A3a.6 BIRDS

A3a.6.1 UK wide context

The seas and extensive and varied coastline of the UK are important for birds year round, with many areas being of international or national importance for the individual species or assemblages they support.

Many coastal sites have been designated as Special Protection Areas (SPAs) and work is continuing to identify and designate inshore and offshore SPAs and seaward extensions as appropriate (see Section A3j). (NB: Following initial mention of the scientific names of birds in the text, common names are subsequently used where appropriate).

Each year over 7 million seabirds breed in the UK. Seabird families and species which regularly breed in Britain are listed in Table A3a.6.1

Table A3a.6.1 – Seabirds regularly breeding in the UK

Family	Species
Procellariidae	Four species of petrel (fulmar[1] (*Fulmarus glacialis*), Manx shearwater (*Puffinus puffinus*), storm petrel (*Hydrobates pelagicus*), Leach's petrel (*Oceanodroma leucorhoa*))
Phalacrocoracidae	Two species of cormorant (cormorant (*Phalacrocorax carbo*), shag[2] (*Phalacrocorax aristotelis*)
Sulidae	One species (gannet[3] (*Morus bassanus*))
Stercorariidae	Two species of skua (great skua (*Catharacta skua*), Arctic skua (*Stercorarius parasiticus*))
Laridae	Seven species of gull (herring gull (*Larus argentatus*), common gull (*Larus canus*), black-headed gull (*Larus ridibundus*), lesser black-backed gull (*Larus fuscus*), great black-backed gull (*Larus marinus*), Mediterranean gull (*Larus melanocephalus)*, kittiwake[4] (*Rissa tridactyla*))
Sternidae	Five species of tern (Sandwich tern (*Sterna sandvicensis*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), Arctic tern (*Sterna paradisaea*), little tern (*Sterna albifrons*))
Alcidae	Four species of auk (guillemot[5] (*Uria aalge*), razorbill (*Alca torda*), black guillemot (*Cepphus grylle*), puffin[6] (*Fratercula arctica*))

Notes: [1]Also known as northern fulmar - referred to as fulmar in this document. [2]Also known as European shag – here referred to as shag. [3] Also known as northern gannet – here referred to as gannet. [4]Also known as black-legged kittiwake – here referred to as kittiwake. [5]Also known as common guillemot – here referred to as guillemot. [6]Also known as Atlantic puffin – here referred to as puffin.

There are also a number of regularly occurring non-breeding seabirds which visit the UK. Many of these may be considered to have important populations occurring in UK waters, e.g. Balearic shearwater (*Puffinus mauretanicus*) and little gull (*Larus minutus*). Other non-breeding species, some of which are rarer visitors, include: little auk (*Alle alle*), pomarine skua (*Stercorarius pomarinus*), long-tailed skua (*Stercorarius longicaudus*), sooty shearwater (*Puffinus griseus*), glaucous gull (*Larus hyperboreus*) and Brünnich's guillemot (*Uria lomvia*).

The definition of "waterbirds" varies slightly between authorities, but for the purpose of this report, waterbirds include seaducks, divers and grebes, bittern and herons, rails, crakes and coots, wildfowl (this group includes swans, geese and ducks – Joint Nature Conservation Committee (JNCC) refer to this group as waterfowl) and waders. Most Regional Sea areas

include coastal habitats suitable for breeding and wintering waterbirds, with relative importance depending on the type and extent of habitats available.

Waterbirds known to breed in the UK are shown in Table A3a.6.2.

Table A3a.6.2 – Waterbirds which regularly breed in the UK

Species		
Waterfowl		**Waders**
Mute swan (*Cygnus olor*)	Red-breasted merganser* (*Mergus serrator*)	Oystercatcher* (*Haematopus ostralegus*)
Greylag goose (*Anser anser*)	Goosander (*Mergus merganser*)	Avocet* (*Recurvirostra avosetta*)
Canada goose (*Branta canadensis*)	Ruddy duck (*Oxyura jamaicensis*)	Little ringed plover (*Charadrius dubius*)
Egyptian goose (*Alopochen aegyptiacus*)	Red-throated diver (*Gavia stellata*)	Ringed plover* (*Charadrius hiaticula*)
Shelduck* (*Tadorna tadorna*)	Black-throated diver (*Gavia arctica*)	Golden plover* (*Pluvialis apricaria*)
Mandarin (*Aix galericulata*)	Little grebe (*Tachybaptus ruficollis*)	Lapwing* (*Vanellus vanellus*)
Wigeon* (*Anas penelope*)	Great crested grebe (*Podiceps cristatus*)	Dunlin* (*Calidris alpina*)
Gadwall (*Anas strepera*)	Slavonian grebe (*Podiceps auritus*)	Ruff* (*Philomachus pugnax*)
Teal (*Anas crecca*)	Black-necked grebe (*Podiceps nigricollis*)	Snipe (*Gallinago gallinago*)
Mallard (*Anas platyrhynchos*)	Bittern (*Botaurus stellaris*)	Woodcock (*Scolopax rusticola*)
Pintail (*Anas acuta*)	Little egret* (*Egretta garzetta*)	Black-tailed godwit* (*Limosa limosa*)
Garganey (*Anas querquedula*)	Grey heron* (*Ardea cinerea*)	Whimbrel (*Numenius phaeopus*)
Shoveler (*Anas clypeata*)	Water rail (*Rallus aquaticus*)	Curlew* (*Numenius arquata*)
Pochard (*Aythya ferina*)	Spotted crake (*Porzana porzana*)	Common sandpiper* (*Actitis hypoleucos*)
Tufted duck (*Aythya fuligula*)	Corncrake (*Crex crex*)	Greenshank* (*Tringa nebularia*)
Eider* (*Somateria mollissima*)	Moorhen (*Gallinula chloropus*)	Redshank* (*Tringa totanus*)
Common scoter (*Melanitta nigra*)	Coot (*Fulica atra*)	Red-necked phalarope* (*Phalaropus lobatus*)
Goldeneye (*Bucephala clangula*)		

** Species which make significant use of marine/maritime habitats during breeding*

The UK lies on some of the major migratory flyways of the east Atlantic, with large numbers of waterbirds attracted each year by the relatively mild winter climate and extensive estuarine and wetland habitats. Coastal wetlands with saltmarsh or grazing marsh in close proximity to intertidal areas provide feeding and roosting areas for a multitude of wintering and migratory birds.

Table A3a.6.3 – Waterbirds which regularly overwinter/stage in the UK

Species		
Waterfowl		**Waders**
Mute swan	Tufted duck	Oystercatcher*
Whooper swan (*Cygnus cygnus*)	Scaup*	Avocet*
Bewick's swan (*Cygnus columbianus bewickii*)	Eider*	Little ringed plover
Bean goose (*Anser fabalis*)	Long-tailed duck* (*Clangula hyemalis*)	Golden plover*
Pink-footed goose* (*Anser brachyrhynchus*)	Common scoter*	Grey plover (*Pluvialis squatarola*)
(European) white-fronted goose	Velvet scoter* (*Melanitta fusca*)	Lapwing*
(Greenland) white-fronted goose (*Anser albifrons flavirostris*)	Smew* (*Mergus albellus*)	Knot* (*Calidris canutus*)
(Icelandic) Greylag goose*	Red-breasted merganser*	Sanderling* (*Calidris alba*)
(NW Scotland) Greylag goose	Goosander* (*Mergus merganser*)	Little stint* (*Calidris minuta*)
Canada goose	Ruddy duck	Curlew sandpiper* (*Calidris ferruginea*)
(Nearctic) barnacle goose*	Red-throated diver* (*Gavia stellata*)	Purple sandpiper* (*Calidris maritima*)
(Svalbard) barnacle goose* (*Branta leucopsis*)	Black-throated diver* (*Gavia arctica*)	Dunlin*
(Dark-bellied) Brent goose* (*Branta bernicla bernicla*)	Great northern diver* (*Gavia immer*)	Ruff*
Nearctic light-bellied) Brent goose*	Little grebe (*Tachybaptus ruficollis*)	Jack snipe* (*Lymnocryptes minimus*)
(Svalbard) Brent goose* (*Branta bernicla hrota*)	Great crested grebe*	Snipe*
Egyptian goose	Red-necked grebe* (*Podiceps grisegena*)	Woodcock
Shelduck*	Slavonian grebe*	Black-tailed godwit*
Mandarin	Black-necked grebe*	Bar-tailed godwit
Wigeon*	Bittern	Whimbrel* (*Numenius phaeopus*)
Gadwall	Little egret*	Curlew*
Teal*	Grey heron*	Common sandpiper
Mallard*	Water rail	Green sandpiper (*Tringa ochropus*)
Pintail*	Corncrake	Wood sandpiper (*Tringa glareola*)
Shoveler	Moorhern	Greenshank*
Pochard	Coot	Spotted redshank* (*Tringa erythropus*)
Goldeneye (*Bucephala clangula*)		Redshank*

Species	
	Turnstone* (*Arenaria interpres*)

** Species which make significant use of marine/maritime habitats during winter/passage*

The UK is a signatory to a number of international conservation conventions and as such has a legal obligation to conserve waterbirds and their habitats.

Every year, large numbers of birds traverse the North Sea and Irish Sea during the spring and autumn migrations on their way between breeding and wintering grounds. These birds include passerines (perching or song birds) and near passerines (e.g. swifts), raptors and owls.

There appear to be no fixed corridors preferred by migratory birds and instead migration usually takes the form of broad-front. There can be high intensity migration (i.e. a few days with extremely high numbers) and flight heights can vary depending on the species and weather conditions. Heights can range from just above the water surface to several thousand metres and as migration is costly in terms of energy expenditure, birds will generally try and fly at altitudes where effort is least (Köller *et al*. 2006).

European Seabirds at Sea (ESAS) was established in 1991 and is an international collaboration between organisations throughout northwest Europe, consisting of a common database housing data from systematic seabird monitoring programmes conducted in British, Dutch, Belgian, German, Danish, Swedish and Norwegian waters. The most recent version of the database contains over two million records of bird sightings collected over 25 years. A number of publications, focusing on the North Sea and including an electronic atlas of seabird distribution and vulnerability, have resulted from the information collected in the database (see Carter *et al.* 1993; Stone *et al*. 1995; BODC 1998). Information from ESAS is also being trialled for inclusion in OBIS-SEAMAP (Ocean Biogeographic Information System – Spatial Ecological Analysis of Megavertebrate Populations) a spatially referenced database for marine mammal, seabird and sea turtle data.

A census has been carried out on all 25 seabird species that regularly breed in Britain and Ireland on three occasions, the last being Seabird 2000. Field work for this commenced in 1998 and completed in 2002 and the results summarised in Mitchell *et al*. (2004). The first census was Operation Seafarer (1969-70, Cramp *et al*. 1974) and the second (the Seabird Colony Register (SCR) was conducted in 1985-87 (Lloyd *et al*. 1991). The SCR served as the foundation for future seabird population monitoring and facilitated the collection of colony information. The SCR census also led to the initiation of the Seabird Monitoring Programme which began in 1986. This involves the regular monitoring of seabird demographics such as population size and breeding success, with results published annually. The most detailed monitoring occurs at "key sites" including the Isle of Man, Fair Isle, Canna and Skomer, with long term monitoring also undertaken on Shetland, Orkney, St Kilda and in Grampian.

Mavor *et al*. (2008) details the 18th annual report of the results of seabird monitoring at colonies in the UK and Ireland. This report highlights notable changes in seabird numbers and breeding performance at each colony studied, with a commentary on longer-term trends.

Breeding distributions of coastal waterbirds were surveyed for the 1988-91 Atlas of Breeding Birds in Britain and Ireland (Gibbons *et al*. 1993). Work has now started on a new breeding bird atlas (2007-2011) with fieldwork spanning 4 winters and 4 breeding seasons during which the whole of Britain and Ireland will be cumulatively surveyed (BTO website).

The annual Wetland Bird Survey (WeBS) is a partnership scheme of the British Trust for Ornithology (BTO), The Wildfowl & Wetlands Trust (WWT), Royal Society for the Protection of Birds (RSPB) and the JNCC (Austin *et al*. 2008) and provides information on the population size, distribution and the most important sites for non-breeding waterbirds (i.e. wildfowl and waterfowl) in the UK. It aims to provide the principal data on which the conservation of populations and wetland habitats is based. WeBS monitoring continues two long-running count schemes; synchronised 'Core Counts' conducted once per month year round, at a wide variety of coastal and wetland sites and 'Low Tide Counts' on selected estuaries with the aim of identifying key areas used principally by feeding birds.

JNCC have a programme of aerial surveys of wintering aggregations of seaducks, divers and grebes within UK coastal areas of known importance for these groups. Results from the 2005/2006 and 2006/07 winter/spring surveys are detailed in Söhle *et al*. (2006) and Lewis *et al*. (2008) respectively.

In 2006, a gap analysis was carried out as part of the then DTI's SEA process to assess the European Seabirds at Sea database and to highlight any gaps in coverage. A programme of surveys was conducted during 2008 to obtain additional recent data and these focused on the Outer Moray Firth, the Dogger Bank and the central North Sea (Cork Ecology 2008).

The State of the UK's Birds is an annual publication by the RSPB on behalf of the BTO, WWT, the Countryside Council for Wales (CCW), Natural England and Scottish Natural Heritage. This contains the results from annual, periodic and one-off surveys and studies, and draws on many sources of information to give an up-to-date overview of the health of bird populations (Eaton *et al*. 2008).

A3a.6.2 International context of seabird populations

In order to fully understand the importance of British and Irish seabird populations, there are two recognised international contexts: the global and the biogeographical. The latter is of particular importance in terms of the EU Directive on the Conservation of Wild Birds (EC/79/409), the "Birds Directive", as under Article 4 of the Directive, member states are required to classify Special Protection Areas for important populations of birds. In the UK, the importance of many bird populations at particular sites is assessed in the biogeographical context where a biogeographical population is defined as a group of birds which breed in a particular location (or group of locations), breed freely within the group, and rarely breed or exchange individuals with other groups (Lloyd *et al*. 1991). Figures indicating the relative biogeographical importance of the breeding seabird populations of Britain and Ireland are provided in Table A3a.6.4.

Table A3a.6.4 – Biogeographical importance of breeding seabird populations in Britain and Ireland[1]

Species	Biogeographic population	Britain min[1] %	Britain max[1] %	Ireland min[1] %	Ireland max[1] %
Fulmar	7,540,000	12.2	18.5	1.0	14.4
Manx shearwater	265,100	68.3	91.2	6.6	17.9
European storm-petrel	257,000	3.1	11.3	10.7	42.7
Leach's storm-petrel	955,000	0.7	1.3	0.0	0.0
Gannet	263,000	59.0	59.0	8.5	8.5
Shag	125,000	39.7	43.9	5.1	5.6
Arctic skua	30,000	6.0	14.0	0.0	0.0

Species	Biogeographic population	Britain min[1] %	Britain max[1] %	Ireland min[1] %	Ireland max[1] %
Great skua	13,600	60.0	60.0	0.0	0.0
Black-headed gull	1,650,000	4.6	6.2	0.5	0.7
Lesser black-backed gull	124,000	65.4	65.4	2.7	2.7
Herring gull	940,000	17.9	20.3	0.8	0.9
Kittiwake	3,170,000	12.3	14.8	1.6	2.0
Common tern	195,105	2.9	4.5	1.2	1.9
Little tern	20,643	8.6	11.2	1.0	1.2
Guillemot	2,250,000	30.7	31.8	5.5	5.7
Razorbill	575,000	20.8	20.8	6.6	6.6
Puffin	901,000	9.1	10.9	0.3	0.4
Mediterranean gull	184,000	0.1	0.1	0.0	0.0
Common gull	124,000	7.4	12.0	0.2	0.4
Sandwich tern	132,000	13.9	15.9	4.7	5.4
Roseate tern	1,770	2.2	2.7	30.8	38.8
Arctic tern	900,000	2.9	10.7	0.2	0.7
Great black-backed gull	95,546	16.8	17.0	2.2	2.2
Cormorant (refers to *P.c. carbo*)	41,200	13.4	13.7	9.8	10.0

Notes: [1] Figures represent the minimum and maximum percentage of the relevant biogeographical populations that the British and Irish populations represent.
Source: Stroud et al. (2001), Mitchell et al. (2004)

In terms of global populations, three species (Manx shearwater, gannet and great skua) have more than 50% of their world breeding population breeding in Britain, two (shag and lesser black-backed gull) have more than 30% and three (herring gull, guillemot and razorbill) have more than 10%.

A3a.6.3 Ecological context

Seabirds have a variety of feeding methods and are able to exploit most marine food sources. Diverse feeding strategies are also seen between species. Gulls are very opportunistic and are easily adaptable; equally at home feeding on fishing boat discards, foraging on estuarine mudflats, rocky shores or inland on newly ploughed fields. Gulls and skuas also steal food from other birds or directly predate other seabirds' eggs and chicks, occasionally killing other adult birds. Some species, e.g. petrels and kittiwake, are surface feeders or feed at shallow depths on fish, plankton and crustaceans. Other species of seabird can exploit deeper waters, either plunge diving to depths generally dependant on body weight, greater depths by those species that can swim under water. Terns plunge after fish and crustaceans, such as sandeels, sprats and aquatic invertebrates, while the gannet, which also plunge-dives, can dive further than the smaller terns, thereby exploiting a deeper prey source including herring, sprat, sandeels and mackerel. Several species, including the cormorant, shag, divers and the auks, can dive deeper to collect deeper water and demersal species, including flatfish, saithe, whiting, sprat and sandeels.

Waterbirds with short beaks, e.g. dunlin, prey on species at the surface while species with long slender bills, such as the curlew, can forage for lugworm buried in burrows. Slender billed species tend not to overturn stones in search of crabs as seen in the turnstone. Oystercatchers and other birds with similar beak structure probe mudflats for prey such as bivalve molluscs, as well as inland areas. Godwits have long, fractionally-upcurved bills and

feed on estuarine worms, snails and insects. The curved bill of the curlews are well adapted for removing worms from deep burrows in intertidal mud, but can also eat crabs, small molluscs and even the eggs of other birds.

Due to the wide range of habitats which they exploit and their high position in the food chain, birds can provide good indicators of the state of the environment. Changes at lower trophic levels, particularly those affecting the abundance of their prey species, will transpire in marked effects on birds populations. For example, the continuing decline in breeding success at many seabird colonies has been attributed to low food availability, particularly of sandeels - a major food source for many species. Additionally, changes in the levels of discarded fish from commercial fishing vessels will alter the availability of food for many species which scavenge on this resource.

A3a.6.4 Features of Regional Sea 1

Regional Sea 1 extends along the east coast of Shetland and follows the east coast of Britain from Duncansby Head to Flamborough Head, and encompasses the inshore and offshore areas of the northern North Sea. For the purposes of this section, the whole of Shetland will be described, not just the east coast.

Some areas of this region are extremely important for seabirds and coastal waterbirds, for breeding and wintering birds and those on migration. The area also includes many important offshore areas which seabirds depend upon for prey and for large proportions of the year, their habitat.

A3a.6.4.1 Seabird species, abundance and distribution

Of the seabird species currently breeding in the UK, only the Mediterranean gull is not recorded as breeding in the Regional Sea 1. The distribution and number of breeding seabirds in the areas comprising Regional Sea 1 are indicated in Tables A3a.6.5 (Scotland) and A3a.6.6 (England) (Mitchell *et al*. 2004).

Table A3a.6.5 – Breeding seabirds at coastal areas in Regional Sea 1 (Scotland)

Species	Total[1]	Species	Total[1]
Shetland			
Fulmar	188,544 (AOS)	Lesser black-backed gull	341 (AON)
Manx shearwater	7 (AOS)	Herring gull	4,027 (AON)
Storm petrel	7,503 (AOS)	Great black-backed gull	2,875 (AON)
Leach's storm petrel	35 (AOS)	Kittiwake	16,732 (AON)
Gannet	26,249 (AOS/AON)	Common tern	104 (AON)
Cormorant	192 (AON)	Arctic tern	24,716 (AON)
Shag	6,147 (AON)	Guillemot	172,681 (I)
Arctic skua	1,120 (AOT)	Razorbill	9,492 (I)
Great skua	6,846 (AOT)	Black guillemot	15,739 (I)
Black-headed gull	586 (AON)	Puffin	107,676 (I)
Common gull	2,424 (AON)		
Caithness			
Fulmar	29,957 (AOS)	Kittiwake	49,533 (AON)
Cormorant	107 (AON)	Common tern	44 (AON)
Shag	1,136 (AON)	Arctic tern	594 (AON)
Black-headed gull	211 (AON)	Little tern	15 (AON)
Common gull	468 (AON)	Guillemot	226,254 (I)
Lesser black-backed gull	2 (AON)	Razorbill	20,333 (I)
Herring gull	3,743 (AON)	Black guillemot	1,104 (I)
Great black-backed gull	211 (AON)	Puffin	1,278 (I)
East Coast Sutherland			
Fulmar	136 (AOS)	Great black-backed gull	1 (AON)
Cormorant	2 (AON)	Common tern	25 (AON)
Common gull	124 (AON)	Arctic tern	236 (AON)
Lesser black-backed gull	1 (AON)	Little tern	8 (AON)
Herring gull	33 (AON)		
East Coast Ross & Cromarty			
Fulmar	1,638 (AOS)	Great black-backed gull	220 (AON)
Cormorant	245 (AON)	Kittiwake	749 (AON)
Shag	270 (AON)	Common tern	497 (AON)
Black-headed gull	4 (AON)	Arctic tern	129 (AON)
Common gull	297 (AON)	Guillemot	1,944 (I)
Lesser black-backed gull	7 (AON)	Razorbill	214 (I)
Herring gull	1,345 (AON)		
Inverness			
Common gull	135 (AON)	Great black-backed gull	5 (AON)
Lesser black-backed gull	6 (AON)	Common tern	10 (AON)
Herring gull	356 (AON)	Arctic tern	25 (AON)
Nairn			
Black-headed gull	300 (AON)	Herring gull	80 (AON)
Moray			
Fulmar	569 (AOS)	Common tern	24 (AON)
Shag	33 (AON)	Arctic tern	244 (AON)
Herring gull	581 (AON)	Little tern	2 (AON)
Great black-backed gull	10 (AON)	Black guillemot	9 (I)
Kittiwake	488 (AON)		
Banff and Buchan			
Fulmar	5,146 (AOS)	Kittiwake	30,599 (AON)
Cormorant	9 (AON)	Common tern	202 (AON)
Shag	656 (AON)	Arctic tern	184 (AON)

Species	Total[1]	Species	Total[1]
Black-headed gull	430 (AON)	Guillemot	73,970 (I)
Lesser black-backed gull	10 (AON)	Razorbill	7,606 (I)
Herring gull	6,671 (AON)	Black guillemot	14 (I)
Great black-backed gull	37 (AON)	Puffin	1,026 (I)
Gordon			
Fulmar	1,017 (AOS)	Sandwich tern	524 (AON)
Cormorant	48 (AON)	Common tern	31 (AON)
Shag	25 (AON)	Arctic tern	76 (AON)
Black-headed gull	194 (AON)	Little tern	58 (AON)
Lesser black-backed gull	6 (AON)	Guillemot	3,345 (I)
Herring gull	853 (AON)	Razorbill	547 (I)
Great black-backed gull	5 (AON)	Puffin	619 (I)
Kittiwake	3,560 (AON)		
Aberdeenshire			
Gannet	1,085 (AOS/AON)		
City of Aberdeen			
Fulmar	225 (AOS)	Great black-backed gull	9 (AON)
Shag	3 (AON)	Kittiwake	1,695 (AON)
Black-headed gull	68 (AON)	Common tern	68 (AON)
Common gull	280 (AON)	Guillemot	395 (I)
Lesser black-backed gull	154 (AON)	Razorbill	157 (I)
Herring gull	3,522 (AON)	Puffin	75 (I)
Kincardine & Deeside			
Fulmar	3,135 (AOS)	Kittiwake	34,501 (AON)
Cormorant	88 (AON)	Common tern	13 (AON)
Shag	13 (AON)	Guillemot	72,179 (I)
Common gull	22 (AON)	Razorbill	9,760 (I)
Lesser black-backed gull	8 (AON)	Black guillemot	3 (I)
Herring gull	4,226 (AON)	Puffin	768 (I)
Great black-backed gull	21 (AON)		
Angus			
Fulmar	1,185 (AOS)	Kittiwake	2,926 (AON)
Cormorant	29 (AON)	Roseate tern	1 (AON)
Shag	21 (AON)	Common tern	50 (AON)
Black-headed gull	19 (AON)	Arctic tern	82 (AON)
Common gull	19 (AON)	Guillemot	1,002 (I)
Lesser black-backed gull	7 (AON)	Razorbill	562 (I)
Herring gull	1,060 (AON)	Puffin	190 (I)
Great black-backed gull	8 (AON)		
Perth & Kinross			
Fulmar	2 (AOS)	Common tern	7 (AON)
City of Dundee			
Lesser black-backed gull	65 (AON)	Herring gull	296 (AON)
Northeast Fife			
Fulmar	887 (AOS)	Roseate tern	2 (AON)
Shag	734 (AON)	Common tern	303 (AON)
Lesser black-backed gull	1,203 (AON)	Arctic tern	910 (AON)
Herring gull	2,846 (AON)	Little tern	5 (AON)
Great black-backed gull	27 (AON)	Guillemot	28,103 (I)
Kittiwake	3,639 (AON)	Razorbill	4,114 (I)
Sandwich tern	300 (AON)	Puffin	42,000 (I)
Kirkcaldy			
Fulmar	401 (AOS)	Kittiwake	349 (AON)
Cormorant	85 (AON)	Guillemot	48 (I)
Shag	21 (AON)	Razorbill	85 (I)

Species	Total[1]	Species	Total[1]
Lesser black-backed gull	3,282 (AON)	Puffin	1,641 (I)
Herring gull	3,590 (AON)		
Dunfermline			
Fulmar	161 (AOS)	Kittiwake	116 (AON)
Cormorant	100 (AON)	Roseate tern	11 (AON)
Shag	7 (AON)	Common tern	135 (AON)
Lesser black-backed gull	1,262 (AON)	Razorbill	6 (I)
Herring gull	700 (AON)	Puffin	40 (I)
Great black-backed gull	1 (AON)		
Falkirk			
Lesser black-backed gull	113 (AON)	Common tern	114 (AON)
Herring gull	19 (AON)		
City of Edinburgh			
Fulmar	228 (AOS)	Great black-backed gull	2 (AON)
Shag	33 (AON)	Common tern	700 (AON)
Lesser black-backed gull	323 (AON)	Puffin	22 (I)
Herring gull	424 (AON)		
East Lothian (includes Bass Rock)			
Gannet	44,110[1] (AOS/AON)	Kittiwake	3,349 (AON)
Cormorant	190 (AON)	Little tern	2 (AON)
Shag	298 (AON)	Guillemot	8,266 (I)
Lesser black-backed gull	1,470 (AON)	Razorbill	566 (I)
Herring gull	3,553 (AON)	Puffin	28,412 (I)
Great black-backed gull	11 (AON)		
Berwickshire			
Fulmar	1,060 (AOS)	Great black-backed gull	1 (AON)
Cormorant	36 (AON)	Kittiwake	18,739 (AON)
Shag	349 (AON)	Guillemot	44,636 (I)
Black-headed gull	90 (AON)	Razorbill	3,534 (I)
Lesser black-backed gull	1 (AON)	Puffin	21 (I)
Herring gull	945 (AON)		

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1]Data from Seabird 2000. [2]Not surveyed in 1998-2000. Extrapolated for 1999 based on previous colony specific trends.
Source: Mitchell et al. (2004), JNCC website

Shetland and the north east coast of Scotland has a high density of seabird colonies, the boundaries between which are often indistinct. Many of these colonies are regarded as of international importance for seabirds and are amongst the most important areas for offshore seabirds in Europe (Tasker 1996, Tasker 1997a, b, c).

