup> derived from a 5 year peak mean for the autumn migratory period.
- <sup>Δ</sup> cited within the Regulation 33 Advice for the Severn Estuary SPA and Ramsar site (Natural England and Countryside Council for Wales, 2009.
- <sup>1</sup> This figure equates to the sum of the 5 year peak mean counts (2003/4-2007/8) for each of the species within the SPA qualifying assemblage.





Appendix III: Study of Soils and Habitats

South Gloucestershire Council, Bristol City Council & Natural England

# Severnside & Avonmouth Wetland Habitat Project

**Baseline Study of Soils and Habitats** 



15<sup>th</sup> June 2010 C1453/Soils&Habitats/v1



South Gloucestershire Council, Bristol City Council & Natural England

# Severnside & Avonmouth Wetland Habitat Project

**Baseline Study of Soils and Habitats** 

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Report no:	C1453/Soils&Habitats/v1	Date:	15 <sup>th</sup> June 2010

This report has been prepared for client in accordance with the terms and conditions of appointment for the Project Partnership (South Gloucestershire Council, Bristol City Council & Natural England) dated 22<sup>nd</sup> January 2010. Hyder Consulting cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.



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## Contents

1	INTRODUCTION									
2	METH	ODOLOGY	iii							
	2.1	Stage 1 - Baseline desk study of existing wetland areas	iii							
	2.2	Stage 2 – Habitat Assessment	iii							
3	RESU	LTS	iv							
3.1	Stage	1 - Baseline desk study of existing wetland areas	iv							
3.2	Stage	2 – Habitat Assessment	vii							

Page i





## 1.0 INTRODUCTION

The identification of land at Severnside/Avonmouth in which to create new wetland habitat relies in part on the understanding of which areas have been and are currently being used by birds associated with the Severn Estuary Special Protection Area (SPA) and Ramsar site. However, additional information will also be needed in relation to the physical environment within the study area to assess the feasibility of restoring or enhancing sub-optimal wetland habitat and to inform the process of identifying a series of target sites.

To that end, a sampling approach was also undertaken to validate the findings of the Stage 1 desk study exercise, by undertaking a habitat-based assessment of a proportion of the sites within study area, to determine their likely suitability for use by wintering wildfowl and waders.

The methodology and findings of the soils and habitat assessments is presented in the paragraphs below.





## 2.0 METHODOLOGY

The methodology used has been broken down into two stages, as detailed below:

## 2.1 Stage 1 - Baseline desk study of existing wetland areas

A significant amount of information has been published in relation to soils, hydrology and land use. The information sources listed below have been reviewed:

- Published soil survey maps (Soil Survey of England and Wales), associated soil memoirs and Soil Survey LANDIS database information;
- MAFF published Agricultural Land Classification (ALC) maps (1:250 000);
- Published geological maps;
- Existing Phase 1 information.

This information has been used to characterise the physical environment within the study area in order that existing and potential wetland areas can be identified.

## 2.2 Stage 2 – Habitat Assessment

An understanding of the physical characteristics of the land, linked to the assessment of the areas birds currently and historically have utilised, has been undertaken to inform impact assessment and the development of mitigation options.

A site walkover was undertaken on 26<sup>th</sup> March 2010 to:

- (a) ground truth the findings of the Stage 1 desk-based study, in terms of the abundance and distributions of wintering waterfowl throughout the study area (particularly within areas of grazing pasture within each of the development zones under consideration as part of this study; and
- (b) determine (to some extent) how existing wetland areas, or areas with potential to be used for wetland creation (in particular areas of degraded wetland habitat), currently function, and what measures would be necessary to achieve the required wetland characteristics (and at the required scale).





## 3.0 RESULTS

## 3.1 Stage 1 - Baseline desk study of existing wetland areas

3.1.1 Landform and drainage

The study area is predominantly flat, lying at lower than 10m AOD across the site. The majority of field boundaries are marked by ditches, which form an intricate drainage network across the site. Given the lack of topographical difference across the site, flow within the ditch network is likely to result predominantly from rainfall inputs raising water levels (i.e. creating a head of water) in one part of the site, resulting in flow across the site.

#### 3.1.2 Soils

The soils within the study area predominantly fall within the Newchurch Series. These soils are characterised as being "deep stoneless mainly calcareous soils developed in marine alluvium". A typical profile is shown opposite (from Soil Site Report). The majority of these soils are recorded as being waterlogged to within 30cm of the soil surface.