As seen in many regions of the UK, populations of kittiwake are in long term decline, however, a small increase was seen in Shetland between 2005 and 2006. Overall numbers of Arctic tern at colonies in Shetland (>35%) and Orkney (0.1%) increased between 2005 and 2006 (Mavor *et al*. 2008). More recent results from RSPB reserves indicate a decline in this species in 2008, with Mousa failing to produce any young, corresponding with reports away from RSPB reserves that few young Arctic terns fledged in 2008 (RSPB website).

With the exception of sites on the west coast of Scotland and Orkney, Shetland is the only other place in Britain where Arctic and great skua breed, with breeding sites located throughout the archipelago. Between 2005 and 2006 number of Apparently Occupied Territories (AOT) for Arctic skua on Shetland continued to increase following a decline between 2003 and 2004, while numbers on Fair Isle reached their highest levels since 1992 (Mavor *et al*. 2008). Numbers of great skua also increased on Shetland between 2005 and

2006, though RSPB reserves on Shetland recorded a 30% decrease in nesting pairs in a single year to 2008, which resulted in just 3 fledgling chicks (RSPB website).

The Moray Firth and surrounding coastline is of year round importance for birds. Breeding seabirds including kittiwake, guillemot and razorbill at colonies along the coastline, such as on the Caithness Cliffs, commute offshore to feed, potentially over Smith Bank. Cormorants, shags, gulls and terns tend to feed closer to shore. Declines in kittiwake and common gull numbers were recorded at North Sutor in 2006, whilst cormorant and shag numbers increased. Numbers of common gull also decreased at Nigg, between 2005 and 2006, while numbers of herring gull increased by almost 100%, as did numbers of lesser and great black-backed gulls.

The waters of the Outer Moray Firth and the nearshore waters off the Moray coast are of particular importance as feeding areas (Tasker 1996); the broad area encompassed by Smith Bank as defined by the 50m depth contour has sandy sediment suitable for sandeel burrowing, and sandeels have been commonly recorded in grab samples across the area (data archived in UKBenthos). After breeding, adult and juvenile auks move offshore where the adults moult. The waters around the Smith Bank also support the largest year round concentration of shags in British waters, while the coast along the southern Moray Firth are of particular year round importance for herring gulls.

In early autumn, the waters off the Aberdeenshire coast are of particular importance to moulting auk, and moulting rafts can be found widely dispersed in many areas of the North Sea, particularly off the eastern coast of Scotland and northern England. Puffins, which do not moult until spring, can be found concentrated in the area around the Buchan Front (*ca*. 60-100 km off the Aberdeenshire coast) during this time.

Other major colonies along this coast include Fowlsheugh, one of the largest guillemot colonies in the UK, while the Isle of May supports one of the largest colonies of common tern. In 2006, numbers of guillemot were stable at Fowlsheugh, with virtually no change detected in plots for the second successive year (Mavor *et al*. 2008).

Bass Rock is one of the most important sites in the UK and the world for breeding gannets. Over the last 40 years the colony has expanded enormously with an increase of over 300% recorded between 1968 and 1995 (Mitchell *et al*. 2004). During the breeding season, adult gannets from the Bass colony have been recorded foraging up to 590km away, with many birds foraging much closer (Hamer *et al*. 2000, Hamer *et al*. 2007). Gannet chicks leave the colonies during August and September and remain on the sea surface for about one week until they are able to fly. The fastest growing gannetry in Britain is also found on this coastline, further north at Troup Head.

Other key areas for breeding seabirds include Isle of May, Inchcolm, Leith Docks, Inchkeith and St Abb's Head. Records from the Isle of May between 2005 and 2006, indicate increases in fulmar, shag, lesser black-backed gull, herring gull and common tern numbers, while great black-backed gull, kittiwake, Arctic tern, guillemot and razorbill populations declined. Inchcolm recorded increases in both fulmar and kittiwake and Inchkeith also recorded increases in fulmar, cormorant and shag. Kittiwake numbers declined at Inchkeith and also at St Abbs Head, where numbers of guillemot decreased whilst fulmar, shag, herring gull and razorbill numbers increased (Mavor *et al*. 2008).

Table A3a.6.6 – Breeding seabirds in Regional Sea 1 (England)

Species	Total[1]	Species	Total[1]
Northumberland			
Fulmar	1,078 (AOS)	Sandwich tern	3,676 (AON)
Cormorant	144 (AON)	Roseate tern	34 (AON)
Shag	1,299 (AON)	Common tern	1,207 (AON)
Black-headed gull	2,794 (AON)	Arctic tern	3,559 (AON)
Lesser black-backed gull	850 (AON)	Little tern	73 (AON)
Herring gull	999 (AON)	Guillemot	31,542 (I)
Great black-backed gull	2 (AON)	Razorbill	271 (I)
Kittiwake	8,621 (AON)	Puffin	72,882 (I)
Tyne and Wear			
Fulmar	234 (AOS)	Kittiwake	2,628 (AON)
Cormorant	248 (AON)	Common tern	5 (AON)
Lesser black-backed gull	4 (AON)	Razorbill	36 (I)
Herring gull	262 (AON)		
Durham			
Common tern	32 (AON)		
Cleveland			
Fulmar	219 (AOS)	Kittiwake	7,101 (AON)
Cormorant	68 (AON)	Common tern	369 (AON)
Lesser black-backed gull	90 (AON)	Little tern	19 (AON)
Herring gull	1,140 (AON)	Razorbill	7 (I)
North Yorkshire			
Fulmar	733 (AOS)	Common tern	5 (AON)
Cormorant	25 (AON)	Guillemot	530 (I)
Lesser black-backed gull	1 (AON)	Razorbill	176 (I)
Herring gull	2,299 (AON)	Puffin	38 (I)
Kittiwake	8,616 (AON)		

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1]Data from Seabird 2000.
Source: Mitchell et al. (2004), JNCC website

Two of the most important seabird breeding sites along the English coast between Berwick-Upon Tweed and just north of Flamborough Head are Farne Island and Coquet Island with several other colonies also present including: Holy Island and Long Nanny (little tern); Marsden Bay (cormorant and kittiwake); South Gare (little tern) and Filey North Cliffs (kittiwake). The most important seabird breeding colonies in this region are listed in Table A3a.6.7 below. Sites are listed geographically north to south.

Table A3a.6.7 – Summary of the most important breeding seabird colonies in Regional Sea 1

Sites	Species + Total
Fetlar	Arctic tern (520 P); great skua (95 AOT); Manx shearwater (7 AOS)
Noss	Gannet (8,017 AOS); great skua (410 P); guillemot (45,777 I); fulmar (4,999 AOS); kittiwake (2,395 AON); puffin (1,892 AOB)[2]
Mousa	Arctic tern (767 P); storm petrel (6,800 AOS)
Sumburgh Head	Arctic tern (700 P); shag (270 AON)

Sites	Species + Total
Fair Isle	Arctic tern (1,120 P); guillemot (39,257 I); fulmar (20,424 AOS); gannet (1,123 AOS); shag (663 AON); Arctic skua (78 AOT); kittiwake (8,204 AON); razorbill (3,599 I); puffin (40,000 AOB)[3]
East Caithness Cliffs	Guillemot (71,509 P); herring gull (9,370 P); kittiwake (31,930 P); razorbill (9,259 P); shag (2,345 P)
Cromarty Firth	Common tern (294 P)
Inner Moray Firth	Common tern (310 P)
Troup, Pennan & Lion's Head	Guillemot (29,902 P); gannet (1,085 AOS)
Loch of Strathbeg	Sandwich tern (530 P)
Buchan Ness to Collieston Coast	Herring gull (2,277 AON)[1]
Ythan Estuary, Sands of Forvie & Meikle Loch	Common tern (265 P); little tern (41 P); Sandwich tern (600 P); herring gull (272 AON)
Fowlsheugh	Guillemot (61,420 I); kittiwake (19,842 AON); razorbill (6,425 I)
Firth of Tay & Eden Estuary	Little tern (44 P)
Firth of Forth Islands	Arctic tern (540 P); common tern (800 P); roseate tern (9 P); Sandwich tern (22 P); gannet (34,400 P); lesser black-backed gull (2,920 P); puffin (21,000 P); shag (2,887 P)
St Abbs Head to Fast Castle	Shag (329 AON); kittiwake (16,223 AON); guillemot (43,744 I)
Lindisfarne	Little tern (38 P)
Farne Island	Arctic tern (2,840 P); common tern (230 P); Roseate tern (3 P); Sandwich tern 92,070 P); guillemot (23,499 P); puffin (55,674 AOB); cormorant (144 AON); shag (1,287 AON)
Northumbria Coast	Little tern (40 P)
Coquet Island	Arctic tern (700 P); common tern (740 P); roseate tern (31 P); Sandwich tern (1,590 P); puffin (17,208 AOB)
Teesmouth & Cleveland Coast	Little tern (37 P)

*Notes: Sites designated as Seabird Assemblages of International Importance are shown in **bold** (Qualifying level is 20,000 birds). P: Pairs, AOB: Apparently Occupied Burrows, AOS: Apparently Occupied Sites, I: individuals. [1]this figure represents numbers from three colonies along the Buchan coast. [2]counts of birds: 1 bird approximates to 1 AOB. [3]Counts of breeding adults: 2 adults approximate to 1 AOB. Source: JNCC website and Mitchell et al. (2004).*

Of the eleven species studied on the Farne Islands, populations of four species increased between 2005 and 2006: fulmar; lesser black-backed gull; guillemot and razorbill, while the remaining seven declined: cormorant; black-headed gull; herring gull; kittiwake; Sandwich tern; common tern and Arctic tern. During this same period, numbers of fulmars on Coquet Island increased by 50% and increases were also recorded for kittiwake, roseate tern, common tern and Arctic tern. As at the Farne Islands, decreases were recorded for black-headed gull and Sandwich tern as well as lesser black-backed gull. The little tern had its highest numbers recorded, representing an increase of over 57% from 2005 (Mavor *et al*. 2008).

A3a.6.4.2 Seabird distribution at sea

Seabird distribution and abundance in the northern and central North Sea varies throughout the year, with offshore areas, in general, containing peak numbers of birds following the breeding season and through winter (see Table A3a.6.8). Seabirds are distributed closer

inshore during the breeding season, foraging closer to coastal breeding colonies in spring and early summer.

Table A3a.6.8 – General seabird distribution in the northern and central North Sea

Month	Distribution and abundance
January	Guillemot and razorbill are abundant in the Moray Firth and close to the coasts of eastern Scotland and northern England and guillemots return to Shetland waters during this month. Herring and great black-backed gulls are most frequently seen in the Moray Firth and off the eastern coast of Britain. At this time glaucous gulls reach an annual peak in the northern North Sea. Although commonest off Shetland, fulmars are present in most offshore areas of the northern and central North Sea.
February	Main concentrations of guillemots present in Moray Firth and Firth of Forth, birds also around the southern half of Shetland. Important numbers present off most of east coast Scotland and Silver Pit. Puffins present in large numbers and widely distributed in northern North Sea. Some adult gannets return in this month, with the area off north east England the most important at this time. Herring and great black-backed gulls most common off east coast of England
March	Guillemots and puffins return to the vicinity of their colonies. Razorbills present in Outer Silver Pit area. Main concentrations of kittiwakes in northern North Sea, off Orkney and Shetland, and more gannets return to the Regional Sea. Highest densities of fulmar present off main breeding areas, but many also present in central North Sea. Herring and great black-backed gulls from Norway return north-eastwards, fewer birds seen off the east coast of England. Gulls remaining in area are breeding birds and the Moray Firth remains important for both species.
April	Breeding season for some seabirds begins at the end of the month. Many birds returning to colonies and pre-breeding feeding, both close to colonies and further offshore. Kittiwakes remain widely distributed particularly in north near main breeding areas. Large numbers of gannets found near colonies. Great skuas return to breeding grounds in Shetland. Terns return in greatest numbers.
May	Start of breeding season for most seabirds, birds away from colonies likely to be immature. Areas including Shetland, Caithness, Aberdeenshire, Firth of Forth, Farne Islands and Flamborough Head the most important for auk species. Birds can still forage at distances further from the colonies than during chick rearing (e.g. auks up to 60km and kittiwakes up to 120km). Manx shearwater, storm petrels and Arctic skua start arriving back in the northern North Sea.
June	Peak of breeding season. Majority of seabirds in coastal areas. Majority of the guillemots in Shetland & Moray Firth, with important concentrations also found further south. Most breeding guillemots do not feed further than 30km from their breeding site. At end of month guillemot chicks start to leave colonies & disperse into northern North Sea. Breeding razorbills feed closer to shore than guillemots. Some adult gannets forage great distances from their breeding sites, with many staying much closer. Kittiwakes forage in similar areas as guillemots, razorbill and puffin. Breeding Arctic and great skua feed close to colonies
July	The nesting season for many species of seabird ends in late June/early July, and adult and juvenile birds start to move south to wintering grounds or move to areas where they form moulting flocks. The area of the Shetland Basin, over some of the banks of the central North Sea and off the Moray Firth and Aberdeenshire coasts support large concentrations of birds than at any other time of the year. Birds widely dispersed so many areas of the North Sea can hold vulnerable populations.
August	The highest number of auks occurs off east coast of Scotland and northern England. Black guillemots moult at this time and are found at specific moult sites concentrated in sheltered inshore waters around Shetland. Puffins disperse rapidly from colonies. Young gannets start to leave and are flightless for a short period, therefore areas close to colonies contain vulnerable concentrations.

Month	Distribution and abundance
September	Distribution of auks spreads outwards into North Sea. Off the eastern coast of Scotland and north-east England remains important for birds, but the width of the area away from the coast is greater than in August. An area in centre of northern North Sea is of primary importance for guillemots. Largest concentrations of razorbills found off Moray Firth (and the inner area of the Firth also important for Manx shearwaters) and east of the Forth and Tay, these areas are also important for puffins. Great skuas become widespread in North Sea as they leave their breeding sites and move south. Great black-back gulls move across the North Sea from Norway and found off east coast of England. Fulmars are numerous and widespread across most of northern and central North Sea.
October	Southward shift in guillemot and razorbill populations, however the inshore band of Scotland and northern England still hold the largest numbers. Puffins found in offshore areas, with areas in central North Sea holding the most birds. Kittiwake distribution moves south and large numbers of birds found off of Yorkshire and the Moray Firth. Small numbers of little auks arrive in northern North Sea. Fulmars remain common throughout most of the northern North Sea.
November	Areas off eastern coast of Britain remain important for guillemots and razorbills. The east coast of Scotland holds relatively few birds compared to other times of the year, with the exception of the Firth of Forth and its approaches. Another important area is off north-eastern England, stretching east to the Dogger Bank and south to the Outer Silver Pit. Flocks of kittiwake found around fishing fleets in the Fladen Ground and several winter visitors become more common in northern North Sea: an obvious change is the arrival of gulls in offshore waters, with herring gulls from Norway moving south-west across the North Sea to areas including the Fladen Ground.
December	Large numbers of guillemots are close to coasts, with the most important area being the southern shore of the Moray Firth. Main area for puffins is Outer Silver Pit, but also present in central North Sea, off the north-east and east coasts of England and Scotland. Considerable numbers of little auk are present in areas including the Dogger Bank and inshore towards Yorkshire. Fulmars are commonest in northern North Sea.

Source: Tasker & Pienkowski (1987), Skov et al. (1995)

A3a.6.5 Waterbird species and distribution

A3a.6.5.1 Breeding waterbirds

Waterbird species characteristic of wet grassland, shingle, sand dune, and dry coastal grasslands can be found throughout this region. Shetland has a diverse array of habitats (e.g. moorland, bog and heathland, shingle, sand dune and other dry grasslands) which support breeding populations of waterbirds. Some species, such as ringed plover, can occur in internationally important numbers. Shetland also supports breeding red-throated divers, with important areas including Foula, Hermaness, Saxa Vord and Valla Field, as well as some rare breeding species such as whimbrel and red-necked phalarope.

The sheltered firths of the north east of Scotland such as in the Moray Firth, and the sandy dune systems and bays including the Montrose Basin, Aberlady Bay and the Forth Estuary, support diverse assemblages of breeding waterbirds.

On the north east coast of England, surrounding Holy Island there are significant areas of saltmarsh and sand dunes and the largest extent of inter-tidal mud and sand flats along this stretch of coastline. These and other areas of suitable habitat support small but significant populations of breeding waterbirds.

A3a.6.5.2 Key areas for wintering and migratory waterbirds

The Regional Sea 1 coastline varies in its importance for wintering and migratory waterbirds (see Table A3a.6.9). Key areas include those listed in the WeBS annual report as "principal sites" (sites supporting more than 10,000 waterbirds as well as those supporting internationally important numbers of one or more waterbird species).

Table A3a.6.9 – Important sites for non-breeding waterbirds in Regional Sea 1 (in decreasing relative abundance of birds)

Site	Average number[1]	Species[2]
The Wash	356,451	**Pink footed goose, dark-bellied Brent goose, shelduck, pintail, oystercatcher, ringed plover, golden plover, grey plover, lapwing, knot, sanderling, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank**, wigeon, teal, eider, cormorant, avocet, greenshank, lesser black-backed gull, great black-backed gull, mallard
Humber estuary	180,390	**Pink-footed goose, dark-bellied Brent goose, shelduck, ringed plover, golden plover, grey plover, lapwing, knot, dunlin, black-tailed godwit, bar-tailed godwit, redshank**
Forth estuary	84,491	**Pink-footed goose, greylag goose, Slavonian grebe, knot, bar-tailed godwit, redshank**, shelduck, eider, common scoter, velvet scoter, goldeneye, red-breasted merganser, great-crested grebe, red-necked grebe, cormorant, oystercatcher, golden plover, knot, sanderling, dunlin, ruff, black-tailed godwit, curlew, greenshank, turnstone
Loch of Strathbeg	69,129	**Whooper swan, pink-footed goose, barnacle goose**
Inner Moray/Inverness Firth	61,295	**Pink-footed goose, greylag goose**, **Slavonian grebe** (listed as Moray Firth only), whooper swan, wigeon, teal, pintail, scaup, common scoter (Moray Firth only), velvet scoter (Moray Firth only), goldeneye, red-breasted merganser (Moray Firth only), black-throated diver (Moray Firth), oystercatcher, knot, bar-tailed godwit, curlew, redshank
Lindisfarne	56,130	**Pink-footed goose, barnacle goose, light-bellied Brent goose, wigeon, bar-tailed godwit**, whooper swan, shelduck, pintail, eider, red-necked grebe, Slavonian grebe, golden plover, grey plover, knot, sanderling, dunlin, redshank, ringed plover, greylag goose, wigeon
Montrose Basin	40,286	**Pink-footed goose**, greylag goose, whooper swan, shelduck, wigeon, eider, red-breasted merganser, knot, greenshank, redshank
Dornoch Firth	35,002	**Greylag goose, bar-tailed godwit**, whooper swan, wigeon, teal, scaup, greenshank
Loch Leven	34,546	**Mute swan, pink-footed goose**
Cromarty Firth	33,038	**Greylag goose, bar-tailed godwit**, wigeon, scaup, knot, redshank, whooper swan
Tees Estuary	24,486	Gadwall, cormorant, little grebe, sanderling, ruff, greenshank, redshank
Loch Spynie	23,314	**Pink-footed goose, greylag goose**
Tay Estuary (**Firth of Tay & Eden Estuary**)	20,891	**Pink-footed goose, bar-tailed godwit**, eider, goosander, cormorant, sanderling, redshank, greylag goose
Loch of Skene	13,944	**Pink-footed goose, greylag goose**
Ythan Estuary	13,192	Pink-footed goose, eider, ruff, greenshank, redshank
Carsebreck & Rhynd Lochs	13,140	Pink-footed goose
Loch of Lintrathen	10,329	**Pink-footed goose**

Site	Average number[1]	Species[2]
Hule Moss	8,246	**Pink-footed goose**
Loch Fleet Complex	6,944	**Greylag goose**
Hornsea Mere	6,787	**Mute swan**
Holburn Moss	6,319	**Pink-footed goose**
Slains Lochs (Meikle & Sand & Cotehill)	6,280	**Pink-footed goose**
Loch Eye	6,163	**Whooper swan, greylag goose**
Cameron Reservoir	5,122	**Pink-footed goose**
R. Tay: Haughs of Kercock	3,886	**Greylag goose**
Tweed Estuary	3,684	**Mute swan**
Kilconquhar Loch	3,544	**Greylag goose**
Loch Tullybelton	3,279	**Pink-footed goose**
Dalreoch	2,586	**Whooper swan, greylag goose**
Lower Teviot Valley	1,882	**Greylag goose**
Moray & Nairn Coast	-	Bar-tailed godwit (1,156 I), greylag goose (2,679 I), pink-footed goose (139 I), redshank (1,690 I)
Northumbria Coast	-	Purple sandpiper (763 I), turnstone (1,456 I)
Teesmouth & Cleveland Coast	-	Ringed plover (634 I, on passage), knot (4,190 I), redshank (1,648 I)

*Notes: [1]Average number is taken from the WeBS annual report and data collected between 2001/02 to 2005/06. For JNCC SPA sites only, no average number is available [2]Species occurring in internationally important numbers are shown in **bold**. [3]Sites designated as Wetland Assemblages of International Importance shown in bold (qualifying level is 20,000 birds). I: Individuals*
Source: Austin et al. (2008), JNCC website

Shetland is not amongst the most important regions in the UK wintering waterbirds. The north east coast of Scotland, includes a number of internationally and nationally important sites and collectively the region can support in excess of 73,000 birds (Stroud & Craddock 1996). The Moray Basin is important for wintering seaduck such as common scoter, goldeneye, long-tailed duck and scaup and large numbers can be present in waters of the Moray, Cromarty and Dornoch Firths. There is also a late-summer moult migration of Canada geese which move north from Midland breeding grounds to the Beauly Firth.