There is a small area in the extreme eastern part of the site (south of Easter Compton) where the soils belong to the Whimpole Series, characterised as being "reddish fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging".

The Soil Site Reports reviewed list the following as the key characteristics of soils of the Newchurch Series:



- 1. HOST (Hydrology Of Soil Type) category 9 soils seasonally waterlogged by fluctuating groundwater and with relatively slow lateral saturated conductivity;
- High ground movement potential, relating to the potential for the clays within the soil to experience seasonal swelling and shrinkage. It is noted that the soils in this location would be likely to have a Very High ground movement potential if drained to an effective depth of at least 2m (i.e. the soils would be likely to experience greater water content fluctuations and thus be at risk of more extensive shrinkage/swelling);
- 3. Major flood risk potential;

Page iv





- 4. Very Highly Aggressive in relation to the risk of corrosion to ferrous iron (related to soil acidity, sulphide content, aeration and wetness, all of which influence the corrosivity of the soil);
- 5. High leaching capacity. In these soils this is likely to relate for the propensity of groundwater to lie at a shallow depth;
- 6. Moderate runoff potential and moderate adsorption potential;
- High leaching potential (Groundwater Protection Policy Class H1) where there is a risk that the soils will readily transmit liquid discharges because they are either shallow or susceptible to rapid bypass flow into the groundwater (see point 5 above);
- 8. Suitable for permanent grassland with winter cereals in Somerset and Avon and can support wet brackish coastal flood meadows;
- 9. Lime-rich, moderate natural fertility;
- 10. Loamy texture.

The key characteristics of the Whimpole Series are given as:

- HOST (Hydrology Of Soil Type) category 21 slowly permeable soils with slight seasonal waterlogging and low storage capacity over slowly permeable substrates with negligible storage capacity;
- 2. Moderate ground movement potential, relating to the potential for the clays within the soil to experience seasonal swelling and shrinkage;
- 3. Minor flood risk potential;
- 4. Moderately Aggressive in relation to the risk of corrosion to ferrous iron (related to soil acidity, sulphide content, aeration and wetness, all of which influence the corrosivity of the soil);
- 5. Intermediate leaching capacity. In these soils this is likely to relate for the propensity of groundwater to lie at a shallow depth;
- 6. High runoff potential and moderate adsorption potential;
- Intermediate leaching potential (Groundwater Protection Policy Class I1) where the soil has a moderate ability to attenuate a wide range of diffuse source pollutants but in which it is possible that some non-adsorbed diffuse source pollutants and liquid discharges could penetrate the soil layer;
- 8. Suitable for dairying and stock rearing, winter cereals and short-term grassland and can support a wide range of grassland and woodland types;
- 9. Moderate to high natural fertility;

Page v





#### 10. Loamy texture.

In summary, the soils across the study area are likely to be fairly uniform in their characteristics, being slowly permeable and seasonally waterlogged and noted as being able to support natural wet grassland habitats.

In the absence of any further soil, hydrological and/or topographical analysis due to funding constraints, this at least indicates that there is predominantly a uniformity of soil type across the study area: and that its characteristics confirms that it is suitable for new wetland creation.



#### 3.2 Stage 2 - Habitat Assessment

The following table presents the findings of the habitat-based assessment of the study area, in relation to: (a) its (likely) suitability for supporting substantial concentrations of over-wintering wildfowl and waders; and (b) its characteristics as existing wetland habitat (or potential for wetland habitat creation and/or enhancement). See Figure 1 for corresponding site locations).