The coast between Montrose Basin and Berwick is of UK and international importance for wintering birds, and holds over a quarter of Scotland's total coastal wintering waterfowl (May & Law 1997a). The estuarine, intertidal mudflats and saltmarshes along this coast are of particular importance but sites cannot be considered in isolation, as during the course of a winter some species, for example dunlin, have shown patterns of interchange between sites. Birds such as greylag and pink-footed geese can have considerable distance between feeding and roosting sites, and use both coastal sites and inland lochs and reservoirs.

Much of the coastline between Berwick and Filey Bay in the south is rocky with relatively little marsh close to intertidal areas. Numbers of grazing wildfowl are relatively low compared with some other areas, although some sites support populations of national and international importance.

Being on the major migratory flyway of the east Atlantic, the estuaries of Shetland and the rest of this coastline are important during spring and autumn migration with many birds stopping and staging here as they move to and from wintering and breeding areas.

At times of severe cold in mainland Europe estuarine and inter-tidal areas of the UK (especially on the west) can become more important as cold weather refuges. The variation in waterbird abundance and distribution throughout the year is described in Table A3a.6.10.

Table A3a.6.10 – General waterbird distribution and abundance in Regional Sea 1

Month	Distribution and abundance
January	Large flocks of eider in waters off eastern Scotland. Firth of Forth supports winter peaks of shelduck, large concentrations of common scoter present in Dornoch/Moray Firth. Large flocks of goldeneye present in waters off the Tweed, the Forth, Cromarty and Moray Firths. Moray Firth also supports large flocks of long-tailed duck, as does Scapa Flow. Great northern diver and black guillemot present in waters round Northern Isles with the latter species concentrated in shallow, sheltered waters.
February	Eiders remain in large numbers in waters off eastern Scotland. Peak numbers of long-tailed duck in Scapa Flow and large concentrations still present in Moray Firth. Moray Firth supports large concentrations of common scoter, velvet scoter, goosander and red-breasted merganser. Peak numbers of bar-tailed godwit in Forth along with important flocks of knot and redshank.
March	Marks start of return of many species to breeding grounds, intertidal areas become less important. Numbers of wading birds on estuaries decline. High Arctic nesting species, e.g. bar-tailed godwit, remain in UK sites later than more temperate species and important numbers remain at sites including Lindisfarne and Firth of Forth. Eiders move back towards breeding grounds and high numbers recorded on the Forth.
April	Estuaries used by birds on passage from southern wintering grounds to northern breeding grounds. There are less feeding waders in terms of absolute numbers on British estuaries between April and June, although number of birds on passage is thought to be underestimated. Eiders continue to return to breeding grounds near the Tay, on Lindisfarne, on the Ythan and Shetland. Large numbers of Brent geese still on wintering grounds.
May	Wildfowl and other waterbirds that have wintered on sites on this coastline return to breeding sites. Numbers of dark-bellied Brent geese peak in May, before rapid departure. Migration of divers continues through the North Sea.
June	June is peak of breeding season, most migrant birds that spend winter on/pass through coasts of North Sea have returned to breeding grounds. Eiders, the only seaduck that breeds in any great numbers around the North Sea, are found at main colonies in Shetland, Aberdeenshire, Firth of Forth. There are few waders at estuaries compared to numbers that use these sites outwith the breeding season.
July	Some species move to moulting sites after breeding, large concentrations of moulting shelduck found in south eastern sector of North Sea, smaller concentrations found in Firth of Forth. Common scoter also undergo moulting migration. Largest concentrations found out with Regional Sea 1 but smaller concentrations found off Aberdeenshire, and north east England. Flocks of moulting eider also found off Aberdeenshire, in Scapa Flow, Wyre Sound and off various areas around Shetland. After breeding, some species of waders return to estuaries and mudflats.
August	Start of main influx of wading birds and ducks into North Sea. Some may remain in area for winter, or stop to moult and/or feed before onward migration southwards. High numbers of redshank found at various sites, including Forth, Tay and Montrose

Month	Distribution and abundance
	Basin. Lindisfarne and Cromarty Firth hold large populations of bar-tailed godwit, high numbers of eider remain in Forth, off Aberdeenshire, in the Tay and around Lindisfarne. Common scoter numbers off Aberdeenshire peak during this month.
September	Peak month for usage of North Sea estuaries. Lindisfarne supports large numbers of wigeon, eider and bar-tailed godwit. Eider present in important numbers in the Forth, Tay, off Aberdeenshire, and large migration of common scoter into Moray and Dornoch Firths. Firth of Forth important for bar-tailed godwit, curlew, redshank and great crested grebe. Large numbers of red-throated divers undergo wing-moult off Aberdeenshire coast and southern Moray Firth.
October	Firth of Forth holds large numbers of ringed plover, bar-tailed godwit and redshank. Large numbers of red-throated divers in wing moult are present in Firths of Forth, Tay and off north east Scotland. Month sees influx of common and velvet scoters, and goldeneye. Large numbers of common scoter found in Dornoch/Moray Firth – and have velvet scoters associated with them (albeit in lower numbers). Firths of Forth and Tay and waters off north-east Scotland support large numbers of red-throated divers. Area off the Tay holds large numbers of red-breasted merganser.
November	Some light-bellied Brent geese move across from Wadden Sea across North Sea to Lindisfarne. Knot also move westward to Lindisfarne and the Firth of Forth (and other areas on the south east coast of England, e.g. the Wash). Month sees immigration by more wading birds. Important flocks of turnstone appear on Shetland and Aberdeenshire coasts, while important sites for purple sandpipers include Shetland, Orkney, Aberdeenshire and the outer Firth of Forth. Large flock of eider on the Tay, and concentrations found in Scapa Flow and goldeneye found in the Forth and Moray/Cromarty Firths. Long-tailed duck arrive in important numbers to the Moray Firth, but can often feed offshore. This species also roosts offshore.
December	Lindisfarne and the Firth of Forth of importance to knot, important flocks of turnstone on coast of Shetland and Aberdeenshire, and of purple sandpipers around Shetland, Aberdeenshire and the outer Firth of Forth. Large flocks of eider on the Tay, Scapa Flow, goldeneye in the Forth and Moray/Cromarty Firth. Long-tailed duck continue to arrive in important numbers to the Moray Firth from breeding areas.

Source: Tasker & Pienkowski (1987)

Waters off this stretch of coastline are very important for several species of wintering seaduck, including eiders off the Aberdeenshire coast and scoter (common and velvet), shelduck and long-tailed duck off the Moray Firth, Tay, Firth of Forth and Lindisfarne.

A3a.6.6 Features of Regional Sea 2

The coast of Regional Sea 2 runs from Flamborough Head in the north to approximately Deal on the south west coast of England. This area includes a number of areas suitable for cliff nesting seabirds and also includes some of the most important sites for wintering and passage waterbirds, including the Wash and the Thames Estuary.

A3a.6.6.1 Seabird species, abundance and distribution

Only a small number of the seabird species breeding in the UK are not listed in Mitchell *et al.* (2004) as breeding within Regional Sea 2 (for example Manx shearwater, storm petrel, Leach's storm petrel, Arctic skua, great skua and black guillemot). Species breeding in Regional Sea 2 are indicated in Table A3a.6.11.

Table A3a.6.11 – Breeding seabirds in Regional Sea 2

Species	Total[1]	Species	Total[1]
Humberside			
Fulmar	1,245 (AOS)	Common tern	2 (AON)
Gannet	2,552 (AOS/AON)	Little tern	49 (AON)
Black-headed gull	2 (AON)	Guillemot	46,625 (I)
Lesser black-backed gull	1 (AON)	Razorbill	8,438 (I)
Herring gull	659 (AON)	Puffin	2,612 (AOB)
Kittiwake	41,971 (AON)		
Lincolnshire			
Black-headed gull	38 (AON)	Little tern	46 (AON)
Common tern	46 (AON)		
Norfolk			
Fulmar	91 (AOS)	Sandwich tern	4,275 (AON)
Mediterranean gull	3 (AON)	Roseate tern	1 (AON)
Black-headed gull	4,906 (AON)	Common tern	502 (AON)
Common gull	6 (AON)	Arctic tern	5 (AON)
Lesser black-backed gull	1,605 (AON)	Little tern	600 (AON)
Herring gull	1,311 (AON)		
Suffolk			
Mediterranean gull	8 (AON)	Great black-backed gull	4 (AON)
Black-headed gull	2,767 (AON)	Kittiwake	369 (AON)
Common gull	16 (AON)	Sandwich tern	7 (AON)
Lesser black-backed gull	6,956 (AON)	Common tern	184 (AON)
Herring gull	1,248 (AON)	Little tern	148 (AON)
Essex			
Mediterranean gull	9 (AON)	Common tern	289 (AON)
Black-headed gull	14,561 (AON)	Little tern	262 (AON)
Lesser black-backed gull	155 (AON)	Cormorant	370 (AON)
Herring gull	167 (AON)		
Kent			
Fulmar	53 (AOS)	Herring gull	770 (AON)
Mediterranean gull	23 (AON)	Kittiwake	1,229 (AON)
Black-headed gull	11,091 (AON)	Sandwich tern	333 (AON)
Common gull	11 (AON)	Common tern	333 (AON)
Lesser black-backed gull	75 (AON)	Little tern	38 (AON)
East Sussex			
Fulmar	111 (AOS)	Herring gull	1,459 (AON)
Mediterranean gull	6 (AON)	Kittiwake	1,002 (AON)
Black-headed gull	33 (AON)	Common tern	57 (AON)
Lesser black-backed gull	38 (AON)	Little tern	11 (AON)

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1]Data from Seabird 2000
Source: Mitchell et al. (2004), JNCC website

The counties along the east and south east of England support an array of breeding seabirds, some of importance in a national and international context. The most important seabird breeding colonies in Regional Sea 2 are indicated in Table A3a.6.12 below. Sites are listed in geographical order, from north to south.

Table A3a.6.12 – Summary of important breeding seabird colonies in Regional Sea 2

Sites	Species	Total[1]
Flamborough Head and Bempton Cliffs	Kittiwake Guillemot Razorbill Puffin Gannet	42,659 (AON) 46,685 (I) 8,539 (I) 2,615 (I) 2,552 (AOS)
Humber flats, marshes and coast	Little tern	63 (P)
Gibraltar Point	Little tern	23 (P)
The Wash	Common tern Little tern	152 (P) 33 (P)
Outer Trial Bank (the Wash)	Lesser black-backed gull Herring gull	1,378 (AON) 1,003 (AON)
North Norfolk Coast	Common tern Little tern Mediterranean gull Roseate tern Sandwich tern	460 (P) 377 (P) 2 (P) 2 (P) 3,457 (P)
Great Yarmouth North Denes	Little tern	220 (P)
Breydon Water	Common tern	155 (P)
Benacre to Easton Bavents	Little tern	53 (P)
Minsmere – Walberswick	Little tern	28 (P)
Orfordness	Lesser black-backed gull Herring gull	5,500 (AON) 700 (AON)
Alde-Ore Estuary	Little tern Sandwich tern Lesser black-backed gull	48 (P) 169 (P) 21,700 (P)
Hamford Water	Little tern	55 (P)
Colne Estuary	Little tern	38 (P)
Abberton Reservoir[2]	Cormorant	370[3] (P)
Blackwater Estuary	Little tern	36 (P)
Foulness	Common tern Little tern Sandwich tern	220 (P) 24 (P) 320 (P)
Medway Estuary and Marshes	Little tern	28 (P)
The Swale	Mediterranean gull	12 (P)
Dungeness to Pett Level	Common tern Little tern Mediterranean gull	266 (P) 35 (P) 2 (P)

Notes: Sites designated as Seabird Assemblages of International Importance are shown in Bold. P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1]Data from Seabird 2000. [2]Abberton Reservoir is included as although the reservoir is located a few kilometres inland, many of the birds feed in nearby estuaries. Source: JNCC website and Mitchell et al. (2004)

During the breeding season, Flamborough Head/Bempton Cliffs, and Alde-Ore Estuary regularly support over 300,000 and 59,000 individual seabirds respectively, including puffin, razorbill, guillemot, herring gull, gannet, kittiwake (Flamborough Head/Bempton Cliffs), herring gull, black-headed gull, lesser black-backed gull, little tern and Sandwich tern (Alde-Ore Estuary) (JNCC website).

Lack of suitable cliff habitat to the south of Flamborough Head results in fewer nesting seabirds other than terns and gulls, with most colonies on saltmarshes, remote beaches or offshore sandbanks (Tasker 1998).

A3a.6.6.2 Seabird distribution at sea

Seabird distribution and abundance in the southern North Sea varies throughout the year, with offshore areas, in general, containing peak numbers of birds following the breeding season and through winter (See Table A3a.6.13).

Table A3a.6.13 – General seabird distribution and abundance in Regional Sea 2

Month	Distribution and abundance
January	Auks (guillemots and razorbills) present in large numbers throughout the southern North Sea, particularly over the Outer Silver Pit area.
February	High numbers of auk present off the coast of Flamborough Head and also over the Outer Silver Pit area. Moderate numbers of other seabirds, particularly kittiwake, present over the Silver Pit area and off the Norfolk and Suffolk coast. Return of some adult gannets to the North Sea.
March	The Outer Silver Pit area is important for immature and adult razorbills and puffins are returning to their breeding colonies, including those at Flamborough Head. Some fulmars are present in the southern North Sea. High concentrations of guillemots found off Flamborough Head.
April	Breeding season for some seabirds begins at the end of the month, with birds re-establishing/establishing/defending territories at colonies. Many seabirds, particularly females, feeding to improve body condition. Some may be feeding close to colonies but some may be further offshore. Guillemots off Flamborough Head can forage up to 100km from colony to feed on sandeels. High numbers of Sandwich terns associated with colonies at Scolt Head, continues through May, with birds feeding around colonies during summer.
May	Start of breeding season for most seabirds, laying and incubating eggs. Likely to be predominantly to be immature birds located away from colonies, some birds, e.g. kittiwake, have been found to travel up to 120km away (off Flamborough Head). Large numbers of Sandwich and little terns found at breeding sites in southern North Sea.
June	Peak of breeding season. Majority of seabirds in coastal areas, but numbers not large in this area of North Sea. Most of the migrant birds that winter on North Sea coasts have returned to their breeding grounds
July	Moulting season for inshore and coastal birds, with some auks flightless at this time. Massive movement of birds into offshore North Sea during this month. Aggregations of birds present in coastal waters off the coast of Flamborough Head and Great Yarmouth.
August	Moderate numbers of flightless auks in offshore waters off the coast of Flamborough Head. Higher densities of fulmar also found in this area. Concentrations of Sandwich tern are coastal, although some birds feed offshore, birds are most widely distributed after the breeding season.
September	Few auks in offshore area at this time, with concentrations further north in the central and northern North Sea. Great black-backed gulls are present, frequently found around trawlers off the east coast of England. Fulmar remains numerous.
October	Southward shift of guillemot and razorbill populations with high concentrations of auks offshore, particularly in the area of southern gas fields off Norfolk and Lincolnshire. Prominent movement of gannet during autumn from the North Sea to the Channel.

Month	Distribution and abundance
November	Few auks present offshore, but not in great numbers. Razorbills from more southerly and westerly colonies fly into southern wintering grounds, including southern North Sea. Fulmar densities similar to those seen in Aug-Oct, but eastern shift in distribution, further into North Sea. Moderate densities of gannet seen over Dogger Bank area, higher densities off Flamborough Head, as dispersion from breeding sites is at maximum. Kittiwakes distributed over large areas of the North Sea, in winter numbers double and areas, including the Silver Pit support large numbers.
December	High concentrations of auks and other seabird species in offshore areas in the southern North Sea. Guillemots are widespread in winter, however densities are generally much lower in the central and southern North Sea than those seen in areas further north.

Source: Tasker & Pienkowski (1987), Skov et al. (1995)

Zones where water masses meet, hydrographic fronts, can have enhanced primary productivity and aggregations of other marine organisms, including birds. A year round frontal system off the coast of Flamborough Head forms the boundary between Regional Seas 1 and 2. The Outer Silver Pit and the Brown Ridge off the Suffolk coast are also important for seabird foraging. This notwithstanding, numbers of seabirds at sea are generally lower in Regional Sea 2 compared with waters further north, with greatest concentrations offshore occurring outside the breeding period.

A3a.6.6.3 Breeding waterbirds

Along this coastline, the estuarine and/or soft coast habitats, including vegetated shingle, sand dunes, coastal lagoons, saltmarshes, dry and wet (and seasonally flooding) grasslands result in high densities of breeding waterfowl, particularly waders, and several areas are of local, national and international importance.

Notable wetland species breeding in Regional Sea 2 include bittern and avocet, which are red-listed (of greatest conservation concern) and amber-listed (of moderate conservation concern) respectively. A number of areas within the region have been designated as SPAs partly due to their breeding populations of these species: North Norfolk Coast (avocet and bittern); Broadland (bittern); Benacre to Easton Bavents (bittern); Minsmere-Walberswick (avocet and bittern); Alde-Ore Estuary (avocet); Foulness (avocet) and Medway Estuary and Marshes (avocet); The Swale (avocet).

A3a.6.6.4 Key areas for wintering and migratory waterbirds

The Regional Sea 2 coast is one of the most important in the UK for wintering and passage waterbirds, particularly wildfowl species. The area is of importance for migrant waterfowl in spring and autumn, as it lies on the principal migratory flyway of the east Atlantic. Many birds pass through and stop here as they move to and from wintering areas on the African, Mediterranean and south-west European coasts to northern and Arctic breeding grounds.

At peak numbers in mid-winter, the region is estimated to hold at least one quarter of the English total of wintering wildfowl (Stroud & Craddock 1995, May & Law 1998). The importance of the area to these wintering and migratory birds may increase during periods of severe cold when there may be influxes of birds to the region.

Four of the top six principal sites monitored by the Wetland Bird Survey WeBS are on the Regional Sea 2 coastline: the Wash; North Norfolk Coast; Humber Estuary and Thames Estuary (Musgrove *et al*. 2007). These (and other areas) are of international importance for individual wintering species, particularly some geese and wader species (see Table A3a.6.14). The average number of birds recorded in the Wash from data collected

2001/2002 to 2005/06, exceeded 356,000, the next most important site being the Ribble Estuary (average 236,211 birds) in Regional Sea 6.

Table A3a.6.14 – Important sites for non-breeding waterbirds in Regional Sea 2

Site	Average number[1]	Species[2]
The Wash	356,451	**Pink footed goose, dark-bellied Brent goose, shelduck, pintail, oystercatcher, ringed plover, golden plover, grey plover, lapwing, knot, sanderling, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank**, wigeon, teal, eider, cormorant, avocet, greenshank, lesser black-backed gull, great black-backed gull, mallard
North Norfolk Coast	232,872	**Pink footed goose, dark bellied Brent goose, wigeon, pintail, ringed plover, knot, black-tailed godwit, bar-tailed godwit**, European white-fronted goose, gadwall, teal, shoveler, common scoter, red-breasted merganser, red-necked grebe, cormorant, oystercatcher, avocet, golden plover, grey plover, sanderling, ruff, curlew, redshank, greenshank, turnstone, great black-backed gull, Sandwich tern
Humber Estuary	177,322	**Pink-footed goose, dark-bellied Brent goose, shelduck, ringed plover, golden plover, grey plover, lapwing, knot, dunlin, black-tailed godwit, bar-tailed godwit, redshank**, teal, goldeneye, oystercatcher, avocet, ringed plover, grey plover, sanderling, ruff, curlew, turnstone, common gull, great black-backed gull, mallard.
Thames Estuary	175,254	**Dark-bellied Brent goose, teal, shoveler, oystercatcher, avocet, ringed plover, grey plover, knot, dunlin, black-tailed godwit, bar-tailed godwit, redshank**, European white-fronted goose, shelduck, wigeon, gadwall, tufted duck, red-throated diver, little grebe, cormorant, golden plover, sanderling, ruff, curlew, greenshank, lesser black-backed gull, herring gull, great black-backed gull
Breydon Water/Berney Marshes	106,431	**Bewick's Swan, pink-footed goose, wigeon, shoveler, avocet, golden plover, lapwing, black-tailed godwit**, teal, pintail, dunlin, ruff, redshank
Swale Estuary	82,846	**Wigeon, teal, pintail, ringed plover, golden plover, black-tailed godwit**, dark-bellied Brent goose, shelduck, shoveler, great-crested grebe, oystercatcher, avocet, grey plover, knot, ruff, redshank
Blackwater Estuary	70,054	**Dark-bellied Brent goose, golden plover, grey plover, knot, dunlin, black-tailed godwit, redshank**, shelduck, wigeon, teal, pintail, Slavonian grebe, cormorant, avocet, ruff, greenshank
Stour Estuary	48,214	**Ringed plover grey plover, knot, black-tailed godwit**, dark-bellied Brent goose, shelduck, pintail, avocet, grey plover, dunlin, redshank, turnstone
Dengie Flats	58,302	**Grey plover, knot, bar-tailed godwit**, dark-bellied Brent goose, oystercatcher, golden plover, dunlin
Hamford Water	43,465	**Dark-bellied Brent goose, ringed plover, grey plover**, shelduck, little grebe, avocet, golden plover, grey plover, knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, redshank
Alde Complex	34,369	**Avocet, black-tailed godwit**, wigeon, gadwall, teal, shoveler, cormorant, black-tailed godwit, redshank, lesser black-backed gull
Abberton Reservoir	50,286	**Mute swan, shoveler, pochard**, bean goose, gadwall, teal, tufted duck, golden eye, smew, coot, ruff,
Medway Estuary	30,871	**Pintail, avocet, black-tailed godwit**, shelduck, shoveler, cormorant, ringed plover, grey plover, knot, curlew, redshank, greenshank,

Site	Average number[1]	Species[2]
Crouch-Roach Estuary	29,553	**Dark-bellied Brent goose, redshank**, shelduck, pintail, avocet, golden plover, ruff,
Colne Estuary	19,102	**Dark-bellied Brent goose**, shelduck, cormorant, avocet, grey plover, black-tailed godwit, redshank,
Dungeness Gravel Pits	12,626	**Shoveler**, cormorant, ruff, great black-backed gull
Hornsea Mere	7,044	**Mute swan**, gadwall, pochard, tufted duck, goldeneye,

Notes: [1]Average number is taken from data collected between 2001/02 to 2005/06, [2]Species occurring in internationally important numbers are shown in bold
Source: Austin et al. (2008)

Several other areas in the Region are designated as SPAs and support internationally important assemblages (>20,000 birds) of waterbirds outside the breeding season (information from JNCC website, SPA information): Gibraltar point (the Wash) – 22,137 individuals; Foulness (Thames Estuary) – 107,468 individuals; Benfleet and Southend Marshes (Thames Estuary) – 34,789 individuals.

Surveys, conducted as part of the co-ordinated survey of Offshore Windfarm Strategic Areas and potential SPA sites (see for e.g. WWT Consulting 2007, WWT Consulting 2008) found high numbers of divers (red-throated, black-throated, great northern and those not identified to species) during much of the winter months in the Thames area. This group were generally found widely distributed, with highest densities at estuarine mouths and in inshore areas. The survey carried out in 2007 estimated in excess of 3,000 red-throated diver off the east coast (i.e. Greater Wash and Thames combined, with most birds occurring in the Thames) (WWT Consulting 2008). Winter maxima for red-throated divers in the Thames area during the 2002/03 to 2005/06 surveys were 11,100, 7,700, 5,600 and 8,000 (Webb et al. 2005, Department of Trade and Industry 2006, WWT Consulting 2007). The extent of the survey area was extended during the 2005/06 survey to specifically investigate the limits of diver distribution further offshore. In both 2005/06 and 2007 small numbers were recorded in the outer limits of the survey areas (off Suffolk, Kent and Norfolk), however the large increase in numbers extending well offshore in the northeast of the area, was only observed in 2007.