	Description of terrestrial habitats								Descript	Bird survey findings			
	Existing land use	Topography	Substrate/vegetation cover	Ground softness	Connectivity with other potentially suitable sites (see Figure 1)	Sightline distance(s)	Description of boundary features	Description of adjacent areas	Standing water features	Ditch/rhyne characteristics	Presence of field drainage outfalls	Waterfowl presence (numbers, species, behaviour, etc)	Suitability for overwintering waterfowl
A	Commercial car storage area	Flat	Concrete hardstanding (100%)	N/a	Yes - Disused Reservoir Pools	Up to 100m	Security fencing with landscape planting	Predominantly industrial setting; however, Adjacent to Disused Reservoir Pools	None	N/a	N/a	None	None
В	Derelict industrial/com mercial	Flat	Concrete hardstanding (100%)	N/a	Yes - Salt Rhyne Balancing Pond (Area A) and Hallen Marsh (Area E)	Up to 100m	Security fencing with landscape planting	Predominantly industrial setting; however, Salt Rhyne Balancing Pond and Hallen Marsh (Area E) located adjacent to the site	None	N/a	N/a	None	Potentially suitable (but sub-optimal) habitat for roosting lapwing/golden plover (given extent of sightlines and flat topography)
С	Greenfield – mosaic of grazing pasture and unmanaged grassland	Flat	Predominantly grassland/rushes of varying heights (90- 100%), the majority <5-10cm in height, with some taller areas (up to 50cm)	Soft in places (penetration of ground by 6" nail).	Located in close proximity to Avonmouth Pools (Area D)	Up to 200m in most cases	Boundaries largely comprise mature hedgerows (up to 5m high) and tree-lines (up to 10m high)	Predominantly industrial/commercial setting; however, Avonmouth Pools (Area D) in close proximity.	Small (<5m wide), isolated areas of standing water scattered throughout the site	Majority of ditches ~1.5- 2.0m deep, with ~0.5-0.8m water depth. No obvious signs of flow, but good levels of connectivity	-	2 x mallard within ditch network	Ditch network likely to support wildfowl (e.g. mallard & teal), with snipe likely to be present in areas of tussocky grassland. Closely grazed areas potentially suitable for use by roosting/foraging lapwing and curlew.
D	Avonmouth Sewage Works and Pools	Flat	Sewage works – predominantly concrete hardstanding with relatively small areas of amenity grassland	N/a	Yes – located adjacent to Area C	<50m	Security fencing with mature hedgerows and scrub (up to 5m high) and	Predominantly industrial/commercial setting to the north & east; however, greenfield land (Area C) to the south and west.	Concrete pools associated with operational works	N/a	N/a	None	None of the remaining habitats within the operational sewage works site appear to provide potentially suitable habitat for over-wintering waterfowl.



Page vii

June 2010



	Description of terrestrial habitats								Description of aquatic habitats				Bird survey findings
	Existing land use	Topography	Substrate/vegetation cover	Ground softness	Connectivity with other potentially suitable sites (see Figure 1)	Sightline distance(s)	Description of boundary features	Description of adjacent areas	Standing water features	Ditch/rhyne characteristics	Presence of field drainage outfalls	Waterfowl presence (numbers, species, behaviour, etc)	Suitability for overwintering waterfowl
			Pools – Mosaic of, grasses, ruderal herbs, reeds and scrub	-			tree-lines (up to 10m high)		Small network of waterbodies which comprise good quality habitat for waterfowl and which are designated as an Avon Wildlife Trust Reserve.	-	-	Small numbers (fewer than five) of mallard, coot and teal.	Avonmouth Pools represent good qualify habitat for over-wintering waterfowl (particularly wildfowl) (see Cresswell Associates, 2010 for further details).
E	Agricultural land (arable and pasture)	Pasture – generally flat with ridge and furrow. Arable - flat	Pasture comprises improved grassland, with remaining arable areas supporting crops. The majority of vegetation <15cm in height.	Soft in places (penetration of ground by 6" nail).	Yes – Located adjacent to Salt Rhyne Balancing Pool and Crook's Marsh (Area L & K).	Up to 200m in some arable areas	Boundaries largely comprise mature hedgerows and tree- lines, mainly 2-5m in height (but up >5m in some cases)	Predominantly industrial/commercial setting to the south and west; however, more extensive area of grazing pasture to the north (Crook's Marsh (Area L) and east. Avonmouth Railway Line and M49 motorway corridor also located adjacent to the site.	Small number of isolated waterbodies (<10m diameter) scattered throughout the site.	Majority of ditches ~0.8- 2.5m deep, with ~0.1-0.5m water depth. No obvious signs of flow, but good levels of connectivity.	Yes, small number of outfalls present	2 x teal in ditch network	The presence of arable land and larger field sizes (compared to other greenfield land in the study area) may offer overwintering waterfowl improved feeding, roosting and loafing opportunities. Re-wetting of fields and increasing sightlines would represent a further enhancement.
F	Horse-grazed pasture	Minor undulations in topography (~0.2-0.4m)	Grassland (vast majority <2cm in height) with isolated stands of bramble scrub (up to 1.5m in height).	-	No – however, Orchard Pools and the foreshore located nearby.	Up to 100m	Boundary features largely comprise mature hedgerows with trees (5- 10m high). In several cases, internal boundaries removed and replaced with post and wire fences.	Predominantly residential (Severn Beach) to the north and east. Orchard Pools/Astra Zeneca fields, and the Severn estuary foreshore located in close proximity to the south and west, respectively.	Several small ponds shown on OS map; however, this was not possible to ground truth, due to lack of land access permission.	Ditches appear to be deep (~2.0m) with ~0.5m water depth. No signs of flow; however, good levels of connectivity.	-	None	This site represents potentially suitable roosting/foraging habitat for waterfowl (particularly waders such as curlew, lapwing and possibly golden plover). The findings of the Stage 1 desk study have confirmed the site's usage by curlew (see Cresswell Associates, 2010).