Table A3a.6.15 provides a summary of waterbird distribution throughout the year.

Table A3a.6.15 – General waterbird distribution and abundance in Regional Sea 2

Month	Distribution and abundance
January	Severity of the weather will influence the movement westward of some bird species from the Wadden Sea. In mild winters, more birds will remain on the eastern side of the North Sea. In years with severe weather, large scale movements of great crested grebes, shelduck, scaup and red-breasted merganser to sites along the English coast have been recorded. The Thames area is important for diver species and peak counts of shelduck occur on the Thames estuary complex and the Wash. Goldeneye are present in large numbers at Blackwater, the Colne and the Wash.
February	Southern English sites such as the Wash, the north Kent marshes, Medway, Blackwater, Hamford Water and Stour continue to support large numbers of shelduck. These and other sites along this coast also remain important for flocks of waders, including grey plover and redshank.
March	Beginning of return to breeding grounds for some species that have wintered in the UK. Numbers start declining at British sites, however numbers are still high, particularly at sites such as Medway, Swale, Dengie, Hamford Water and Blackwater.

Month	Distribution and abundance
	Large numbers of shelduck also still present at the Wash, Stour and Blackwater.
April	Birds with breeding sites outwith the UK, continue to leave their wintering grounds along the British coast. Although absolute numbers on British estuaries are declining during this period, birds on passage will continue to use these sites. Sites such as the Wash and the Humber remain important for species such as dark-bellied Brent goose, dunlin, knot and curlew, and the Wash continues to support important numbers of shelduck. Concentrations of common scoter are found off the Kent coast.
May	Peak of migration to breeding grounds for several species such as ringed plover, grey plover, knot, sanderling, dunlin, bar-tailed godwit and turnstone. The Wash and the Humber continue to support important numbers of birds, including dark-bellied Brent geese and dunlin.
June	Peak of breeding season for species which breed in the UK. Migrant birds that winter in the UK and passage birds have all returned to their breeding grounds, with eider being the only seaduck which breeds in any significant numbers. Strongholds for this species are further north, in Scotland and also the Wadden Sea.
July	Large numbers of waders, including grey plover, knot, sanderling, bar-tailed godwit, curlew and redshank move to sites along this coast including the Wash, Blackwater and Stour estuaries. Shelduck moult during this month, peak numbers occur in the Helgoland Bight (east of the Wadden Sea), with smaller concentrations found in the Humber and the Wash. Relatively small flocks of moulting common scoter also found in the outer Thames estuary.
August	Start of the main influx of wading birds and ducks to the North Sea, in areas such as The Wash and the estuarine systems further south along the coast, e.g. Blackwater, Dengie, Stour and The Medway, with many sites supporting important numbers of birds including black-tailed godwit, grey plover and redshank.
September	Peak month for estuary usage. Large numbers of waders and ducks at estuaries, such as the Wash and the Humber, including grey plover, dunlin, knot, sanderling, curlew, redshank and shelduck.
October	Areas including the Wash and the Humber remain important for oystercatcher, grey plover, sanderling, dunlin, knot and redshank and the Thames estuary complex also supports large numbers of ringed plover, grey plover and redshank.
November	Some birds, including knot and sanderling move west from the Wadden Sea to sites on the east coast of England, such as the Humber and the Wash. Other sites remain important, supporting similar numbers and species to that seen in October. Shelduck moult has been completed and large flocks move from sites in the Wadden Sea to areas on the Wash and further north at Teesmouth. The Wash and Colne also support large influxes of goldeneye and pink-footed goose return to North Norfolk area.
December	More estuaries on this coast become important for shelduck as numbers increase: Medway, Blackwater, Colne and Hamford. The Wash remains one of the most important estuaries in the western North Sea for wading birds.

Source: Tasker & Pienkowski (1987), Skov et al. (1995)

Eider, long-tailed duck, common and velvet scoter, goldeneye and red-breasted merganser are coastal species, occasionally recorded offshore in the southern North Sea.

The area is important for some species which only winter at a few sites in Britain. The bean goose, is no longer a common wintering species in the UK, is now only regularly found wintering at two sites: the Yare Valley in Norfolk (part of the Broadland SPA) and a site in central Scotland (JNCC website). The main UK wintering areas for dark-bellied Brent geese are in England, with important concentrations found around the Wash, along the Norfolk, Essex and north Kent coasts. The international importance of the region as a wintering ground for this species is reflected in the number of SPAs that have it listed under Article 4.1 of the Birds Directive (site qualifies by supporting populations of that species which are of European importance).

A3a.6.7 Features of Regional Sea 3

This region encompasses the eastern Channel, approximately between Deal in the east to Weymouth. Suitable habitat for nesting seabirds is limited. There are some estuarine and soft coastal areas notable for breeding, wintering and passage waterbirds.

A3a.6.7.1 Seabird species, abundance and distribution

Of the seabird species currently known to breed in the UK, thirteen do not breed along the Eastern Channel coastline (Mitchell *et al*. 2004). The remaining twelve species breed throughout the area in varying numbers (Table A3a.6.16).

Table A3a.6.16 – Breeding seabird species in Regional Sea 3

Species	Total[1]	Species	Total[1]
Isle of Wight			
Great cormorant	90 (AON)	Herring gull	244 (AON)
Shag	4 (AON)	Great black-backed gull	10 (AON)
Mediterranean gull	6 (AON)	Common tern	9 (AON)
Black-headed gull	2 (AON)	Guillemot	337 (I)
Lesser black-backed gull	1 (AON)		
West Sussex			
Black-headed gull	31 (AON)	Common tern	1 (AON)
Lesser black-backed gull	36 (AON)	Little tern	1 (AON)
Herring gull	684 (AON)		
East Sussex			
Great cormorant	2 (AON)	Herring gull	1,459 (AON)
Mediterranean gull	6 (AON)	Kittiwake	1,002 (AON)
Black-headed gull	33 (AON)	Little tern	11 (AON)
Lesser black-backed gull	38 (AON)		
Hampshire			
Black-headed gull	9,304 (AON)	Common tern	311 (AON)
Great black-backed gull	2 (AON)	Little tern	151 (AON)
Sandwich tern	356 (AON)		
Kent			
Common gull	11 (AON)	Sandwich tern	333 (AON)
Lesser black-backed gull	75 (AON)	Common tern	333 (AON)
Herring gull	770 (AON)	Little tern	38 (AON)
Kittiwake	1,229 (AON)		
Greater London			
Lesser black-backed gull	195 (AON)	Common tern	40 (AON)
Herring gull	76 (AON)		

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1]Data from Seabird 2000.
Source: Mitchell et al. (2004), JNCC website

Overall, this region is of relatively less importance for breeding seabirds than elsewhere in the UK; with the exception of the Mediterranean gull, which although colonising other parts of England, appears to be maintaining a small central breeding presence along the south coast. The most notable breeding sites along this coast are described in Table A3a.6.17, however although some of these sites are listed as SPAs and have breeding seabirds listed as qualifying features, none of these sites have been designated as supporting Seabird Assemblages of International Importance.

Table A3a.6.17 – Summary of important breeding seabird colonies along the coast of the Regional sea 3 area

Sites	Species + Total
Poole Harbour	Common tern (155 P), Mediterranean gull (5 P)
Solent and Southampton Water	Common tern (267 P), little tern (49 P), Mediterranean gull (2 P), roseate tern (2 P), Sandwich tern (231 P)
Chichester and Langstone Harbours	Little tern (100 P), Sandwich tern (158 P), common tern (33 P)
Pagham Harbour	Little tern (12 P)
Dungeness to Pett Level	Common tern (266 P), little tern (35 P), Mediterranean gull (>2 P)

Notes: P: Pairs Source: JNCC website and Mitchell et al. (2004).

A3a.6.7.2 Seabird distribution at sea

Seabird numbers in coastal waters off this stretch of coastline are generally low, with most breeding seabird species from the region feeding in estuaries, on exposed intertidal areas or in other shallow, inshore waters (Tasker 1998).

Between November and February, fulmar are widely distributed throughout the eastern Channel and a similar distribution continues through to July and the species only appears to be absent between August and October. Gannets move from the North Sea to the Channel in winter, and although widely distributed throughout its range, there are several distinct concentrations one of which is the Channel. Gannets are also distributed throughout the Channel between May and August, probably associated with the breeding colonies on the Channel Islands. In winter, the Channel supports good numbers of common gull.

After the breeding season, lesser black-backed gulls in the Channel are likely to be from the Channel Island colonies, while some 15,000 birds, manly likely to be from outwith the region, can winter in the area (Skov *et al*. 1995). Herring gulls are widely distributed throughout the Channel between November and February with distribution becoming more concentrated in the eastern Channel between May and October. During winter, great black-backed gulls are widely distributed throughout the Channel with distribution concentrating in the eastern and western areas between August and October. Kittiwakes are also widely distributed in low numbers in the Channel throughout the year (Barton & Pollock 2007).

In winter guillemots are widely distributed in low numbers, with distribution concentrated in the eastern Channel between March and April. Razorbills are present in low numbers in the Dover Strait and the eastern Channel in winter and appear to be scarce or absent during the remainder of the year (Skov *et al*. 1995).

A3a.6.7.3 Breeding waterbirds

Regional Sea 3 coastal habitats suitable for waterbird breeding includes estuaries, wet grassland, shingle/sand beaches and chalk cliff, and there are several notable breeding assemblages. The occurrence of wet grassland habitat has decreased over the last 100 years.

Pagham Harbour supports high densities of grassland breeding waders, with the area supporting important populations of garganey, shoveler, gadwall and lapwing. Important numbers of breeding garganey and shoveler are also found on Pett Levels, while the Rye

and Chichester harbour areas support populations of breeding ringed plover and oystercatcher. Chichester Harbour also provides important breeding areas for shelduck.

Further along the coast towards the western Channel, important sites for breeding birds include: Poole Harbour; Southampton Water; Beaulieu Estuary; Langstone Harbour; Newton Estuary and Solent Marshes, all of which support notable populations of breeding redshank, lapwing, snipe and oystercatcher. The highest densities of breeding waders can be found on Newtown and Beaulieu Estuary.

Abbotsbury supports colonially breeding mute swans, a species that is highly territorial and which only nests colonially under unusual circumstances (e.g. superabundant food supply, coupled with limited nesting sites) (Bacon & Anderson-Harild 2008). The Solent/Isle of Wight area is a stronghold for ringed plover in the region and this species also nests along the coast including at Chesil Beach.

A3a.6.7.4 Key areas for wintering and migratory waterbirds

The stretch of coast between Rye Bay and Chichester is characterised by chalk cliffs and shingle beaches with a few small estuarine areas. Further west between Hayling and Lyme Regis, much of the coastline is either soft coast or estuarine and important for wintering and passage birds. Table A3a.6.18 summarises the most important areas and species.

Estuarine shores attract species including dark-bellied Brent goose, dunlin, grey plover and bar-tailed godwit. Dunlin roost on shingle beaches and saltmarshes and golden plover knot, sanderling, and purple sandpiper can be found on sand and shingle beaches and chalk cliffs.

Table A3a.6.18 – Important sites for non-breeding waterbirds in Regional Sea 3 (in decreasing size order of number of birds they contain)

Site	Average number[1]	Species[2]
Chichester Harbour	44,726	**Dark-bellied Brent goose, dunlin, black-tailed godwit**, shelduck, red-breasted merganser, little grebe, golden plover, grey plover, bar-tailed godwit, curlew, greenshank, redshank, little egret
Langstone Harbour	39,173	**Dark-bellied Brent goose, dunlin, black-tailed godwit**, red-breasted merganser, curlew, little egret, bar-tailed godwit, dunlin, grey plover, redshank
Poole Harbour	22,166	**Avocet, black-tailed godwit**, dark-bellied Brent goose, shelduck, teal, pintail, red-breasted merganser, little grebe, cormorant, dunlin, curlew, greenshank, little egret
Pagham Harbour	18,344	**Dark-bellied Brent goose, pintail, black-tailed godwit**, little grebe, cormorant, grey plover, greenshank, ruff, pintail
Fleet and Wey	15,889	**Mute swan**, dark-bellied Brent goose, wigeon, pintail, pochard, red-breasted merganser
Portsmouth Harbour	14,518	**Dark-bellied Brent goose**, black-tailed godwit
Southampton Water	14,247	Dark-bellied Brent goose, black-tailed godwit, greenshank, ringed plover, teal
North West Solent	13,810	Dark-bellied Brent goose, pintail, greenshank, black-tailed godwit
Walland Marsh	12,661	Bewick's swan, bean goose, European white-fronted goose, golden plover, ruff
Dungeness Gravel Pits	12,323	Gadwall, shoveler, pochard, smew, cormorant, greenshank
Arun Valley	12,087	Wigeon, teal, pintail, shoveler,

Site	Average number[1]	Species[2]
Rye Harbour and Pett Leval	11,529	Shoveler, smew, little grebe, cormorant, greenshank
Beaulieu Estuary	10,258	Dark-bellied Brent goose, black-tailed godwit, greenshank,
R. Avon: Ringw'd-Christchurch	9,507	**Black-tailed godwit**, teal, pintail,
R.Avon: Fordinbr'-Ringwood	6,607	**Gadwall, black-tailed godwit**, shoveler

*Notes: [1]Average number is taken from the WeBS annual report and data collected between 2001/02 to 2005/06. For JNCC SPA sites only, no average number is available [2] Species occurring in internationally important numbers are shown in **bold**. [3]Sites designated as Wetland Assemblages of International Importance shown in bold (qualifying level is 20,000 birds).*
Source: Austin et al. (2008), JNCC website

The region is important for wintering populations of black-tailed godwit and dark-bellied Brent goose, which are recorded in internationally important numbers from at least six and four of the sites listed above respectively. The whole coastline is important during spring and autumn migration as it lies on the principal migratory flyway of the east Atlantic and is used by birds moving to and from wintering grounds on African, Mediterranean and south-west European coasts and to Arctic breeding grounds.

Both Chichester and Pagham Harbours support significant numbers of waterbirds on spring and autumn passage, notably spotted redshank and greenshank. This area is also used by dunlin for moulting during autumn passage. Pett Levels are important for wintering birds including shoveler, lapwing and Bewick's swan.

Further west Poole Harbour, Chesil Beach and the Fleet, Portsmouth Harbour and The Solent and Southampton Water are all individually and collectively important for wintering waterbirds. Areas of saltmarsh or other grassland in close proximity to intertidal areas are attractive to species including godwit, lapwing, curlew, grey plover and golden plover as they provide feeding as well as secure roosting sites. The brackish waters of the Fleet lagoon support pochard, and coot, little grebe, shoveler, wigeon and the largest wintering concentration of mute swan in Britain (Stroud & Craddock 1996, May & Law 1998).

A3a.6.8 Features of Regional Seas 4 & 5

Regional Sea areas 4 and 5 include the Western Channel and Celtic Sea (4) and the Atlantic South West Approaches (5). Regional Sea 4 extends along the south east English coast and encompasses Devon, Cornwall, Somerset and Gloucestershire and the south Wales coast around to St Govan's Head, while Regional Sea 5 is entirely open sea (oceanic).

A3a.6.8.1 Seabird species, abundance and distribution

The region is close to the southern limit of the breeding ranges of several species and 17 species are listed as breeding in Regional Sea 4 (Table A3a.6.19).

Table A3a.6.19 – Breeding seabird species in Regional Sea 4

Species	Total[1]	Species	Total[1]
Mid-Glamorgan			
Herring gull	3 (AON)		
South Glamorgan			
Fulmar	31 (AOS)	Herring gull	294 (AON)

Species	Total[1]	Species	Total[1]
Lesser black-backed gull	3,381 (AON)	Great black-backed gull	2 (AON)
West Glamorgan			
Fulmar	18 (AOS)	Kittiwake	225 (AON)
Shag	1 (AON)	Guillemot	190 (I)
Lesser black-backed gull	94 (AON)	Razorbill	60 (I)
Herring gull	519 (AON)	Puffin	2 (AOB)
Gloucestershire			
Lesser black-backed gull	2,224 (AON)	Common tern	12 (AON)
Herring gull	85 (AON)		
Avon			
Great cormorant	72 (AON)	Herring gull	1,164 (AON)
Lesser black-backed gull	768 (AON)	Great black-backed gull	18 (AON)
Somerset			
Fulmar	10 (AOS)	Herring gull	286 (AON)
Lesser black-backed gull	64 (AON)	Great black-backed gull	1 (AON)
Devon			
Fulmar	471 (AOS)	Great black-backed gull	166 (AON)
Manx shearwater	166 (AOS)	Kittiwake	1,204 (AON)
Great cormorant	181 (AON)	Guillemot	3,926 (I)
Shag	260 (AON)	Razorbill	1,137 (I)
Lesser black-backed gull	426 (AON)	Puffin	13 (AOB)
Herring gull	4,035 (AON)		
Cornwall			
Fulmar	1,692 (AOS)	Great black-backed gull	322 (AON)
Great cormorant	199 (AON)	Kittiwake	1,853 (AON)
Shag	1,109 (AON)	Guillemot	1,426 (I)
Lesser black-backed gull	39 (AON)	Razorbill	465 (I)
Herring gull	4,940 (AON)	Puffin	33 (AOB)
Dorset			
Fulmar	94 (AOS)	Kittiwake	115 (AON)
Great cormorant	150 (AON)	Sandwich tern	31 (AON)
Shag	67 (AON)	Common tern	262 (AON)
Mediterranean gull	5 (AON)	Little tern	81 (AON)
Black-headed gull	1,801 (AON)	Guillemot	954 (I)
Lesser black-backed gull	10 (AON)	Razorbill	41 (I)
Herring gull	606 (AON)	Puffin	26 (AOB)
Great black-backed gull	74 (AON)		
Isles of Scilly			
Fulmar	180 (AOS)	Herring gull	900 (AON)
Manx shearwater	201 (AOS)	Kittiwake	281 (AON)
European storm-petrel	1,475 (AOS)	Common tern	96 (AON)
Great cormorant	56 (AON)	Guillemot	196 (I)
Shag	1,092 (AON)	Razorbill	261 (I)
Lesser black-backed gull	3,603 (AON)	Puffin	121 (AOB)

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1] Data from Seabird 2000.
Source: Mitchell et al. (2004), JNCC website

The relative unimportance of the area for breeding seabirds is represented by the limited number of sites designated for either the individual species or seabird assemblages they support (see Table A3a.6.20).

Table A3a.6.20 – Summary of important breeding seabird colonies along the coast of Regional Sea 4

Sites	Species + Total
Isles of Scilly	Storm petrel (1,475 AOS), lesser black backed gull (3,603 AON)
Chesil Beach and The Fleet	Little tern (55 P)

*Notes: Sites designated as Seabird Assemblages of International Importance are shown in **bold** (Qualifying level is 20,000 birds). P: Pairs, AON: Apparently Occupied Nests.*
Source: JNCC website and Mitchell et al. (2004).

The Isles of Scilly form an archipelago of over 200 islands and rocks. They lie some 45km south west of Land's End and experience low levels of disturbance and predation, making them suitable for nesting seabirds.

Lundy island in the Bristol Channel although not designated as an SPA (it is an SAC) is important for its breeding seabird populations, particularly Manx shearwater. Surveys have shown that the population of this species has declined on the island as a result of predation by rats. The island has both brown and black rats which predate the eggs and chicks of ground and burrow nesting birds. An eradication programme under the auspices of the Lundy Seabird Recovery Group took place between January 2003 and March 2004 (Appleton *et al*. 2006) and an RSPB survey in 2008 showed the populations of several bird species have increased, including Manx shearwaters, guillemots, razorbills and puffins.

A3a.6.8.2 Seabird distribution at sea

The numbers of birds at sea are generally low compared to waters further to the north. The greatest concentrations of birds at sea generally occur outside the breeding period when gannets and gulls are more common offshore and there is immigration by guillemots and razorbills to offshore waters in winter (Barton & Pollock 2007).

In the breeding season the largest concentrations of birds occur around the Castlemartin coast as birds remain relatively near the Skomer and Skokholm colonies and waters in the far west of the region are used by relatively high numbers of Manx shearwater and gannet.

With the exception of August and October, low numbers of fulmar are present in the western Channel. Relatively high numbers of gannet are concentrated just off the Plymouth coast between November and February, with low numbers present throughout the rest of the western Channel and also between May and August. Small numbers of great skua are found off the Plymouth coast between November and March but are absent from the area during the rest of the year. Lesser black-backed gulls are present in low numbers throughout the western Channel between November to February. The species may also be present in low numbers between May and June, but their distribution is not as widespread in the Channel as previously (Skov *et al*. 1995).

Moderate numbers of herring gull are found off Bigbury Bay between November and February, with low numbers found throughout the Channel during this time. Great black-backed gull are widespread, in low numbers, throughout the western Channel between November and February, while between August and October this species is concentrated in the western Channel. Kittiwake are present throughout the whole Channel in all months of the year.

Guillemots are present in the Channel in low numbers between November and February, and May and June. Razorbill, which can often be associated with guillemot, are present off

the coast of Plymouth in low numbers between December and February and are relatively absent from the area for the remainder of the year (Skov *et al*. 1995). However, data from aerial surveys indicates that during the mid-winter period, at least, there are potentially substantial numbers of auks to the west of Bude Bay near Plymouth and increasing in early spring off north Cornwall.

The Balearic shearwater breeds in the Balearic Islands and the south coast of France, before migrating and traditionally, gathering to moult in late summer in northern and central parts of the Bay of Biscay. Over the last 10 years, this moulting population has shifted northwards, with large numbers now recorded, principally between July and October, in the western English Channel, with Portland Bill in Dorset being a prime site. Birds are also seen off the Cornwall, Devon and west Wales coast.

A3a.6.8.3 Breeding waterbirds

The nature of the western Channel coast means there is limited grassland and saltmarsh and the diversity and numbers of breeding waterbirds are relatively low. There are a few key areas that support important numbers of birds: the Exminster and Bowling Green Marshes, at the head of the Exe Estuary, support breeding redshank and lapwing. The Exe and Tamar estuaries support important numbers of shelduck.

The Severn Estuary comprises extensive areas of saltmarsh and associated wet grassland, large expanses of intertidal sand and mud flats, vegetated sand dune systems and reed beds. The Severn is important for breeding shelduck and this and other areas including the Somerset and Gwent Levels support breeding waterbirds, including snipe, teal, lapwing, redshank and pintail. The region along the south west of England is also one of the most southerly regions with breeding eider.

The Isles of Scilly, which are mainly important for their breeding seabirds also support breeding shelduck, mallard, oystercatcher and ringed plover.

A3a.6.8.4 Key areas for wintering and migratory waterbirds

The main areas of estuarine areas and other sheltered habitats within Regional Sea 4, and the species they support, are described in Table A3a.6.21.

Table A3a.6.21 – Important sites for non-breeding waterbirds in Regional Sea 4 (in decreasing size order of number of birds they contain)

Site	Average number[1]	Species[2]
Somerset Levels	96,733	**Mute swan, wigeon, gadwall, teal, shoveler, lapwing**, bean goose, golden plover, ruff, Bewick's swan
Severn Estuary	68,769	**Mute swan, Bewick's swan, bar-tailed godwit, shelduck, pintail, shoveler, ringed plover, dunlin**, pochard, golden plover, ruff, black-tailed godwit, curlew, greenshank, redshank
Carmarthen Bay	46,150	**Curlew, sanderling**, oystercatcher, golden plover, black-tailed godwit, greenshank
Burry Inlet	45,933	**Pintail, oystercatcher, knot, black-tailed godwit**, dark-bellied Brent goose, shoveler, dunlin, curlew, greenshank
Cleddau Estuary	23,188	Wigeon, teal, golden plover, greenshank
Exe Estuary	19,982	**Black-tailed godwit**, dark-bellied Brent goose, avocet, greenshank, Slavonian grebe
Taw-Torridge	13,789	**Golden plover**, greenshank

Site	Average number[1]	Species[2]
Estuary		
Chew Valley Lake	9,864	**Shoveler**, gadwall, pochard, little grebe, great crested grebe, coot,
Castlemartin Coast	-	Chough (24 P)
Tamar Estuaries Complex	-	Little egret (72 I, on passage, 42 I over winter), avocet (201 I)
Chesil Beach and The Fleet	-	Dark-bellied Brent goose (3,182 I)

*Notes: 1 Average number is taken from the WeBS annual report and data collected between 2001/02 to 2005/06. For JNCC SPA sites only, no average number is available 2. Species occurring in internationally important numbers are shown in bold. 3 Sites designated as Wetland Assemblages of International Importance shown in **bold** (qualifying level is 20,000 birds). P: Pairs, I: Individuals*
Source: Austin et al. (2008), JNCC website

As with breeding waterbirds, one of the most important areas for wintering waterbirds is the Severn Estuary, which supports internationally important numbers of mute swan, Bewick's swan, bar-tailed godwit, shelduck, pintail, shoveler, ringed plover and dunlin. It also supports nationally important numbers of eight other species, as well as being the most important area in the UK for the European White-fronted goose. There are three other areas in this region with Wetland Assemblages of International Importance.