Page viii



	Description of terrestrial habitats								Description of aquatic habitats Bird survey f				Bird survey findings
	Existing land use	Topography	Substrate/vegetation cover	Ground softness	Connectivity with other potentially suitable sites (see Figure 1)	Sightline distance(s)	Description of boundary features	Description of adjacent areas	Standing water features	Ditch/rhyne characteristics	Presence of field drainage outfalls	Waterfowl presence (numbers, species, behaviour, etc)	Suitability for overwintering waterfowl
G	Grazing pasture	Largely flat with some minor undulations in topography (~0.2-0.4m).	Grassland (vast majority <5cm in height) with isolated areas of scattered rushes (up to 30m in height).	Soft in places (penetration of ground by 6" nail).	Relatively isolated due to fragmentation by South Wales Mainline, M49 corridor and Severn Road	>200m in most cases	Boundary features largely comprise mature hedgerows with trees (5- 10m high). In several cases, internal boundaries removed and replaced with post and wire fences.	The South Wales Main Line and Pilning to the north, commercial development to the east, the M49 motorway and commercial development to the south and Severn Road to the west. These land use areas are interspersed by relatively small and isolated areas of greenfield land.	Several small ponds are thought to be present; however, this was not possible to ground truth, due to lack of land access permission.	-	-	None	The larger field sizes (compared to other greenfield land in the study area) likely to offer overwintering waterfowl good feeding, roosting and loafing opportunities. The findings of the Stage 1 desk study have confirmed the site's usage by flocks of over 600 lapwings (see Cresswell Associates, 2010).
Н	Grazing pasture	Largely flat with some minor undulations in topography (~0.2-0.4m).	Grassland (vast majority <5cm in height) with isolated areas of scattered rushes (up to 30m in height).	Soft in places (penetration of ground by 6" nail).	Good levels of connectivity with comparable habitat to the south, east and north (beyond the South Wales Mainline).	Up to 100m in most cases	In most cases, managed hedgerows (<2.0m), although some taller hedgerows and tree-lines also present (5-10m)	The South Wales Main Line to the north (with greenfield land beyond), comparable areas of greenfield land to the east and south, with recently built commercial development to the west.	-	Ditches appear to be relatively deep (~1.0- 1.5m) with ~0.5m water depth. Relatively good levels of connectivity, although no signs of flow.	-	None	The fields could provide potentially suitable roosting sites for lapwing and golden plover, and/or feeding sites for curlew; however, their usage by these species may be limited due to restricted sightlines.