A3a.6.9 Features of Regional Sea 6

Regional Sea 6 runs the length of the Irish Sea and encompasses several important seabird breeding colonies, most notably those on offshore islands and estuarine systems.

A3a.6.9.1 Seabird species, abundance and distribution

An estimated 487,000 pairs of 25 seabird species breed in the Irish Sea area, 4% of which breed in Northern Ireland. Of these, over 80% are made up of just five species: Manx shearwater; gannet; lesser black-backed gull; guillemot and herring gull (Barton & Pollock 2005). It is thought that up to 60% of the British population of Manx shearwater breed in the region (Barton & Pollock 2005) and significant proportions of both lesser black-backed gull and gannet also occur here, with the two large gannetries at Ailsa Craig and Grassholm present in the region. Table A3a.6.22 summarises key breeding areas and species.

Table A3a.6.22 – Breeding seabird species in Regional Sea 6

Species	Total[1]	Species	Total[1]
Argyll & Bute			
Fulmar	8,467 (AOS)	Herring gull	15,370 (AON)
Manx shearwater	1,483 (AOS)	Great black-backed gull	1,736 (AON)
Storm petrel	5,248 (AOS)	Kittiwake	8,976 (AON)
Cormorant	231 (AON)	Common tern	1,362 (AON)
Shag	3,341 (AON)	Arctic tern	1,823 (AON)
Arctic skua	21 (AOT)	Little tern	126 (AON)
Great skua	3 (AOT)	Guillemot	42,697 (I)
Black-headed gull	679 (AON)	Razorbill	9,056 (I)
Common gull	2,683 (AON)	Black guillemot	3,046 (I)
Lesser black-backed gull	3,235 (AON)	Puffin	2,597 (AOB)
Dumbarton			
Black-headed gull	5 (AON)	Herring gull	30 (AON)
Common gull	50 (AON)	Great black-backed gull	3 (AON)

Species	Total[1]	Species	Total[1]
Lesser black-backed gull	143 (AON)	Common tern	16 (AON)
Inverclyde			
Common gull Lesser black-backed gull Herring gull	25 (AON) 190 (AON) 102 (AON)	Great black-backed gull Black guillemot	18 (AON) 84 (I)
Clydebank			
Common gull	1 (AON)	Lesser black-backed gull	30 (AON)
City of Glasgow			
Lesser black-backed gull	209 (AON)	Herring gull	7 (AON)
Renfrew			
Black-headed gull Lesser black-backed gull	250 (AON) 340 (AON)	Herring gull	1 (AON)
Cunninghame			
Fulmar Great cormorant Shag Black-headed gull Common gull Lesser black-backed gull	237 (AOS) 51 (AON) 109 (AON) 50 (AON) 330 (AON) 4,588 (AON)	Herring gull Great black-backed gull Common tern Arctic tern Black guillemot	2,561 (AON) 133 (AON) 12 (AON) 7 (AON) 98 (I)
Kyle & Carrick			
Fulmar Gannet Great cormorant Shag Black-headed gull Common gull Lesser black-backed gull Herring gull	465 (AOS) 35,825 (AOS/AON)[1] 307 (AON) 476 (AON) 13 (AON) 2 (AON) 1,721 (AON) 3,615 (AON)	Great black-backed gull Kittiwake Common tern Arctic tern Guillemot Razorbill Black guillemot Puffin	298 (AON) 1,675 (AON) 1 (AON) 2 (AON) 9,415 (I) 1,477 (AON) 302 (I) 20 (AOB)
Nithsdale			
Black-headed gull Lesser black-backed gull	40 (AON) 2 (AON)	Herring gull	11 (AON)
Wigtown			
Fulmar Gannet Great cormorant Shag Black-headed gull Common gull Lesser black-backed gull Herring gull	147 (AOS) 1,670 (AOS/AON) 389 (AON) 55 (AON) 52 (AON) 5 (AON) 10 (AON) 487 (AON)	Great black-backed gull Kittiwake Sandwich tern Common tern Arctic tern Guillemot Razorbill Black guillemot	7 (AON) 374 (AON) 70 (AON) 55 (AON) 5 (AON) 3,931 (I) 421 (AON) 174 (I)
Stewartry			
Fulmar Great cormorant Shag Black-headed gull Common gull Lesser black-backed gull Herring gull	84 (AOS) 313 (AON) 3 (AON) 26 (AON) 14 (AON) 1,025 (AON) 748 (AON)	Great black-backed gull Kittiwake Common tern Guillemot Razorbill Puffin	7 (AON) 7 (AON) 6 (AON) 335 (I) 111 (AON) 4 (AOB)
Lancashire			
Mediterranean gull Lesser black-backed gull Herring gull	3 (AON) 4,167 (AON) 939 (AON)	Great black-backed gull Kittiwake Common tern Arctic tern	9 (AON) 22 (AON)[4] 103 (AON) 2 (AON)
Cumbria			

Species	Total[1]	Species	Total[1]
Fulmar	65 (AOS)	Common tern	71 (AON)
Great cormorant	80 (AON)	Little tern	42 (AON)
Lesser black-backed gull	22,772 (AON	Guillemot	6,450 (I)
Herring gull	19,541 (AON)	Razorbill	312 (I)
Great black-backed gull	51 (AON)	Black guillemot	7 (I)
Kittiwake	1,269 (AON)	Puffin	9 (AOB)
Sandwich tern	340 (AON)		
Merseyside			
Lesser black-backed gull	51 (AON)	Common tern	157 (AON)
Herring gull	59 (AON)		
Clwyd			
Fulmar	46 (AOS)	Common tern	490 (AON)
Lesser black-backed gull	27 (AON)	Little tern	75 (AON)
Herring gull	198 (AON)		
Gwynedd			
Fulmar	509 (AOS)	Kittiwake	3,880 (AON)
Manx shearwater	16,183 (AOS)	Sandwich tern	450 (AON)
Storm petrel	35 (AOS)	Roseate tern	2 (AON)
Great cormorant	1,366 (AON)	Common tern	184 (AON)
Shag	683 (AON)	Arctic tern	1,705 (AON)
Black-headed gull	840 (AON)	Guillemot	21,859 (I)
Lesser black-backed gull	1,556 (AON)	Razorbill	2,959 (I)
Herring gull	4,424 (AON)	Black guillemot	28 (I)
Great black-backed gull	101 (AON)	Puffin	1,156 (AOB)
Dyfed			
Fulmar	2,870 (AOS)	Lesser black-backed gull	15,588 (AON)
Manx shearwater	151,950 (AOS)	Herring gull	8,424 (AON)
Storm petrel	2,770 (AOS)	Great black-backed gull	322 (AON)
Gannet	30,688 (AOS/AON)	Kittiwake	3,188 (AON)
Great cormorant	268 (AON)	Guillemot	35,912 (I)
Shag	230 (AON)	Razorbill	9,619 (I)
Black-headed gull	10 (AON)	Puffin	9,170 (AOB)
Co. Down			
Fulmar	31 (AOS)	Lesser black-backed gull	548 (AON)
Manx shearwater	4,633 (AOS)	Great black-backed gull	55 (AON)
Mediterranean gull	2 (AON)	Kittiwake	453 (AON)
Shag	20 (AON)	Sandwich tern	1,555 (AON)
Black-headed gull	2,203 (AON)	Common tern	1,068 (AON)
Common gull	276 (AON)	Arctic tern	763 (AON)
Herring gull	608 (AON)	Black guillemot	249 (I)
Co. Antrim			
Shag	281 (AON)	Roseate tern	4 (AON)
Black-headed gull	1,834 (AON)	Common tern	608 (AON)
Common gull	107 (AON)	Arctic tern	4 (AON)
Lesser black-backed gull	485 (AON)	Guillemot	98,546 (I)
Great black-backed gull	16 (AON)	Razorbill	24,084 (I)
Herring gull	101 (AON)	Black guillemot	865 (I)
Kittiwake	12,109 (AON)	Puffin	1,160 (AOB)
Sandwich tern	348 (AON)		
Isle of Man			
Fulmar	3,147 (AOS)	Great black-backed gull	405 (AON)
Manx shearwater	34 (AOS)	Kittiwake	1,045 (AON)
Great cormorant	134 (AON)	Arctic tern	8 (AON)
Shag	912 (AON)	Little tern	20 (AON)
Black-headed gull	2 (AON)	Guillemot	4,566 (I)
Common gull	6 (AON)	Razorbill	1,524 (I)

Species	Total[1]	Species	Total[1]
Lesser black-backed gull	114 (AON)	Black guillemot	602 (I)
Herring gull	7,126 (AON)	Puffin	85 (AOB)

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1] Data from Seabird 2000 [2] Morecambe Bay gas platform
Source: Mitchell et al. (2004), JNCC website

There are a number of important seabird colonies (Table A3a.6.23) where several seabird species occur in internationally important numbers and with at least 20,000 seabirds, thus qualifying as Seabird Assemblages of International Importance under the Birds Directive).

Skomer and Middleholm islands support internationally important numbers of Manx shearwater and lesser black-backed gull and nationally important numbers of guillemot and razorbill. The colony of lesser black-backed gull on Skomer was once the largest colony in Britain and Ireland while the island also supports the largest colony of guillemot, razorbill and fulmar in Wales. Skokholm has internationally important numbers of Manx shearwater and nationally important numbers of lesser black-backed gulls. Kittiwake breed on Skomer, while both islands also support storm petrel, herring gull and the main Welsh colonies of puffin.

The Grassholm gannet colony has approximately 8% of the world's population of gannets (RSPB website). The gannetry has increased rapidly over the last 100 years and although nesting space is still available on the Island, the 2004 surveys showed the population growth slowing down. The island also has nationally important numbers of razorbill. Bardsey Island supports internationally important numbers of Manx shearwater and nationally important numbers of cormorant. In 2005 radio tracking of Manx shearwater was undertaken to establish offshore feeding grounds as part of possible SPA identification.

Table A3a.6.23 – Summary of important breeding seabird colonies along the coast of Regional Sea 6

Sites	Species + Total
Ailsa Craig	Razorbill (1,000 I), lesser black-backed gull (400 AON), gannet (35,825 AOS/AON)[1]
Larne Lough (NI)	Common tern (180 P), roseate tern (6 P), Sandwich tern (165 I)
Outer Ards (NI)	Arctic tern (207 P)
Strangford Lough (NI)	Arctic tern (210 P), common tern (603 P), Sandwich tern (593 P)
Carlingford Lough (NI)	Common tern (339 P), Sandwich tern (575 P)
Duddon Estuary	Sandwich tern (210 P)
Morecambe Bay	Little tern (26 P), Sandwich tern (290 P), herring gull (11,000 P), lesser black-backed gull (22,000 P)
Ribble and Alt Estuaries	Common tern (182 P), lesser black-backed gull (1,800 P)
The Dee Estuary	Common tern (277 P), little tern (56 P)
Ynys Seiriol / Puffin Island	Cormorant (766 P)
Ynys Feurig, Cemlyn Bay and The Skerries	Arctic tern (1,290 P), common tern (189 P), roseate tern (3 P), Sandwich tern (460 P)
Glannau Aberdaron and Ynys Enlli / Aberdaron Coast and Bardsey Island	Manx shearwater (6,930 P)
Skokholm and Skomer	Storm petrel (2,560 AOS), lesser black-backed gull (12,426 AON), Manx shearwater (148,000 AOS), puffin (9,131 AOB), razorbill (3,898 I [Skomer])
Grassholm	Gannet (30,688 AOS/AON)[2]

*Notes: Sites designated as Seabird Assemblages of International Importance are shown in **bold** (Qualifying level is 20,000 birds). P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1] Not surveyed in 1998-2000, Extrapolated estimate for 1999 based on previous colony-specific trends.*
Source: JNCC website and Mitchell et al. (2004).

Ailsa Craig in the outer Firth of Clyde, is one of the biggest gannetries in the UK and cliff nesting species include fulmar, kittiwake, guillemot, razorbill and herring gull. The area is a Seabird Assemblage of International Importance as it supports some 65,000 individual seabirds during the breeding season. It remained the most successful colony in Britain in 2006, with higher than colony average number of chicks fledged (Mavor *et al*. 2008).

During the breeding season, over 61,000 individual seabirds are present at Morecombe Bay, qualifying it as a Seabird Assemblage of International Importance. St Bee's Head is the only English breeding site for black guillemot and has breeding populations of razorbill, herring gull and cormorant. The Ribble and Alt Estuaries are designated as Seabird Assemblages of International Importance, regularly supporting 30,000 individual seabirds, including black-headed gull and lesser black-backed gull and the area is also important for its breeding population of common tern. The Ribble Estuary is the larger of the two and it forms part of the chain of western SPAs that fringe the Irish Sea. During the summer, the large expanse of saltmarsh and areas of coastal grazing marsh support large concentrations of breeding birds which feed both offshore and inland.

In Northern Ireland, Strangford Lough has important numbers of Sandwich tern and cormorant, black-headed gull, common gull, lesser black-backed gull, herring gull, great black-backed gull, common and Arctic tern. Between 2005 and 2006, numbers of cormorant decreased at the Lough, as did lesser black-backed gull, however numbers of black-headed gull, herring gull, great black-backed gull, Sandwich tern, common tern, Arctic tern and common gull all increased (Mavor *et al*. 2008).

Anglesey is the main colony for Sandwich tern in the region and in 2006 a recovery was recorded at the site after a decline between 2004 and 2005, with numbers increasing to their second highest level on record (Mavor *et al*. 2008).

Larne Lough is important as a breeding and feeding area for several tern species, including common, Sandwich and roseate tern, and for breeding black-headed gull. Between 2005 and 2006, the number of breeding Sandwich tern declined by over 40%, and the number of roseate tern also declined. However, common tern numbers increased by over 52% over the same period (Mavor *et al*. 2008).

Carlingford Lough is an important breeding site for common and Sandwich terns. The Outer Ards Peninsula is a sheltered stretch of open rocky coast in Northern Ireland and the site includes the Copeland Islands, with breeding populations of European importance for a number of seabirds, including Arctic tern, the numbers of which at Big Copeland increased by nearly 70% between 2005 and 2006 (Mavor *et al*. 2008).

A3a.6.9.2 Seabird distribution at sea

Areas of the Irish Sea vary in importance over the year. Manx shearwater return to European waters in spring to breed and from May to August birds remain relatively close to their breeding colonies. In August and particularly in September, flocks in the Irish Sea Front area possibly hold the majority of the population from the adjacent breeding colonies before they leave for their wintering grounds. Different species (e.g. Manx shearwater, guillemots, and razorbills) have been observed to utilise spatially distinct areas of the Irish Sea Front, indicative of different foraging strategies (Begg & Reid 1997).

The offshore feeding areas for birds from breeding colonies are of key importance (Tasker 1995). Most auks (guillemots, puffin and razorbill) feed within 30km of the colony, while gannets and lesser black-backed gulls frequently forage near fishing fleets in and around the area (Stone *et al*. 1995). Offshore sandbanks such as Bais Bank (off St David's Head) are important for sandeels (*Ammodytes* spp), a key prey species for a number of seabirds.

Little gulls winter in the Irish Sea and concentrations are found off Liverpool. During the breeding season, Sandwich, common and Arctic terns are generally seen in waters near their colonies. Following the breeding season, a concentration of terns occurs between Holyhead and Ireland. Gannet, are present throughout the year, but are generally only in the North Channel and St George's Channel in autumn and winter (Mackey *et al*. 2005). Birds concentrate around colonies during the breeding season and following breeding, are more widely distributed throughout the Irish Sea, with concentrations found around the Irish Sea and Celtic Sea Fronts.

Other species found in the area throughout the year are cormorant and shag primarily in coastal regions off Liverpool (cormorant) and in the North Channel (shag). Herring gull are also present year round with concentrations found offshore and in coastal waters of the central Irish Sea. Kittiwakes are widely distributed over the whole of the area at relatively high densities throughout the year, with the exception of the waters to the south-west of the Lleyn Peninsula in the post breeding season and autumn (Mackey *et al*. 2005).

Highest densities of guillemot are generally observed during the breeding and post-breeding seasons. Densities decrease during autumn and winter, but they remain present in the area (Mackey *et al*. 2005). Razorbill distribution is generally less widespread than that of guillemots. Both species congregate in large concentrations post breeding, where adults moult and the young are still flightless. Concentrations of moulting auks are found throughout the Irish Sea from July through August, becoming more localized in the western and central Irish Sea during late August and September. By October and through November high densities are still present in the North Channel, with concentrations also found in the eastern Irish Sea and Cardigan Bay (Webb *et al*. 1995).

A3a.6.9.3 Breeding waterbirds

The numbers of breeding waders and other waterbirds on the west coast of Wales is relatively low compared to other parts of Britain, though the Dyfi Estuary is one of the most important areas in Wales for breeding waders, particularly breeding redshank, teal, red-breasted merganser and shelduck. The area also includes Milford Haven and the Cleddau Estuaries, both of which support breeding shelduck.

The Ribble, Morecambe Bay and the Solway Firth have species-rich breeding wader assemblages (Craddock & Stroud 1996). Large numbers of ringed plover breed in Morecambe Bay, the Solway Firth and Luce Bay. These are the main breeding concentrations of this species on the west coast of Britain outside the Western Isles (Cradock & Stroud 1996). The Inner Solway, the Ribble, Morecambe Bay and Duddon Estuary have large breeding populations of shelduck, redshank, oystercatcher, dunlin (the most southerly regularly saltmarsh breeding dunlin in Britain) and curlew. The dry grassland breeding population of shelduck in the Ribble Estuary is the most numerous in Britain. Breeding eider are also found in Morecambe Bay (the most southerly breeding population in Britain) and around Walney Island (Gibbons *et al*. 1993).

One of the main concentrations of shelduck in Scotland is in Kintyre (Gibbons *et al*. 1993), with other breeding sites including the shores of Bute, Inchmarnock and Little Cumbrae. The majority of the Scottish breeding population of red-breasted merganser are concentrated on the west coast of Scotland, while eider breed on Lady Isle (off Troon) and on Horse Isle (off Ardrossan). Little Cumbrae has large numbers of nesting ducks, predominantly eider, mallard, shelduck, teal and red-breasted merganser. There are large colonies of eider duck on Sanda, Sheep and Glunimore Islands, off the Kintyre Peninsula. A small number of red-throated diver nest on the south-west mainland of Scotland. Breeding sites along the east coast of Ireland include Lady's Island Lake and the islands within it, where great crested grebe, mallard, tufted duck, coots and moorhens nest (Hutchinson 1994).

A3a.6.9.4 Key areas for wintering and migratory waterbirds

This region contains some of the most important sites for many wintering or migratory species of waterbird in the UK: the Dyfi; Dee; Mersey; Ribble and Alt Estuaries; Morecambe Bay; Duddon Estuary; Belfast Lough; Strangford Lough, inner Firth of Clyde and the Solway Firth are individually and collectively of major international and national importance for their winter populations of waterbirds and there is considerable interchange in the movements of wintering birds between sites. The area lies on a major migratory flyway and in spring and autumn many birds utilise the region as a staging post during onward migration to wintering grounds (Rehfisch *et al* 2003). Table A3a.6.24 summarises the most important sites and the species they support.

Table A3a.6.24 – Important sites for non-breeding waterbirds in Regional Sea 6 (in decreasing size order of number of birds they contain)

Site	Average number[1]	Species[2]
Ribble Estuary	237,256	**Whooper swan, pink-footed goose, shelduck, wigeon, teal, pintail, oystercatcher, ringed plover, grey plover, lapwing, knot, sanderling, dunlin, black-tailed godwit, bar-tailed godwit redshank**, shoveler, cormorant, golden plover, ruff, curlew, greenshank
Morecambe Bay	220,910	**Pink-footed goose, shelduck, pintail, oystercatcher, knot, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank**, teal, shoveler, goldeneye, red-breasted merganser, great crested grebe, cormorant, ringed plover, golden plover, grey plover, sanderling, greenshank
Dee Estuary (England & Wales)	134,002	**Light-bellied Brent goose (Svalbard population), shelduck, pintail, oystercatcher, knot, dunlin, black-tailed godwit, redshank**, wigeon, teal, cormorant, grey plover, sanderling, ruff, grreenshank
Solway Estuary	119,555	**Whooper swan, pink-footed goose, barnacle goose (Svalbard population), shelduck, pintail, oystercatcher, ringed plover, knot, dunlin, redshank**, teal, scaup, great crested grebe, cormorant, golden plover, sanderling, ruff, black-tailed godwit, bar-tailed godwit, curlew, greenshank, turnstone
Mersey Estuary	85,801	**Shelduck, teal, dunlin, black-tailed godwit, redshank**, curlew, golden plover, ringed plover, pintail
Strangford Lough	84,055	**Mute swan, light-bellied Brent goose (Nearctic population), shelduck, knot, bar-tailed godwit, redshank**, whooper swan, wigeon, teal, mallard, pintail, shoveler, eider, goldeneye, red-breasted merganser,

Site	Average number[1]	Species[2]
		great crested grebe, grey heron, oystercatcher, ringed plover, golden plover, grey plover, lapwing, dunlin, black-tailed godwit, curlew, greenshank, turnstone
Alt Estuary	54,766	**Grey plover, knot, sanderling, bar-tailed godwit**, cormorant, dunlin,
WWT Martin Mere	35,999	**Whooper swan, pink-footed goose**, shelduck, teal, pintail
Duddon Estuary	29,581	**Pintail**, curlew, redshank, ringed plover, sanderling, knot
Inner Firth of Clyde	23,026	Red-breasted merganser, Slavonian grebe, oystercatcher, greenshank, redshank,
Traeth Lafan/Lavan Sands	21,350	Red-breasted merganser, great crested grebe, oystercatcher, curlew, greenshank, redshank
Belfast Lough	19,471	**Black-tailed godwit**, shelduck, teal, scaup, eider, goldeneye, red-breasted merganser, great crested grebe, grey heron, oystercatcher, ringed plover, dunlin, curlew, redshank, turnstone
Wigtown Bay	17,644	**Whooper swan, pink-footed goose, barnacle goose (Svalbard population)**
WWT Caerlaverock (inland)	16,600	**Whooper swan, barnacle goose (Svalbard population)**
Aber Dyfi/Dyfi Estuary	12,133	Greenshank, Canada goose, Greenland white-fronted goose
Mersehead RSPB Reserve	11,189	**Barnacle goose (Svalbard population), pintail**, teal
Outer Ards Shoreline	10,818	Eider, red-breasted merganser, oystercatcher, ringed plover, purple sandpiper, dunlin, curlew, greenshank, redshank, turnstone, golden plover
Carlingford Lough	10,202	Shelduck, teal, scaup, red-breasted merganser, great crested grebe, grey heron, oystercatcher, ringed plover, dunlin, curlew, greenshank, redshank, turnstone, light-bellied Brent goose
R. Nith: Keltonbnk-Nunholm	7,690	**Pink-footed goose, barnacle goose (Svalbard population)**, whooper swan, greenshank
Orchardton and Auchencairn Bays	4,903	**Barnacle goose (Svalbard population)**
Dee Flood Meadows	3,609	**Pintail**
Loch Ken	2,473	**Greenland white-fronted goose**
Upper Quoile River	1,737	**Mute swan**, whooper swan, little grebe
Moine Mhor & Add Estuary	509	**Greylag goose (Northwest Scotland population)**
Larne Lough	-	Light-bellied Brent goose (227 I)
Killough Harbour	-	Light-bellied Brent goose (354 I)
Loch of Inch and Torrs Warren	-	Greenland white-fronted goose (534 I)
Glannau Ynys Gybi/Holy Island Coast	-	Chough (18 P)
Glannau Aberdaron and Ynys Enlli?Aberdaron Coast and Bardsey Island	-	Chough (24 P)
Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal/Mynydd Cilan, Trwyn y Wylfa and the St Tudwal Islands	-	Chough (18 P)
Ramsey and St David's Peninsula Coast	-	Chough (22 P)

Site	Average number[1]	Species[2]
Skokholm and Skomer	-	Chough (4 P)

*Notes: [1] Average number is taken from the WeBS annual report and data collected between 2001/02 to 2005/06. For JNCC SPA sites only, no average number is available [2]. Species occurring in internationally important numbers are shown in **bold**. [3] Sites designated as Wetland Assemblages of International Importance shown in bold (qualifying level is 20,000 birds). P: Pairs*
Source: Austin et al. (2008), JNCC website

Along with Carmarthen Bay, the area is of particular importance for common scoter, red-throated diver and great-crested grebe. The Dyfi estuary complex contains extensive sand dunes together with sand banks, mud flats, saltmarshes, peat bogs, river channels and creeks. The site supports important numbers of wigeon and is an important wintering area for Greenland white-fronted geese. They generally arrive at their wintering grounds in October (Fox & Stroud 1986) and remain until mid-April (Wernham *et al*. 2002).

Other important sites include the Cleddau Estuary, with important numbers of dunlin, curlew, shelduck, wigeon and teal and Tremadog Bay with wintering common scoter and Slavonian grebe (Barton & Pollock 2005).

Morecambe Bay is one of the largest estuarine systems in the UK and regularly holds over 210,000 waterbirds in winter, and is of particular importance for migrating waders. The site has internationally and nationally important numbers of several species of waterbird (e.g. Pink-footed goose, shelduck, redshank) and remains the principal site for curlew, with peak counts from the 2006/07 survey the highest at the site for four years (Austin *et al*. 2008). The Duddon Estuary is important for large numbers of wintering and passage waterbirds and the area regularly supports over 70,000 birds with higher numbers when acting as a cold weather refuge. The area is of international and national importance for several species and has important high tide roosts for wintering waterbirds and feeding areas for both wintering and migratory waterbirds. Torrs Warren has important numbers of Greenland white-fronted geese, while South Walney and Foulney Island have red-throated diver and important numbers of eider.

Liverpool Bay is a key area for common scoter with Shell Flats and Colwyn Bay being of particular importance. Aerial surveys of common scoter in Liverpool Bay between 2000 and 2004 indicated an apparent shift of birds to deeper waters as winter progresses, presumed to be in response to food depletion (Cranswick *et al*. 2004). Over 6,000 birds were recorded during a survey in August 2002 (Cranswick *et al*. 2004) when the birds where in moult. Observations in the spring of 2002 indicated that the main departure of common scoter from Liverpool Bay is in late April or early May (Cranswick *et al.* 2004). Cranswick *et al.* (2004) also recorded a number of divers (thought to be chiefly red-throated divers) widely distributed throughout the Bay and extending further offshore than scoters. Aerial surveys which included Liverpool Bay, recorded winter maxima for common scoter during 2001/02 to 2004/05 of 27,800; 79,100; 42,900 and 47,600 (last figure includes relatively small number in the Solway Firth that were not included in totals for previous winters) (Cranswick *et al*. 2004, Hall *et al*. 2005 as cited in DTI 2006). This shows a regular and continued presence of common scoter within Liverpool Bay and while no marine SPA has yet been designated in the area, the boundaries for the site are in preparation (DTI 2006).

The Dee Estuary and Mersey Estuary are Wetlands of International Importance regularly supporting over 130,000 and 99,000 individual waterbirds respectively in winter. The Dee estuary is England's key site for redshank, which occurs in internationally important numbers, however in the most recent WeBs count, peak numbers were slightly below average for the site and were the lowest since 2001/02. Other species present here in

internationally important numbers, are light-bellied Brent goose, shelduck, pintail, oystercatcher, knot, dunlin and black-tailed godwit (Austin *et al*. 2008).

Lavan Sands, Conway Bay and Formby Point support common scoter and red-throated diver. Lavan Sands and Conway Bay also hold red-breasted merganser, Slavonian grebe, great-crested grebe and are of particular importance for wintering oystercatchers acting as refuge areas for birds displaced from the Dee estuary during severe winter weather.

Strangford Lough qualifies as a Wetland of International Importance as it regularly supports over 60,000 individual waterbirds in winter. The area holds internationally important numbers of mute swan, light-bellied Brent goose, shelduck, knot, bar-tailed godwit and redshank (Austin *et al*. 2008). Carlingford Lough is an important feeding area for the wintering Brent geese and is of all-Ireland (Northern Ireland and the Republic of Ireland) Importance for several species. Belfast Lough is a Wetland of International Importance and regularly supports over 20,000 waterbirds over winter, some of which are in internationally or nationally important numbers.

The flats and marshes of the Upper Solway form one of the largest continuous areas of intertidal habitat in Britain and the Solway Estuary is of international importance for at least 10 species of waterbird and of national importance for several more (Austin *et al*. 2008). The Solway Firth and nearby Nith Estuary, along with Morecambe Bay are key sites along the Irish Sea coast for great-crested grebe (Barton & Pollock 2005). The Solway Firth also supports wintering scaup, common scoter, and red-throated diver.

The Clyde Estuary has important numbers of redshank, eider, oystercatcher and curlew. Other wintering species include Slavonian grebe, red-throated diver, goldeneye, red-breasted merganser, scaup, red-necked grebe and whooper swan.

Important numbers of birds are found on the Isle of Man, particularly golden plover, sandpiper and curlew. Several areas along the east and south-east coast of Ireland support internationally and nationally important numbers of wintering and passage birds, with a number of sites designated as Wetlands of International Importance. In winter common scoter, goldeneye, scaup and red-breasted merganser are found off the east and south-east coast of Ireland. Flocks of common scoter occur off Courtown, Curracloe and Rosslare (Co. Wexford), as well as Gile's Quay at Dundalk Bay (Co. Louth) and North Bull, while several other species use the shallow sandy waters of Wexford Harbour (Nairn *et al.* 1995).

Other birds

The British and Irish coasts bordering the Irish Sea have numerous SPAs designated for their breeding (and wintering) chough populations, with important sites along the west coast of Wales including Aberdaron Coast, Bardsey Island, Myndd Cilan, Trwyn y Wylfa, the St Tudwall Islands, Ramsey, St David's Peninsula Coast, Skokholm, Skomer and the Holy Island Coast. The coastline also has important coastal breeding populations of peregrine, particularly Cumbria, Dumfries and Galloway. Skomer and Skokholm also support breeding short-eared owls.

A3a.6.10 Features of Regional Sea 7

Regional Sea 7 encompasses the Minches and western Scotland. The border of this region runs down the centre of the Western Isles and also includes sites in Northern Ireland. The west coast of Scotland has many large and small islands, relatively free from predators and

disturbance making them ideal for nesting seabirds. This coast also has a large number of sea lochs and sheltered sounds, suitable for breeding, wintering and migrating waterbirds.

A3a.6.10.1 Seabird species, abundance and distribution

The Regional Sea 7 coast comprises a diversity of cliff and cliff top habitats, as well as large and varied sand dune systems, many of which are associated with bays and hard cliffs. This coastline also includes small offshore islands, islets and stacks, making it ideal for breeding seabirds. Table A3a.6.25 summarises the numbers of seabirds breeding in the area and Table A3a.6.26 describes the main colonies and the species present.

Table A3a.6.25 – Breeding seabird species in Regional Sea 7

Species	Total[1]	Species	Total[1]
Western Isles – Comhairle nan eilean			
Fulmar	118,073 (AOS)	Lesser black-backed gull	552 (AON)
Manx shearwater	4,803 (AOS)	Herring gull	2,665 (AON)
Storm petrel	1,833 (AOS)	Great black-backed gull	2,007 (AON)
Leach's storm petrel	94,870 (AOS)	Kittiwake	21,152 (AON)
Gannet	73,287 (AOS/AON)[1]	Common tern	502 (AON)
Cormorant	445 (AON)	Arctic tern	4,146 (AON)
Shag	2,661 (AON)	Little tern	111 (AON)
Arctic skua	156 (AOT)	Guillemot	120,594 (I)
Great skua	345 (AOT)	Razorbill	37,434 (I)
Black-headed gull	1,012 (AON)	Black guillemot	4,577 (I)
Common gull	1,707 (AON)	Puffin	234,666 (AOB)
Sutherland (Northwest coast)			
Fulmar	23,200	Herring gull	544 (AON)
Storm petrel	449 (AOS)	Great black-backed gull	1,058 (AON)
Cormorant	76 (AON)	Kittiwake	21,775 (AON)
Shag	880 (AON)	Common tern	95 (AON)
Arctic skua (Sutherland	48 (AOT)	Arctic tern	265 (AON)
total)	216 (AOT)	Guillemot	161,858 (I)
Great skua (Sutherland	87 (AON)	Razorbill	21,657 (I)
total)	44 (AON)	Puffin	9,046 (AOB)
Common gull			
Lesser black-backed gull			
West coast Ross & Cromarty			
Fulmar	2,565 (AOS)	Great black-backed gull	159 (AON)
Storm petrel	4,466 (AOS)	Kittiwake	195 (AON)
Cormorant	82 (AON)	Sandwich tern	1 (AON)
Shag	505 (AON)	Common tern	109 (AON)
Great skua	8 (AOT)	Arctic tern	26 (AON)
Lesser black-backed gull	41 (AON)	Razorbill	37 (I)
Common gull	51 (AON)	Black guillemot	1,490 (I)
Herring gull	634 (AON)		
Lochaber			
Fulmar	1,586 (AOS)	Great black-backed gull	247 (AON)
Manx shearwater	120,252 (AOS)	Kittiwake	2,107 (AON)
Cormorant	23 (AON)	Common tern	130 (AON)
Shag	973 (AON)	Arctic tern	149 (AON)
Great skua	2 (AOT)	Guillemot	8,692 (I)
Black-headed gull	5 (AON)	Razorbill	1,200 (I)
Common gull	367 (AON)	Black guillemot	1,335 (I)
Lesser black-backed gull	88 (AON)	Puffin	1,073 (AOB)
Herring gull	2,798 (AON)		

Species	Total[1]	Species	Total[1]
Skye & Lochalsh			
Fulmar	4,726 (AOS)	Kittiwake	1,309 (AON)
Cormorant	866 (AON)	Common tern	43 (AON)
Shag	866 (AON)	Arctic tern	209 (AON)
Common gull	235 (AON)	Guillemot	6,470 (I)
Lesser black-backed gull	41 (AON)	Razorbill	623 (I)
Herring gull	1,283 (AON)	Black guillemot	2,672 (I)
Great black-backed gull	151 (AON)	Puffin	110 (AOB)
Argyll & Bute			
Fulmar	8,467 (AOS)	Herring gull	15,370 (AON)
Manx shearwater	1,483 (AOS)	Great black-backed gull	1,736 (AON)
Storm petrel	5,248 (AOS)	Kittiwake	8,976 (AON)
Cormorant	231 (AON)	Common tern	1,362 (AON)
Shag	3,341 (AON)	Arctic tern	1,823 (AON)
Arctic skua	21 (AOT)	Little tern	126 (AON)
Great skua	3 (AOT)	Guillemot	42,697 (I)
Black-headed gull	679 (AON)	Razorbill	9,056 (I)
Common gull	2,683 (AON)	Black guillemot	3,046 (I)
Lesser black-backed gull	3,235 (AON)	Puffin	2,597 (AOB)

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals [1] Data from Seabird 2000
Source: Mitchell et al. (2004), JNCC website

Table A3a.6.26 – Summary of important breeding seabird colonies along the coast of the Regional Sea 7 area

Sites	Species + Total
Handa	Razorbill (16,991 I), great skua (195 AOT), kittwake (7,013 AON), Arctic skua (31 P), guillemot (112,676 I)
Priest Island (Summer Isles)	Storm-petrel (4,400 AOS)
Shiant Isles	Razorbill (10,950 I), puffin (>76,100 P), fulmar (4,387 AOS), shag (506 AON), guillemot (18,380 I)
Canna and Sanday	Puffin (945 AOB [Canna]), Guillemot, Kittiwake, Herring Gull (1,138 AON), Shag (740 AON [Canna])
Rum	Manx shearwater (120,000 AOS)[2]
Treshnish Isles	Storm-petrel (5,040 P)
Glas Eileanan	Common tern (530 P)
Sheep Island (NI)	Cormorant (344 AON)[2]
Rathlin Island (NI)	Razorbill (20,860 I)2, kittiwake (9,917 AON)[2], guillemot (95,117 I)[2]

*Notes: Sites designated as Seabird Assemblages of International Importance are shown in **bold** (Qualifying level is 20,000 birds). P: Pairs, AOS: Apparently Occupied Sites, I: individuals.*
Source: JNCC website and Mitchell et al. (2004).

Rum is a large island to the south west of Skye and is particularly noted for its large colony of Manx shearwater, second only to the "super-colony" on the three Pembrokeshire islands, which held 151,000 AOS in 1997-98 (Smith *et al*. 2001 as cited in Mitchell *et al*. 2004).

Handa off the west coast provides a strategic nesting site for seabirds that feed in the waters of the northern Minch. Priest Island is the outermost and most exposed of the Summer Isles and lies some 6km off the coast of Wester Ross. It, along with Treshnish Isles (principally Lunga) supports some of the largest storm petrel colonies after sites on Shetland (Mousa) and in County Kerry (Inishtooskert, Great Skellig and Inishvickillane) (Mitchell *et al*. 2004).

The Shiant Isles in the Minch comprise three large and several small islands and are important for breeding seabirds, especially auks and fulmars during summer. After Coquet Island, Glas Eileanan, a group of three small islets in the Sound of Mull, supports one of the biggest common tern colonies in Britain. Birds from these colonies feed in the surrounding marine areas as well as inshore waters.

The main Northern Irish sites within Regional Sea 7 are Rathlin Island and Sheep Island. Rathlin Island has several sea stacks and many of these are important for breeding seabirds. The island supports a diverse assemblage of breeding seabirds, including auk and gull species. Sheep Island is a small exposed island with steep cliffs and supports a breeding colony of cormorant.

A3a.6.10.2 Seabird distribution at sea

As seen in the North Sea, seabird distribution off the west coast varies throughout the year. Birds will be concentrated in coastal waters and at colonies during the breeding season, while during post breeding time, adults and young birds disperse from colonies and generally become more widespread throughout offshore areas or leave the area altogether. Table A3a.6.27 provides a summary of seabird distribution and abundance in these waters throughout the year.

Table A3a.6.27 – General seabird distribution and abundance in the Minches and Western Scotland

Month	Distribution and abundance
January-April	Prior to breeding season highest densities of fulmar on the shelf. Manx shearwater begin returning to breeding colonies in March and highest densities recorded around Rum. Storm petrels also begin returning from wintering grounds in April. Adult gannets begin returning to the area during March, while immature birds tend to delay their arrival until May. Between March and August, gannets remain widely distributed at low densities. Cormorants are resident in the area, and are recorded in shallow inshore waters along almost the entire coast. Low densities of shag found in inshore waters throughout the year. Low densities of black-headed gull are found inshore throughout the year, within the northern Minch area, while common gull found at low densities throughout the Minch, throughout the year.
May-July	Higher densities of fulmar found in the Minch, but still mainly concentrated in waters west of the Western Isles. Fulmars range widely when feeding, even during breeding season. During June and July, birds are widespread at low densities over shelf edge. Many non-breeding storm petrels may be widespread throughout the area in low densities from the end of June. Proportion of immature gannets peak in July and birds regularly scavenge around fishing vessels. Pomarine skua found widely distributed through the northern and southern Minch areas between May and November, while Arctic skua are widely distributed at low densities between June and August and great skua are present at low densities in the northern Minch area during July. Lesser black-backed gull distributed throughout the Minch at low densities between April and August, as are herring gull. Kittiwake, the most abundant and widespread gull throughout the area is recorded in all months of the year, however higher numbers found concentrated at Handa and the coast round this island between May and July. During breeding season Arctic terns found mainly in inshore waters around Western Isles. June & July sees highest densities of puffin concentrated around colonies, including Shiants
August-October	Densities of fulmar remained relatively low in the Minch, with birds concentrated further to the north and over slope/oceanic waters. Great shearwater recorded in the Minch but only in very small numbers with majority occurring further offshore. Storm petrels were recorded associating with fishing vessels in the Minch during August. Gannets leave the area during September and October, resulting in lower densities during the winter months. Distribution of great skua is more widespread, but still at low densities,

Month	Distribution and abundance
	throughout the Minch. Herring gull remains widespread throughout the Minch area with small concentrations of birds at Canna and Sanday and at Handa. Concentrations of kittiwake found off Summer Isles and waters around Shiant Islands, during August and September and in waters off Skye during October and December, with moderate numbers remaining widespread throughout the Minch area. Arctic tern begin to disperse from area, with low densities found in the Minch. During August and September, highest concentrations of guillemot found over shallow inshore waters of the Minch and the Sea of Hebrides southwards to Islay. The Minch is an important area for moulting auks during August and an estimated two-thirds of the west coast population of razorbill congregate here with the remainder thought to move south into the Irish sea. Moderate densities of puffin seen in the Minch.
November-December	Lowest densities of fulmar seen during this period. Storm petrels remained widely distributed, at low densities, throughout the Minch. Few sightings of small numbers of Iceland gulls seen off the east coast of Lewis. Great black-backed gulls are found throughout the Minch during all months, however slightly higher numbers found around Coll between October and December. Fewer guillemot seen in the Minch between December and April, although adult birds continue to visit colonies during autumn and winter months.

Source: Pollock et al. (2000)

A3a.6.10.3 Breeding waterbirds

Some areas along this coastline are extremely important for breeding waterbirds, particularly Islay and Mull and other islands in the Inner Hebrides and the Southern Isles: North and South Uist and Benbecula are one of the major breeding grounds for waders in western Europe. Individual areas support important populations of breeding birds and the entire Scottish breeding population of chough occurs in this region.

In the Inner Hebrides, the most important areas for breeding waders are the machair and other grasslands of Tiree, pasture near Loch Indaal, Loch Gruinart and other farmland on Islay, with low-lying coastal regions also important. Tiree is also the most important breeding area for mute swan in the Inner Hebrides. Shelduck are found on several of the estuaries throughout the region, with main concentrations in Kintyre and Islay as well as Bute. The islands off the west coast also support important populations of breeding ringed plover and the majority of the Scottish breeding population of red-breasted merganser. This coastline is also important for breeding ducks including eider, mallard, shelduck and teal.

Wader species which breed in the Southern Isles, include snipe, redshank, lapwing and dunlin, the latter of these which are usually a moorland and montane breeding species elsewhere breed at sea level in this region.

Much of the coastline is rocky and where this is the case, waterbirds are restricted to a few suitable locations. Areas on Rum and Isle of Skye provide nesting areas for a highly diverse assemblage of waders and other waterbirds.

Rare breeding species in the region include, red-necked phalarope, pintail, spotted crake, Slavonian grebe, garganey and Whooper swan (May & Law 1997b).

Other bird species

A number of other bird species breed throughout this region, which are not marine, but which use rocky, coastal areas, and these include: white-tailed eagle, peregrine and merlin, the latter of which can leave upland areas during winter and come down to inland lowland and coastal areas (RSPB website).

A3a.6.10.4 Key areas for wintering and migratory waterbirds

The presence of sheltered sounds, numerous sea lochs and islands with a varied selection of habitats including machair, makes this region extremely important for wintering and migrating species, particularly geese and wader species (Table A3a.6.28).

Table A3a.6.28 – Important sites for non-breeding waterbirds in Regional Sea 7 (in decreasing size order of number of birds they contain)

Site	Average number[1]	Species[2]
Lough Foyle	35,539	**Whooper swan, light-bellied Brent goose (Nearctic population)**, wigeon, teal, mallard, pintail, eider, red-breasted merganser, red-throated diver, great crested grebe, oystercatcher, golden plover, lapwing, knot, dunlin, black-tailed godwit, curlew,
Loch a Phuill (Tiree)	3,678	**Greylag goose (Northwest Scotland population)**, whooper swan
Loch Bee (South Uist)	3,462	**Mute swan, greylag goose (Northwest Scotland population)**
Isle of Coll	2,690	**Greenland white-fronted goose, greylag goose (Northwest Scotland population), barnacle goose (Nearctic population)**
Loch Paible (North Uist)	2,264	**Greylag goose (Northwest Scotland population)**
Balranald Nature Reserve	2,238	**Greylag goose (Northwest Scotland population)**
Baleshare (North Uist)	1,128	**Greylag goose (Northwest Scotland population)**
Loch Bhasapoll (Tiree)	1,102	**Greylag goose (Northwest Scotland population)**
Loch Sandary (North Uist)	775	**Greylag goose (Northwest Scotland population)**
Loch Riaghain (Tiree)	620	**Greylag goose (Northwest Scotland population)**
Loch An Eilein (Tiree)	600	**Greylag goose (Northwest Scotland population)**
Traigh Luskentyre	266	**Great northern diver**
Outer Loch Indaal	168	**Great northern diver**
Island of Islay	-	**Greenland white-fronted goose, barnacle goose (Nearctic population)**
Machrihanish	-	**Greenland white-fronted goose, Greylag goose (Northwest Scotland population)**
Rhunahaorine	-	**Greenland white-fronted goose**
Keills Peninsula & Isle of Danna	-	**Greenland white-fronted goose**
Isle of Lismore	-	**Greenland white-fronted goose**

*Notes: [1] Average number is taken from the WeBS annual report and data collected between 2001/02 to 2005/06. For JNCC SPA sites only, no average number is available [2]Species occurring in internationally important numbers are shown in **bold**. [3] Sites designated as Wetland Assemblages of International Importance shown in bold (qualifying level is 20,000 birds). I: Individuals*
Source: Austin et al. (2008), JNCC website

Several sites in the above table are on Tiree. The WeBS publication records species in internationally important numbers on Tiree (as a whole, not at specific loch sites), as including Greenland white-fronted goose and barnacle goose, (both in internationally

important numbers) and ringed plover, sanderling, purple sandpiper and turnstone which are recorded in nationally important numbers. Islay is also very important for its populations of Greenland white-fronted goose (Austin *et al*. 2008).

Passage and wintering birds such as mallard, teal and wigeon utilise the rocky shorelines of the region. Wintering shelduck are relatively scarce, but the largest concentrations occur on Islay and Arran, and Appin/Eriska/Benderloch are important areas for wintering birds. As well as being important for breeding birds, Loch Indaal is important as a site for moulting red-breasted merganser and for wintering scaup. Numbers of long-tailed duck also winter at this site, and although small in a Scottish context, are regionally important. Loch Indaal, Islay, the Sound of Gigha, west Kintyre Peninsula, Loch Caolisport and Howmore, South Uist are important for great northern diver.

Staging areas utilised by species such as whooper swan, golden plover, lapwing and dunlin in autumn include Loch Indaal, where passage waders also include sanderling and ringed plover. Peak numbers of knot and sanderling occur on Islay during autumn migration with only small numbers over-wintering. Whimbrel also occurs on passage and in autumn the island supports large numbers of migrating bar-tailed godwit.

Extensive areas of sandflats and machair including the Atlantic coasts of Uists and Benbecula, Lewis and Harris are favoured by wintering birds. Sandy shores along these coasts support some of the most important numbers of wintering sanderling in the UK, together with bar-tailed godwit and knot. Wintering and passage Greenland barnacle goose occur in important numbers within the region, including at the Shiant Isles, Monach Islands and West Sound of Harris. The greylag goose occurs in large numbers on Baleshare and Kirkibost, and from Malaclete to Oronsay on the north coast of North Uist.

The most recent aerial and shore-based surveys in the area were conducted by JNCC in 2006/07. Only great northern divers were present in significant numbers, and found throughout the west coasts of the Uists, Benbecula and Barra. Other species recorded were eider, common scoter, red-breasted merganser and long-tailed duck. With the exception of eider, which was present throughout the survey area, the small numbers of other seaducks were recorded mainly in sheltered areas including the Sound of Harris (Lewis *et al*. 2008).

Mallard, wigeon and teal, among the most abundant wintering waterbirds, are found at the heads of the larger sea lochs along this coastline and in the shallower bays, with the sheltered areas between Portree and Kyleakin and around Loch Alsh and Loch Carron the most important for ducks, the latter two are amongst the most important for eider.

This region can increase in its importance for wintering and passage birds during periods of severe cold weather on the east and mainland Europe. At these times, the region can experience an influx of waterbirds from other coastal or inland regions.