Page ix



	Description of terrestrial habitats								Description of aquatic habitats				Bird survey findings	
	Existing land use	Topography	Substrate/vegetation cover	Ground softness	Connectivity with other potentially suitable sites (see Figure 1)	Sightline distance(s)	Description of boundary features	Description of adjacent areas	Standing water features	Ditch/rhyne characteristics	Presence of field drainage outfalls	Waterfowl presence (numbers, species, behaviour, etc)	Suitability for overwintering waterfowl	
1	Horse-grazed pasture	Flat	Grassland (vast majority <5cm in height). Pre- construction hedgerow/tree clearance works recently completed at the time of the survey	Soft in places (penetration of ground by 6" nail).	Good levels of connectivity to the south with Dyer's Common (Area J).	Extensive following site clearance (>500m in places); however, likely to have been <200m previously.	All boundary features within the site have been removed.	Commercial/industrial development to the north and west, the M49 motorway to the east (with greenfield land beyond), comparable greenfield land to the south.	None	Ditches appear to be ~1.0-1.2m deep, with 0.5m water depth. No signs of water flow.	-	None	Prior to hedgerow/tree clearance, the fields could have provided potentially suitable roosting sites for lapwing and golden plover, and/or feeding sites for curlew; however, their usage by these species may have been limited due to restricted sightlines. Following hedgerow/tree clearance works, the likely suitability of the site for roosting/foraging waterfowl (particularly lapwing and curlew) appears to have increased due to the increased sight-lines.	
J	Horse-grazed pasture	Generally flat with ridge and furrow (~0.2-0.3m) present across the majority of fields. In addition, there is an area of raised ground (up to 10m) in the north-eastern corner.	Predominantly grassland (<5-10cm) with some areas of ruderal herbs/scrub.	Generally firm, with some softer areas (2.5" penetration of ground by 6" nail).	Good levels of connectivity with comparable habitat to the north (Area I), and Crook's Marsh (Area K) to the south.	Up to 100m in most cases	The majority of boundary features comprise mature hedgerows with trees (up to 10m high).	Derelict brownfield land to the west (Area M), the M49 motorway to the west (with greenfield land beyond), and comparable greenfield land to the north (Area I) and south (Crook's Marsh (Area K)).	Small pond (<10m diameter) at the western end of the site.	Ditches appear to be ~1.0-1.2m deep, with 0.5m water depth. No signs of water flow.	None identified	Snipe flushed from small stand of reeds.	The site supports a well- established network of mature hedgerows/trees which restrict the extent of sight-lines and, therefore, could limit the attractiveness of this area for use by waterfowl. However, the ditch network could be used by moderate numbers of wildfowl (particularly mallard and teal), and snipe are likely to utilise water-logged field margins, and small stand of reeds.	



Page x



				Descriptio	on of terrestrial h	abitats		Description of aquatic habitats				Bird survey findings	
	Existing land use	Topography	Substrate/vegetation cover	Ground softness	Connectivity with other potentially suitable sites (see Figure 1)	Sightline distance(s)	Description of boundary features	Description of adjacent areas	Standing water features	Ditch/rhyne characteristics	Presence of field drainage outfalls	Waterfowl presence (numbers, species, behaviour, etc)	Suitability for overwintering waterfowl
к	Horse-grazed pasture	Generally- flat with ridge and furrow (~0.2-0.3m)	Predominantly grassland (<5-10cm) with some areas of ruderal herbs/scrub.	Soft in places (such as bases of furrows) (5" penetration of ground by 6" nail),	Good levels of connectivity with comparable habitat to the north (Area J) and south (Crook's Marsh continued Area L)	<200m in most cases	The majority of boundary features comprise mature hedgerows with trees (up to 10m high in places).	The immediate surroundings comprise greenfield land (including Areas J & L), as well as industrial development and the M49 motorway.	Isolated areas of waterlogged ground in a small number of places (less than 5m diameter)	Ditches appear to be ~2.0-2.5m deep, with <0.5m water depth. No signs of water flow; however, good levels of connectivity.	None identified	4 x mallard in ditch network	As above for Area J.
L	Horse-grazed pasture	Generally- flat with ridge and furrow (~0.2-0.3m)	Predominantly grassland (<5-10cm) with some areas of ruderal herbs/scrub.	Soft in places (such as bases of furrows) (5" penetration of ground by 6" nail),	Good levels of connectivity with comparable habitat to the north (Area K) and south (Hallen Marsh Area E) beyond the Avonmouth Railway Line.	<200m in most cases	The majority of boundary features comprise mature hedgerows with trees (up to 10m high in places).	The site's immediate surroundings generally comprise built development (Avonmouth Railway Line, industrial/commercial development and the M49 motorway); however, the wider surroundings support comparable areas of greenfield land (e.g. Hallen Marsh).	Isolated areas of waterlogged ground in a small number of places (less than 5m diameter)	Ditches appear to be ~2.0-2.5m deep, with <0.5m water depth. No signs of water flow; however, good levels of connectivity.	None identified	2 x mallard in ditch network	As above for Area J.
м	Derelict brownfield site	Flat	Concrete hardstanding (70%) and gravel (30%)	N/a	Good levels of connectivity with Area J.	>300m	Security fencing	Industrial development to the north, south and west, with greenfield land (Area J) to the east.	None	N/a	N/a	None	This area of hardstanding is considered potentially suitable for roosting waders (possibly including lapwing, golden plover and curlew).



Page xi





## Habitat Characteristics

The majority of the greenfield land within the study area comprised pasture, which (in most cases) was subject to heavy levels of on-going grazing by horses and sheep.

However, several fields containing arable crops were also present within Hallen Marsh (Area E). The overall profile of the study area is area is flat, although many of the fields contain a 'ridge and furrow' landform which provides some small-scale topographical variation and is likely to support areas of standing water following periods of heavy rainfall, or during periods of water-logging. At the time of the habitat survey, several parts of the study area were found to comprise soft ground conditions (particularly Hallen Marsh (Area E) and the land to the south of Avonmouth Sewage Works (Area C). Whilst this finding is not necessarily representative of the ground conditions throughout any given winter period (since ground softness is to a large extent dependent upon previous rainfall levels), it was noted that these sites generally appeared to comprise softer ground than other areas of ('greenfield') land within the study area (e.g. Areas I to L).

The study area was intersected by a well-established network of rhynes and ditches, which appeared to provide an effective means of carrying water from the associated areas of pasture/arable farmland. In general, the ditches were estimated to be between 1.0m - 2.5m in depth (with the deepest ditches recorded at Crook's Marsh (Areas L & K) and Hallen Marsh (Area E)). Water depths of up to 0.5m were recorded within these features. Although no obvious signs of water flow were recorded within the ditches, they appeared to provide good levels of connectivity throughout the study area. Furthermore, it is likely that levels of surface water flow into the Severn Estuary are to some extent dependent upon estuary outfall structures (which may moderate flow rates depending upon the tidal cycle).

The vast majority of the ditches/rhynes were associated with mature hedgerows/tree-lines. In most cases, these boundary features did not appear to have been subject to recent management.

## **Bird/Habitat Associations**

As described above, the greenfield land within the study area was generally found to consist of grazing pasture. In principle, this habitat type appeared to be potentially suitable for use by roosting and (to some extent) foraging wintering waterfowl. However, the surrounding hedges and trees restricted the line of sight to below 200m in many cases (in particular, the grazing pasture at Dyer's Common and Crook's Marsh (Areas I, J, K and L on Figure 1) was intersected by a well-established network of hedges which limited the field sizes). As a result, it was considered less likely that these areas would support large flocks of wildfowl and waders particularly lapwing (Vanellus vanellus), golden plover (Pluvialis apricaria), and curlew (Numenius arquata)), and this appears to reflect the findings of the 2001-2008 Severnside Bird Surveys (see Cresswell Associates, 2010). Nonetheless, the Severnside Bird Surveys confirmed that Area F regularly supports flocks of up to 58 curlews during the winter months. Whilst these fields offer good foraging and roosting opportunities for the species since they comprise horse-grazed pasture which (at times) contains areas of water-logged ground, they are surrounded by a well-established network of mature hedgerows/trees (5-10m high) which restrict sight-lines across the wider area. Nevertheless, this does not appear to inhibit their use

Page xii





by curlew. Indeed, the Severnside bird surveys indicate that curlew have previously been recorded foraging within three to four metres of mature hedgerows.

Notwithstanding Area F, the remaining areas of greenfield land with the greatest potential for use by wintering waterfowl appeared to be: an area of land to the south of Avonmouth Sewage Works (Area C); Hallen Marsh (Area E); and fields in the vicinity of Whitehouse Farm (Area G). These sites generally contain larger field sizes than the areas described above and, therefore, appeared to provide more extensive sight-lines for wintering wildfowl. In addition to the grazing pasture, Hallen Marsh also supported areas of arable land, which appeared to have the potential to provide improved foraging opportunities for 'farmland' waders (e.g. lapwing, golden plover and curlew). Whilst Areas G and (to a lesser extent) C, have previously been found to support large aggregations of over-wintering lapwings (see Cresswell Associates, 2010), desk-study records indicate that Hallen Marsh has previously supported relatively low numbers of birds, relative to its large size, diversity of habitat types, low levels of disturbance, etc.

In many cases, the ditches/rhynes were associated with mature hedgerows/trees and the 'enclosed' nature of these watercourses made it unlikely that these would support a diverse range of waterfowl. Notwithstanding this, mallard (*Anas platyrhynchos*) and teal (*Anas crecca*) were recorded from the ditch/rhyne network on a small number of occasions and it was considered that these species were likely to be present in the greatest abundance along these water features. In addition, areas of unmanaged grassland (e.g. within Area C adjacent to the Avonmouth Sewage Works) and waterlogged ground supporting rushes/reeds were identified across parts of the greenfield land, providing potential habitat for roosting and/or foraging snipe (*Gallinago gallinago*) during the winter months.

Page xiii