A3a.6.11 Features of Regional Sea 8

The Regional Sea 8 encompasses a broad area along the Scottish continental shelf from the north of Shetland, to south of the Western Isles. The coastal habitats in this region range from extensive and diverse cliff formations, stacks, voes, and sand dune, saltmarsh and estuarine systems.

The west coast of Shetland is within Regional Sea 8, and the east coast is in Regional Sea 1; for simplicity Shetland as a whole has been described in Section A3a.6.3 above.

A3a.6.11.1 Seabird species, abundance and distribution

The majority of the seabird species regularly breeding in Britain and Ireland breed within Regional Sea 8. The region is internationally important in terms of seabird numbers and/or the diverse breeding assemblages it supports and is amongst the most important for offshore seabirds in Europe (Tasker 1997a, b & c, Pollock *et al*. 2000). Table A3a.6.29 lists the numbers of breeding seabirds throughout the region.

Table A3a.6.29 – Breeding seabird species in Regional Sea 8

Species	Total	Species	Total
Orkney			
Fulmar	90,846 (AOS)	Great black-backed gull	5,505 (AON)
Storm petrel	1,870 (AOS)	Kittiwake	57,668 (AON)
Gannet	5,137 (AOS/AON)[1]	Sandwich tern	173 (AON)
Cormorant	412 (AON)	Common tern	125 (AON)
Shag	1,872 (AON)	Arctic tern	13,476 (AON)
Arctic skua	720 (AOT)	Little tern	4 (AON)
Great skua	2,209 (AOT)	Guillemot	181,026 (I)
Black-headed gull	2,854 (AON)	Razorbill	10,194 (I)
Common gull	11,141 (AON)	Black guillemot	5,820 (I)
Lesser black-backed gull	1,045 (AON)	Puffin	61,758 (AOB)
Herring gull	1,933 (AON)		
Western Isles – Comhairle nan eilean			
Fulmar	118,073 (AOS)	Lesser black-backed gull	552 (AON)
Manx shearwater	4,803 (AOS)	Herring gull	2,665 (AON)
Storm petrel	1,833 (AOS)	Great black-backed gull	2,007 (AON)
Leach's storm petrel	94,870 (AOS)	Kittiwake	21,152 (AON)
Gannet	73,287 (AOS/AON)[1]	Common tern	502 (AON)
Cormorant	445 (AON)	Arctic tern	4,146 (AON)
Shag	2,661 (AON)	Little tern	111 (AON)
Arctic skua	156 (AOT)	Guillemot	120,594 (I)
Great skua	345 (AOT)	Razorbill	37,434 (I)
Black-headed gull	1,012 (AON)	Black guillemot	4,577 (I)
Common gull	1,707 (AON)	Puffin	234,666 (AOB)
Caithness (North coast)			
Fulmar	9,688 (AOS)	Great black-backed gull	30 (AON)
Shag	61 (AON)	Kittiwake	5,694 (AON)
Arctic skua (Caithness	71 (AOT)	Common tern	42 (AON)
total)	5 (AOT)	Arctic tern	585 (AON)
Great skua (Caithness	184 (AON)	Little tern	1 (AON)
total)	453 (AON)	Guillemot	30,959 (I)
Black-headed gull	2 (AON)	Razorbill	1,172 (I)
Common gull	240 (AON)	Puffin	781 (AOB)
Lesser black-backed gull			
Herring gull			
Sutherland (Northwest coast)			
Fulmar	23,200	Great black-backed gull	1,058 (AON)
Storm petrel	449 (AOS)	Kittiwake	21,775 (AON)
Cormorant	76 (AON	Common tern	95 (AON)
Shag	880 (AON)	Arctic tern	265 (AON)
Arctic skua (Sutherland	48 (AOT)	Guillemot	161,858 (I)
total)	216 (AOT)	Razorbill	21,657 (I)
Great skua (Sutherland	87 (AON)	Puffin	9,046 (AOB)
total)	44 (AON)		
Common gull	544 (AON)		
Lesser black-backed gull			

Species	Total	Species	Total
Herring gull			

Notes: AON: Apparently Occupied Nests, AOB: Apparently Occupied Burrows, P: Pairs, AOS: Apparently Occupied Sites, I: individuals
Source: Mitchell et al. (2004), JNCC website

A key site in Regional Sea 8 is St Kilda, a group of remote islands lying in the North Atlantic, approximately 70km west of North Uist. It is remote and relatively free from predators and disturbance and therefore provides a strategic nesting locality for seabirds that feed in the rich waters to the west of Scotland. The islands support one of the largest concentrations of birds in the North Atlantic and the largest in the UK with total numbers of seabirds exceeding 600,000 pairs. The species include auks, petrels, shearwaters and gulls, and is one of the few sites in the EU for nesting Leach's petrel.

Also important are the Flannan Isles, Ramna Stacks and Gruney and the colonies at North Rona and Sula Sgeir which support important breeding sites for Leach's petrel, three of only six breeding sites in the EU. Sula Sgeir and Sule Skerry also both support breeding Leach's petrel and are both gannet colonies. A gannet colony established at Noup Head (Orkney) in 2003, increased from 27 apparently occupied nests in 2005 to 43 in 2006. Actively displaying adults were recorded at Copinsay and the Calf of Eday suggesting possible further colonisation may occur. Between 2005 and 2006, colony counts of kittiwake were carried out at five mainland sites on Orkney, the first time since 2003, and a decline of 39% on the 2003 figure was recorded (Mavor *et al*. 2008). Orkney is important for breeding Arctic and great skua. Between 2005 and 2006, numbers of apparently occupied territories for Arctic skua on Orkney increased, while overall numbers of great skua declined slightly.

Guillemots also breed on both North Rona and Sula Sgeir, while North Rona has long supported a large colony of great black-backed gull (Benn *et al*. 1986). Manx shearwater are found around North Rona, but not breed on either North Rona or Sula Sgeir. These birds are thought to be from the nearest Scottish colonies on Hoy, St Kilda and Rum, Canna and Eigg (Regional Sea 7) or non-breeders (Benn *et al.* 1986). In addition to these internationally important colonies there are important Arctic terns colonies on the Pentland Firth Islands with, while Scapa Flow is of importance for wintering and breeding shags. The main breeding colonies in the region and the species and numbers they support are given in Table A3a.6.30.

Table A3a.6.30 – Summary of important breeding seabird colonies

Sites	Species + Total
Hermaness, Saxa Vord and Valla Field	Gannet (16,386 AOS/AON), great skua (788 P), puffin (25,094 AOB), fulmar (19,539 P), shag (450 P), guillemot (25,000 I)
Ramna Stacks and Gruney	Leach's storm-petrel (22 P, 20 AOS [Gruney])
Papa Stour	Arctic tern (1,000 P)
Foula	Arctic tern (1,100 P), Leach's storm-petrel (15 AOS), great skua (2,293 AOT), guillemot (41,435 I), puffin (22,500 AOB), shag (2,277 AON)
Calf of Eday	30,000 breeding seabirds including: fulmar, great cormorant, great black-backed gull , kittiwake, guillemot
Papa Westray (North Hill and Holm)	Arctic tern (1,950 P), Arctic skua (64 AOT)
West Westray	Arctic tern (1,200 P), guillemot (54,718 I)
Rousay	Arctic tern (1,000 P)
Marwick Head	Kittiwake (5,509 AON), guillemot (34,679 I)

Sites	Species + Total
Hoy	Great skua (1,973 AOT), fulmar (35,858 AOS), shag (161 AON), Arctic skua (72 AOT), great skua (1,973 AOT), great blacked-backed gull (389 [Burn of Forse, Stourdale, Lochs of Suifea] AON)
Pentland Firth Islands	Arctic tern (>1,200 P)
Auskerry	Arctic tern (780 P), Storm petrel (994 AOS), Arctic skua (1 AOT), great skua (1 AOT)
Copinsay	Great black-backed gull (600 P), kittiwake (4,364 AON), guillemot (20,045 I)
Switha	Great black-backed gull (120 AON)
North Caithness Cliffs	Razorbill (3302 I), fulmar (16,310 P, 5,465 AOS [Dunnet Head]), kittiwake (15,630 P), guillemot (26,994 P)
Cape Wrath	Razorbill (1,800 I), kittiwake (9,660 P), guillemot (13,670 I)
Sule Skerry and Sule Stack	European storm-petrel (309 AOS), gannet (4,890 P[1], 5,137 AOS/AON) [Sule Stack][1]), puffin (59,471 AOB), Leach's storm-petrel (5 P), shag (724 AON)
North Rona and Sula Sgeir	Storm petrel (377 AOS), Leach's storm-petrel (2,750 P), gannet (10,703 AOS/AON [Sula Sgeir])[1], guillemot (20,877 I), razorbill (2,300 I), puffin (5,265 AOB), fulmar (3,520 AOS), great black-backed gull (983 AON), kittiwake (5,000 P)
Flannan Isles	Leach's storm-petrel (1,425 AOS), razorbill (1,569 I), puffin (15,761 AOB), storm-petrel (>100 P), guillemot (14,638 I)
Monach Isles	Common tern (194 P), little tern (26 P), black guillemot (850 I)
South Uist Machair and Lochs	Little tern (<31 P)
Mingulay and Berneray	Razorbill (22,900 I), fulmar (8,424 AOS), shag (183 AON), kittiwake (2,613 AON), guillemot (19,083 I)
St Kilda	Leach's storm-petrel (45,433 AOS), storm-petrel (1,121 AOS), gannet (61,340 AOS/AON)[1], great skua (240 AOT), puffin (142,264 AOB), razorbill (3,800 I), fulmar (68,448 AOS), Manx shearwater (6,803 AOS), kittiwake (7,800 P), guillemot (22,700 I)

*Notes: Sites designated as Seabird Assemblages of International Importance are shown in **bold** (Qualifying level is 20,000 birds). P: Pairs, AOS: Apparently Occupied Sites, I: individuals. [1] Not surveyed in 1998-2000, Extrapolated estimate for 1999 based on previous colony-specific trends.*
Source: JNCC website and Mitchell et al. (2004).

Fulmar are present in important numbers at various colonies, as are kittiwakes, which generally nest on steep cliff slopes often shared with other seabird species. The islands of Sule Skerry and Sule Stack are important for a number of bird species including storm petrel and puffin (JNCC website). The great black-backed gull, the least common of the breeding *Larus* species recorded in the SAST/ESAS survey of the Atlantic Frontier and waters north and west of Scotland, is generally a coastal breeder on islands or on tops of rocky stacks. There are important colonies on the Orkney and North Rona and Sula Sgeir.

A3a.6.11.2 Seabird distribution at sea

In general, nearshore waters of Orkney and the north coast of Scotland hold large concentrations of birds virtually throughout the year (Stone *et al*. 1995). After the breeding season, species that feed further offshore e.g. fulmar, gannet, kittiwakes, guillemot, puffin

and razorbill leave coastal waters. SAST/ESAS surveys have found several species are present over the deep waters of the Atlantic Frontier (in and adjacent to Regional Sea 8) throughout the year. The distribution of the main species are described below.

In late summer, fulmars leave their breeding colonies to moult. During autumn (August to October), high densities are concentrated over shelf waters, particularly north of Scotland and around Shetland, probably due to the presence of recently fledged birds. Wintering densities are relatively low with the majority of the breeding population are thought to remain within a few hundred kilometres of the breeding colonies. While adult birds remain close to land, juvenile birds are thought to disperse over large distances. High densities of fulmars are concentrated along the continental slope south of 60°N and around Shetland from January to April, prior to the breeding season. Breeding fulmars begin returning to Faroe colonies during November and by January, high densities are concentrated in shelf waters, particularly close to large colonies such as Vágar, estimated to hold in excess of 100,000 pairs (Taylor & Reid 2001), over the Faroe Bank and the Faroe Bank Channel (Regional Sea 8/9). During April, great and Arctic skuas begin returning to their breeding sites.

The North Sea and waters west of Britain are extensively used throughout the year by gannets and while some adults winter in the area, some adults and most immature birds move south. Gannets feed on shoaling fish and have a supplementary diet of fishery discards. Adults return to the waters of Regional Sea 8 in March, with immature birds tending to arrive in May. Distribution, at low densities, is widespread throughout this area between March and August, regardless of water depth. During this time, high densities of adults are found near breeding colonies around the Northern Isles, foraging within a maximum of 150km from the colonies. Immature birds not tied to colonies were more widely dispersed, with the proportion of immature birds reaching a peak in July. Winter densities are low after gannets leave the area during September and October for wintering grounds as far south as west Africa (Pollock *et al.* 2000).

The most abundant and widespread gull species throughout the area is the kittiwake (Pollock *et al*. 2000, Taylor & Reid 2001). Small shoaling fish dominate its diet, which is generally supplemented by fishery waste, particularly in winter (Skov *et al*. 1995). From January to April kittiwakes are widely distributed along the continental slope and on the shelf north and north-east of Scotland, with fewer birds in shelf waters to the west of Scotland. Kittiwakes concentrate in coastal waters close to colonies from May to June, particularly around Orkney and the northern coasts of Caithness and Sutherland. These areas hold the majority of Scotland's breeding kittiwakes (Pollock *et al*. 2000). Foraging during breeding can range from less than 5km to 160km from the colony and during this time few birds are present in offshore areas. Distribution becomes patchy later in the year, with movement away from the colonies around the north coast and Orkney to the Minch and other inshore areas west of Scotland. Distribution also extends to offshore waters south of the Faroes around 60ºN. Lowest numbers of birds are found offshore between October and December, with some dispersal out into the North Atlantic. High numbers of birds remain concentrated in inshore waters west and north of Scotland, around Orkney and to the east of Fair Isle.

Guillemot is the most abundant and widespread auk species throughout the region (Pollock *et al*. 2000). This is primarily a shelf species preferring waters less than 100m deep, but is recorded along the shelf break in low densities throughout the year. They mainly feed on sandeels and clupeids during the summer and a wider selection of fish species in winter (Skov *et al*. 1995). From May to July they are concentrated around Shetland (Regional Sea 1), Orkney, the northern coast of Caithness and Sutherland and off the west coast of Scotland, with large concentrations seen around Orkney. These areas contain most of the breeding bird population in Scotland (Pollock *et al*. 2000). During the breeding season, most

breeding birds feed within 55km of their colony, while after the breeding season (Aug-Sept), they disperse from the colonies and congregate in inshore waters where the adults undergo a complete moult. By late autumn/early winter, moulting flocks have dispersed further offshore, with low densities found along the shelf-edge with some birds wintering in the North Sea. Distribution is more widespread between December and April with highest densities remaining in inshore waters around Orkney.

Puffins are generally more widespread than guillemots, and are often more abundant in oceanic rather than inshore waters. At the onset of the breeding period (April-May), puffins are widespread and numerous within Regional Sea 8 and the majority of puffins that breed in the North Sea, breed in Shetland (Regional Sea 1) and Orkney (Skov *et al*. 1995). During this time puffins can also be found over deeper waters, as far west as the Rockall Trough and north to the Norwegian Sea. Breeding birds are thought to forage within 40km of a colony, and birds found in deeper waters are thought to be non-breeding. However, during times of low food availability foraging distance by breeding birds can increase. After breeding (Aug-Sept), distribution becomes more widespread into deeper waters south and west of the Faroes and shelf waters between Orkney and Shetland. In winter and early spring (Oct-Mar), distribution becomes scattered, with birds from the Shetland and Orkney colonies moving south and wintering in the North Sea. Some birds move north-west of Shetland to beyond the shelf break and over deeper waters of the Faroe Bank, the Faroe-Shetland Channel and the Wyville Thomson Ridge (Regional Sea 9).

Distribution of herring gulls, the most widespread species of large gull in the northern hemisphere, during the pre-breeding and breeding periods (May-Sept) is almost entirely coastal. Migrants arrive during September and October and leave in March and April for favoured wintering grounds. Favoured offshore areas for the species lie to the west and north of Shetland and to the west of Scotland, south of 60ºN.

The great black-backed gull breeding population from the North Sea are thought to be largely sedentary, while birds from higher latitudes migrate south in autumn (Skov *et al*. 1995). This species is the least common of the *Larus* species breeding regularly in Regional Sea 8 and is an opportunistic scavenger, taking a variety of food including other birds, eggs, fish and invertebrates. It is known to scavenge around fishing vessels and land-fill sites during winter. Distribution during the pre-breeding and breeding season, (May-Sept), is widespread, at low densities, within 50km of the colonies. Orkney, Shetland (Regional Sea 1) and the Western Isles hold the majority of the breeding population of great black-backed gulls in Britain, as well as the largest colonies (Pollock *et al*. 2000).

A3a.6.11.3 Breeding waterbirds

Although many are primarily associated with freshwater, wet grassland and moorland habitats, rather than strictly coastal locations, species of waterbirds known to breed in Regional Sea 8 include several wildfowl and wader species as well as red-throated diver. Red-throated diver are known to breed at sites on Orkney and travel between hill-top lochan breeding sites and coastal waters to feed. Particularly important are Hoy, the Mainland Orkney moors and Ronas Hill–North Roe and Tingon.

Along the northern coastline of Sutherland, large stretches of the coast are cliff-bound so that breeding birds typical of soft coastlines, such as waders and other waterbirds, are restricted in occurrence. Caithness and Sutherland are strongholds for breeding red-throated diver and the little grebe, which has expanded its range into Caithness, while there is a long-established breeding population of gadwall in the wetlands of Caithness and Sutherland (Gibbons *et al*. 1993).

A3a.6.11.4 Key areas for wintering and migratory waterbirds

The importance of the Northern Isles for wintering and migratory waterbirds has been discussed in the Section for Regional Sea 1, and the following description focuses on the north and north west coast of Scotland.

The region is of national and international importance for a variety of seaducks, divers and grebes outside of the breeding season with many species overwintering in coastal and nearshore waters. Howmore, South Uist, is a key area for great northern divers, while the Sound of Taransay holds Slavonian grebe. These and other areas are of international importance for individual wintering species, particularly some geese and wader species (Table A3a.6.31):

Table A3a.6.31 – Important sites for non-breeding waterbirds in Regional Sea 8 (in decreasing size order of number of birds they contain)

Site	Average number[1]	Species[2]
Loch of Harray	10,190	**Mute swan, greylag goose (Icelandic population)**, scaup, Slavonian grebe
Loch of Boardhouse	6,281	**Greylag goose (Icelandic population)**
Loch of Stenness	5,970	**Greylag goose (Icelandic population)**, scaup
Milldam/Balfour Mains Pools	5,386	**Greylag goose (Icelandic population)**
Island of Egilsay	3,628	**Greylag goose (Icelandic population)**
Loch Scarmclate	3,253	**Greylag goose (Icelandic population)**
Loch of Skaill	3,173	**Greylag goose (Icelandic population)**
Loch of Hundland	3,047	**Greylag goose (Icelandic population)**
Loch of Swannay	2,879	**Greylag goose (Icelandic population)**
Loch Hempriggs	2,419	**Greylag goose (Icelandic population)**
Broubster Leans	1,392	**Greylag goose (Icelandic population)**
Hermaness, Saxa Vord and Valla Field	-	Red-throated diver (28 P)
Ronas Hill – North Roe and Tingon	-	Red-throated diver (50 P)
Papa Stour	-	Ringed plover (89 P)
Foula	-	Red-throated diver (11 P)
East Sanday coast	-	Bar-tailed godwit (600 I), purple sandpiper (840 I), turnstone (1,400 I)
Switha	-	Barnacle goose (1,000 I)
Hoy	-	Red-throated diver (58 P)
North Sutherland Coastal Islands	-	Barnacle goose (631 I)
Ness & Barvas, Lewis	-	Corncrake (18 I)
Lewis Peatlands	-	Black-throated diver (11 P), red-throated diver (60 P), dunlin (3,650 P), greenshank (152 P), golden plover (1,978 P)
North Uist Machair and Islands	-	Barnacle goose (1,500 I), dunlin (260 P), oystercatcher (260 P), redshank (470 P), purple sandpiper (370 I), ringed plover (590 I), turnstone (670 I)
Mointeach	-	Black-throated diver (3 P), red-throated diver (48 P)

Site	Average number[1]	Species[2]
Scadabhaigh		
Monach Isles	-	Barnacle goose (540 I)
South Uist Machair and Lochs	-	Dunlin (357 P), oystercatcher (577 P), redshank (350 P), ringed plover (490 I), sanderling (700 I), greylag goose (30 P)

*Notes: [1] Average number is taken from the WeBS annual report and data collected between 2001/02 to 2005/06. For JNCC SPA sites only, no average number is available [2]. Species occurring in internationally important numbers are shown in **bold**. [3] Sites designated as Wetland Assemblages of International Importance shown in bold (qualifying level is 20,000 birds). P: Pairs, I: Individuals*
Source: Austin et al. (2008), JNCC website

The islands off the west and north coasts of Scotland and Ireland are of importance for migrant waterfowl in spring and autumn, being on the major migratory flyway of the east Atlantic and many waterfowl, especially geese, either on passage or overwintering in the region. The importance of the region may increase during periods of severe cold further east in Scotland and continental Europe when there may be influxes of waterfowl into the region. Many of the key sites are in Regional Sea 7 (see above), although over winter, the rocky and sandy shorelines of the North Uist Machair and Islands SPA support internationally important numbers of migratory waders such as purple sandpiper, ringed plover and turnstone. Similar habitat in the South Uist Machair and Lochs SPA supports ringed plover and sanderling. Large numbers of bar-tailed godwit and knot are also associated with sandy shores throughout the region.

Other birds Regional Sea 8

The region represents a stronghold for breeding corncrake which are found in important numbers at a number of sites including North Uist Machair and Islands and South Uist Machair and Islands

The successfully re-established white-tailed eagle breeds on the Western Isles. Separate sub-species of wren are found on the Western Isles and St Kilda.

A3a.6.12 Features of Regional Sea 9

This area is to the west of Shetland and mainland Scotland and covers the area including the Faroe-Shetland Channel. There are no land masses in this region.

A3a.6.12.1 Seabird species, abundance and distribution

Seabirds found at sea over the Faroe-Shetland Channel and to the north of Shetland, are likely to originate mainly from major colonies in the Faroe, Shetland and Orkney Islands and more northerly breeding areas such as Iceland. The areas are probably too far to visit during the breeding season for most species and birds will generally move through the area in late summer and autumn on passage to winter breeding grounds, or in spring on route to breeding colonies or over the winter months.

North of Shetland

Fulmar is the most likely species to be present in greatest densities in areas north of Shetland. Gannet, kittiwake and guillemot are also present, but in low densities. The greatest densities of birds are present throughout this area between March and September. During the breeding season (May to July) birds in the area are likely to be non-breeders.

Some species, e.g. petrels, fulmar, gannet and puffin have been found to travel up to 100-150km from Shetland colonies to forage, so the southern part of the area may be within the maximum limits of their feeding ranges. The area is relatively unimportant for seabirds, with only fulmar and kittiwake present in anything but low densities during the post-breeding season and during the winter months.

Faroe Shetland Channel

The Faroe-Shetland Channel is within the maximum foraging range of fulmar, gannet and puffin but is probably too far to visit during the breeding season by most bird species. Again this area is more likely to be used by non-breeders and by birds moving through it in late spring or autumn on passage. Fulmar is the most abundant species, while storm petrel and kittiwake occur in moderate densities at certain times of the year and low densities of gannet, guillemot and puffin may also be present.

Wyville Thomson Ridge

The Wyville Thomson Ridge is a seabed topographic high at the southern end of the Faroe-Shetland Channel and the water depths here are shallower than those of the channel. This area will therefore potentially provide a richer feeding ground for those species which are known to forage large distances from colonies, illustrated by the increased number of species found in moderate densities compared to the Faroe-Shetland Channel. Fulmar is the most abundant species, while storm petrel, kittiwake, guillemot and puffin all occur in moderate densities at certain times of the year.

Seabird distribution is closely correlated to water depth with more birds found over shallower continental shelves than the deeper oceanic waters. Birds present in the deeper slope and oceanic waters will comprise mainly pelagic species such as fulmar, gannet, kittiwake and storm petrel.

Species accounts

SAST/ESAS surveys (Pollock 2000) have shown 40 species of seabird were found in slope and oceanic waters, with petrels (mainly fulmar) the most abundant taxon, followed by auks and gulls. Eight species were present over the deep waters of the Atlantic Frontier throughout the year. In order of decreasing abundance they were fulmar, gannet, kittiwake, puffin, great black-backed gull, guillemot, herring gull and razorbill. Apart from fulmar, all species were found in greater numbers over the shelf. Seven species were summer visitors: storm petrel, lesser black-backed gull, great skua, Leach's storm petrel, Manx shearwater, Arctic tern and Arctic skua. Three species were winter visitors: Iceland gull, glaucous gull and little auk and four were migrants: great shearwater, long-tailed skua, pomarine skua and sooty shearwater.

Table A3a.6.32 – Seasonal densities of principal seabirds north of Scotland in the Faroe-Shetland Channel and over the Wyville Thomson Ridge

	Pre-breeding	Breeding season	Post breeding	Winter months
Species	**Mar-Apr**	**May-Jul**	**Aug-Sept**	**Oct-Feb**
Fulmar	NoS: unsurveyed FSC: moderate WTR: unsurveyed	NoS: low-high FSC: low-moderate WTR: low-moderate	NoS: low-high FSC: low-moderate WTR: moderate-high	Nos: very low-low* FSC: very low-moderate WTR: unsurveyed
Gannet	NoS: unsurveyed FSC: no birds-very low WTR: unsurveyed	Nos: very low* FSC: very low WTR: very low	NoS: very low* FSC: very low WTR: very low	NoS: no birds* FSC: very low WTR: no birds*
Kittiwake	NoS: very low* FSC: very low-moderate	NoS: very low* FSC: very low	NoS: very low* FSC: very low	NoS: very low-low* FSC: very low

	Pre-breeding	Breeding season	Post breeding	Winter months
	WTR: unsurveyed	WTR: very low-low	WTR: low-moderate	WTR: unsurveyed
Guillemot	NoS: unsurveyed FSC: no birds-very low WTR: unsurveyed	NoS: very low* FSC: very low WTR: low-moderate	NoS: unsurveyed FSC: no birds-very low WTR: no birds-low	NoS: no birds-very low* FSC: no birds-very low WTR: unsurveyed
Puffin	NoS: no birds* FSC: no birds-very low WTR: very low-moderate	NoS: no birds-very low* FSC: very low WTR: no birds-low	NoS: very low-low* FSC: very low WTR: no birds-low	NoS: unsurveyed FSC:no birds-low WTR: no birds*
Storm petrel	FSC: no birds WTR: no birds*	FSC: very low-moderate WTR: no birds-moderate	FSC: very low-high WTR: low-high	FSC: no birds WTR: unsurveyed

*Notes: NoS: North of Scotland, FSC: Faroe Shetland Channel, WTR: Wyville Thomson Ridge. High = 500+ birds/km^2, moderate= 2.0-4.99 birds/km^2, low= 1.0-1.99 birds.km^2 and very low = 0.01-0.99 birds/km^2. * = based on data available, however much of area unsurveyed*
Sources: Pollock et al. (2000), BODC (1998), Bloor et al. (1996), Hamer et al. (1993) and Danielsen et al. (1990)

A3a.6.12.2 Waterbirds

As all of Regional Sea 9 is open seas, there are no breeding waterbirds. Similarly, there are no areas for wintering waterbirds and any birds within the area are likely to be on passage.

A3a.6.13 Features of Regional Sea 10 and 11

A3a.6.13.1 Seabird species, abundance and distribution

Regional Sea areas 10 and 11 cover the offshore areas of the Rockall Trough and Bank and the Atlantic North West Approaches and do not contain any inshore or coastal areas.

There are large gaps in the ESAS/SAST survey coverage for the area. However based on the surveys that have been conducted, seabird density and species diversity is generally low beyond the shelf edge. The most commonly recorded species are fulmar. Summary details of seabird distribution are shown in Table A3a.6.33.

Table A3a.6.33 – General seabird distribution and abundance in Regional Sea 10 and 11

Species	Distribution and abundance
Fulmar	Peak densities in Apr, lowest Nov, account for ca. 80% of seabirds offshore. **Jan-May**: Widespread at low densities, concentrations along shelf edge, north west of Anton Dohrn seamount & over Hatton Bank **Jun-Sep**: Widespread at low to moderate densities, with occasional high densities along shelf break & over Rockall Bank **Oct-Dec**: Limited survey coverage. Highest densities N & W of Western Isles & over shelf edge around 57ºN
Gannet	Tend to migrate south after breeding season. Recorded in all months of year, peak densities in Aug, with lowest in Nov **Nov-Apr**: Highest densities along shelf edge. Few birds in deep waters. Widespread at low densities over shelf waters **May-Oct**: More widespread in offshore waters with low densities as far west as Hatton Bank. Highest densities N & W of Western Isles close to colonies, low densities along shelf edge
Kittiwake	Largely oceanic in nature, only coming ashore during breeding season. Recorded in all months, peak numbers in Aug, lowest in Mar. **Jan-Apr**: Widespread in inshore waters, further offshore peak densities recorded along shelf break. Densities lowest over Rockall Trough and Bank **May-Sep**: Highest densities in inshore waters close to breeding colonies, widespread at low densities over the Rockall trough and Bank and the Hatton Bank **Oct-Dec**: limited survey coverage. High densities in shelf waters north of the

Species	Distribution and abundance
	Western Isles, in the Minch & occasionally further offshore. Low densities over shelf break.
Manx shearwater	Majority that breed in Britain winter off South America. Highest densities in Aug, with numbers decreasing rapidly into Sept and Oct. Large numbers regularly recorded passing Islay on passage. **Mar-May**: highest densities inshore close to major breeding colony on rum. Birds largely absent from offshore areas, although low densities along shelf break & over Rockall Trough. **Jun-Sep**: Widely scattered in low densities offshore, with occasional high density patches encountered (e.g. Rockall bank). Birds encountered over Hatton Bank in June.
Puffin	Largely pelagic, only coming ashore to breed between Mar and Aug. After breeding birds disperse widely. Recorded in all months, although majority between Apr and Nov. **Apr-Aug**: Highest densities recorded around Western Isles & in the Minch. Widely scattered at low densities along shelf break and eastern edge of Rockall Trough & as far west as Hatton bank. **Sep-Nov**: Birds disperse offshore away from breeding colonies. Low to moderate densities in the northeast Rockall Trough. Low densities over the Rockall Bank in Sept **Dec-Mar**: Few birds, with numbers increasing in Mar north of the Western Isles and in the Minch, although densities still low.
Guillemot	Widespread in all months and found mostly in shelf waters. **May-Jul**: Highest densities recorded off NW Scotland. Moderate densities throughout Minch **Aug-Sep**: Large flocks in inshore waters as undergo full body moult and birds are flightless for several weeks. **Dec-Jan**: High densities recorded off Skye and north coast of N Ireland
Razorbill	Recorded in all months of year, more widespread in winter than summer. Leave breeding colonies by mid-Aug with most birds not returning to land until Feb or Mar **May-Sep**: Widespread at low to moderate densities throughout the Minch and west of the Western Isles. High densities recorded between Mull and Skye in Aug. Slightly more restricted range over the winter months, high densities recorded off Mull in Feb.
Great black-backed gull	More marine than lesser black-back gull. Recorded in all months with peak in Jan and Apr, lowest numbers in Jul. **Nov-Apr**: Widespread at low to moderate densities as far west as 10ºW. Patches of moderate to high densities along shelf break. **May-Oct**: Distribution pattern broadly similar to the winter distribution, although densities generally lower. Occasional birds recorded in offshore waters, although very few along shelf break.
Storm petrel	Pelagic species only coming ashore to breed on offshore islands. Return from wintering grounds off Africa in Apr. Majority recorded in Jun-Sep with peak in Aug. **May-Jun**: Widespread at low to moderate densities over shelf edge to N and W of Western Isles. Highest densities along shelf edge. **Jul-Sep**: Widespread at low to moderate densities over shelf waters, with low densities over the Rockall Bank and north of the Anton Dohrn Seamount. **Oct-Nov**: Majority have left the area. Birds primarily restricted to inshore areas such as the Minch and shelf waters.
Leach's storm petrel	Pelagic species, only coming ashore to breed on offshore islands. Return from wintering grounds in the tropics in Apr, with numbers increasing in May and Jun and peaking in Aug. **May-Aug**: Highest numbers recorded north west of the Western Isles, beyond the shelf edge, in waters greater than 1,000m deep. A few birds recorded far offshore and very few inshore. **Sep-Oct**: Numbers decreased considerably with birds widely scattered throughout the area. Birds more frequently encountered in low numbers in shelf waters and

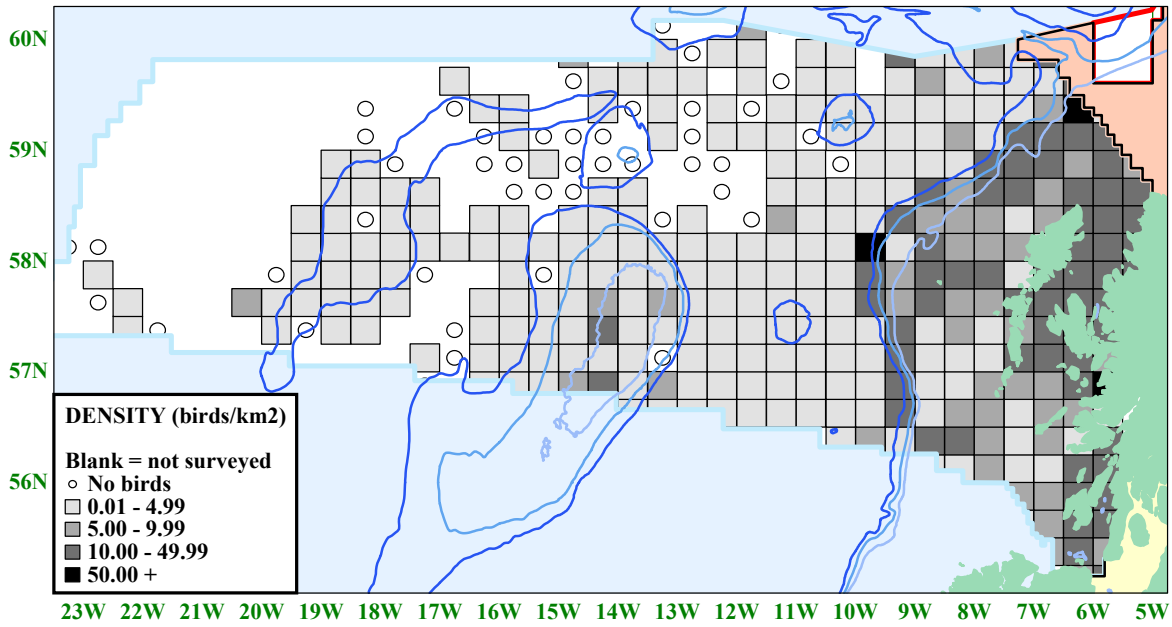
Species	Distribution and abundance
	also over deeper water in the Rockall Trough and over the Rockall Bank.
Lesser black-back gull	Partial migrant with most birds moving south during winter. Recorded in all months with lowest densities in Nov & highest in Apr. **Nov-Mar**: Low densities in the Minch and inshore waters with a few individuals scattered further offshore. **Apr-May**: large influx of birds. Low densities in offshore areas such as the Hatton Bank, Rockall Bank and Rockall Trough, although moderate to high density patches over shelf break. **Jun-Sep**: Low densities throughout the area.
Great skua	Recorded in all months except Jan. Peak in Aug. **Nov-Mar**: Low numbers observed to N and W of Western Isles. Majority inshore of the shelf break. **Apr-Oct**: Widespread in low numbers throughout offshore waters as well as shelf waters.
Arctic tern	Commonest tern breeding in Britain. After breeding heads south to Antarctic seas. Recorded Apr to Oct. Low numbers of early returning birds in April, with greater numbers seen in May, when birds as far offshore as 23ºW. **Jun-Jul**: Concentrated around breeding colonies on west coast islands, occasional birds offshore. **Aug**: more widespread in offshore areas in low to moderate numbers. **Sep**: Considerable drop in numbers, majority of records from offshore areas. **Oct**: Low numbers in the Minch
Common tern	Majority winter along the coast of west Africa, returning to Britain and Ireland to breed between Apr + Oct. **May-Jul**: Earliest birds recorded in the area in May, with highest densities recorded in June and July around Western Isles **Aug**: Birds only recorded occasionally
Arctic skua	**May**: Widely scattered in low numbers. Many birds migrating north to Arctic breeding grounds. **Jun-Jul**: Bias towards inshore areas, particularly around Western Isles, low numbers offshore. **Aug**: majority in inshore waters of the Minch. Low numbers over Rockall Bank and Trough. **Sep-Nov**: Few widely scattered birds.

Source: Pollock & Barton (2006)

Other migrant seabird species which are present within offshore areas in low numbers and at certain times of the year include sooty shearwater, great shearwater, little auk, pomarine skua and long-tailed skua.

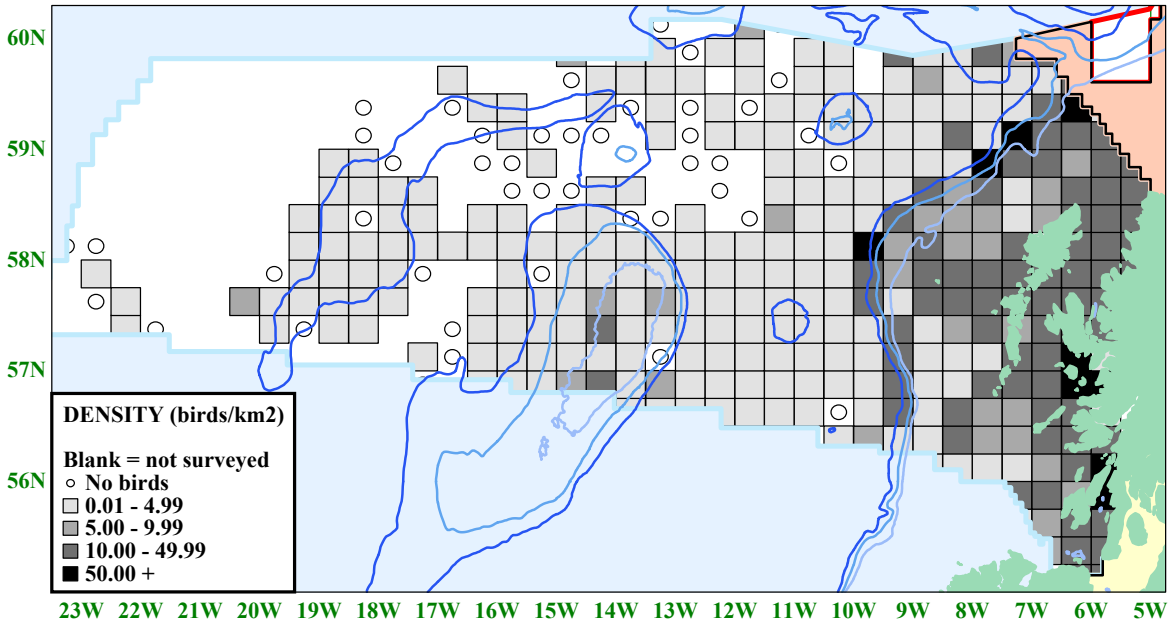
Figures from Pollock & Barton (2006) are included here to illustrate total seabird density in the area. Fulmar were the most frequently recorded species in high density areas, with gannet and kittiwake also commonly recorded. Combining all seabird density data for all months showed that the shelf edge and the Rockall Bank were the areas where highest seabird densities were likely to be encountered, with generally low densities elsewhere in offshore areas (Figure A3a.6.1).

Figure A3a.6.1 – Total seabird density throughout the year



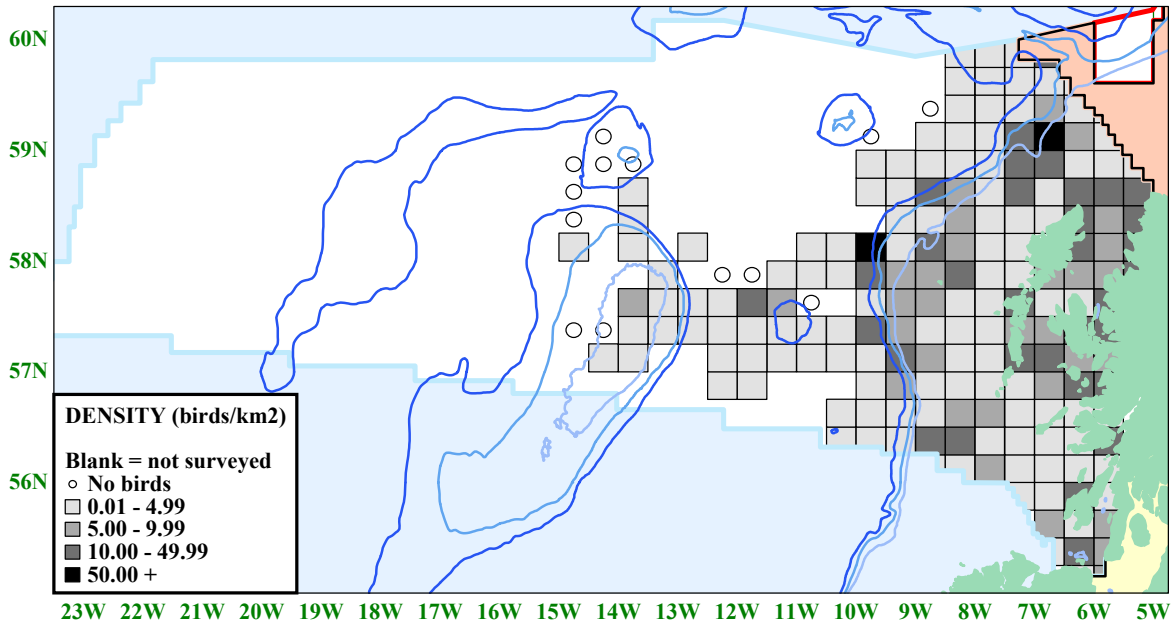
From ESAS data, seabirds generally occurred at moderate to high densities over much of the shelf in summer with low densities in offshore waters. Concentrations of birds were found along the shelf edge, north east Rockall Trough and over the Rockall Bank (Figure A3a.6.2).

Figure A3a.6.2 – Total seabird density in summer – April to September



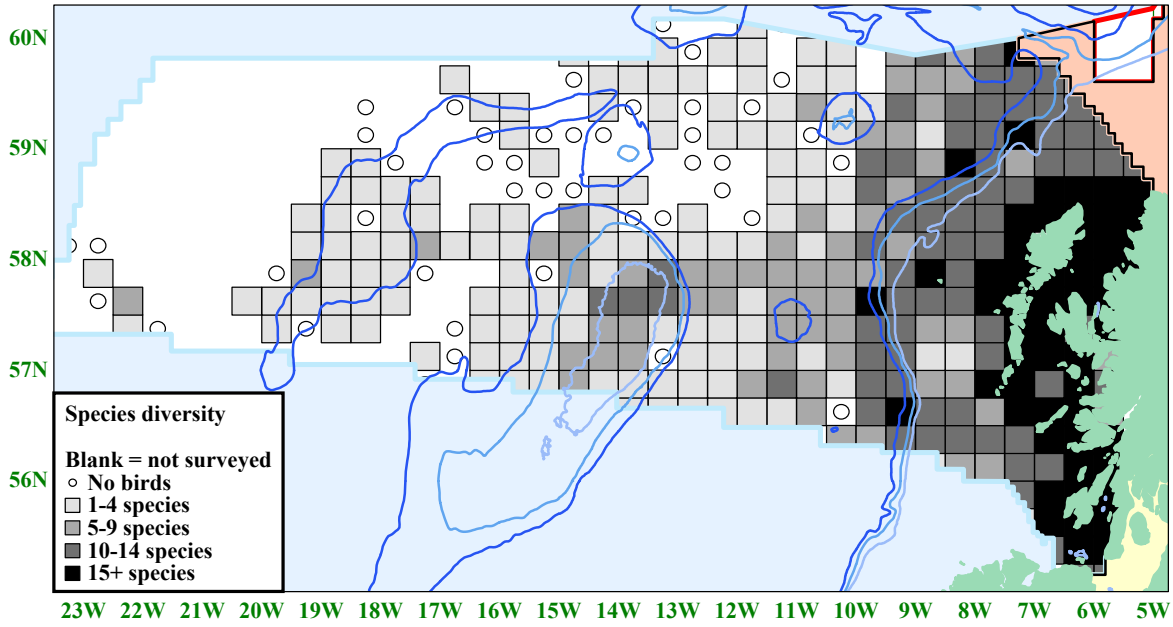
During the winter months, lower densities of birds were found along the shelf break and across much of the shelf. Low densities were generally found over deep waters although coverage was limited at this time. Moderate to high densities were recorded close to the Anton Dohrn Seamount and to the north and east of the Western Isles (Figure A3a.6.3).

Figure A3a.6.3 – Total seabird density in winter – October to March



In summer the Rockall Bank and Rockall Trough held between 5 and 14 species, and less than 5 species were recorded in most other offshore areas (Figure A3a.6.4). Species diversity was highest over the Rockall Bank in July and September, with fulmar, gannet and kittiwake being the most common species. Other species regularly recorded in these areas in summer included great shearwater, Manx shearwater, sooty shearwater, great skua and lesser black-backed gull (Pollock & Barton 2006).

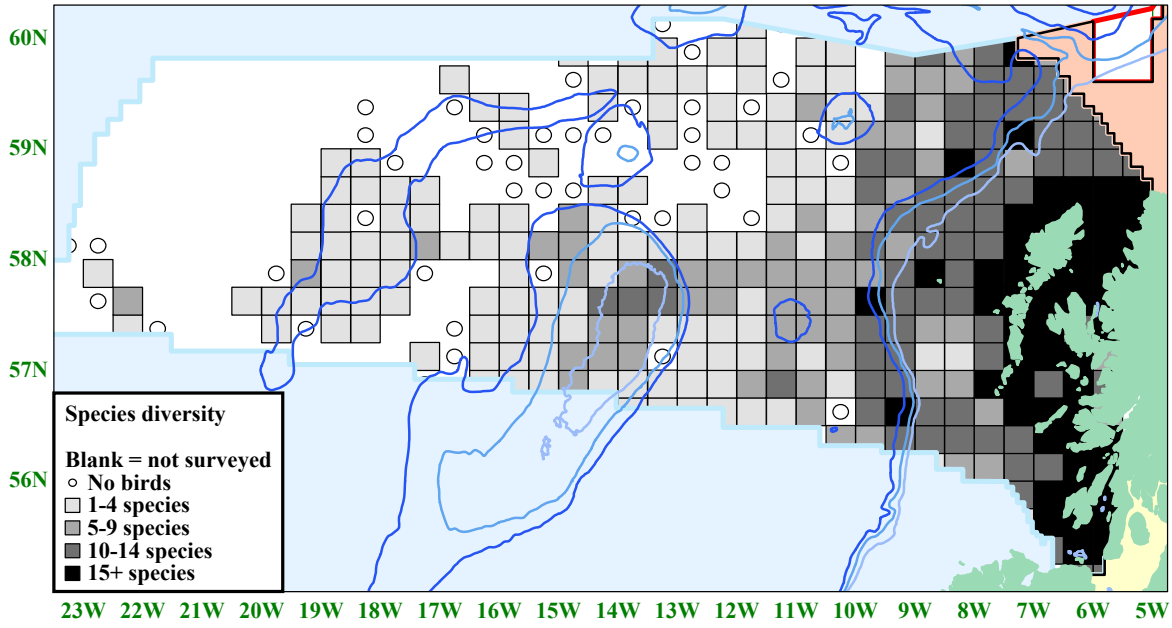
Figure A3a.6.4 – Species diversity in summer – April to September



Although survey coverage was not as extensive in the winter period, lowest species diversity was again recorded in offshore waters. Inshore waters around the Minch supported the greatest diversity of species. Between 5 and 14 species were recorded in the north east Rockall Trough and along the shelf break (Figure A3a.6.5). Less than 5 species were

recorded in most other parts of the Rockall Trough and Rockall Bank, with fulmar, gannet and kittiwake being the most common (Pollock & Barton 2006).

Figure A3a.6.5 – Species diversity in winter – October to March



A3a.6.13.2 Waterbirds

As all of the Regional Sea 10 and 11 areas are marine in nature, there are no breeding waterbirds in these regions; also no areas for wintering waterbirds.

A3a.6.14 Landbird migration

The food source of many land birds are seasonal, with the result many species migrate, including passerines, near passerines, raptors and owls sometimes over vast distances. The waters around the British Isles are well used by these birds during the spring and autumn migrations, with some areas being of greater importance than others for these birds. Precise migratory routes are not well known and it is currently thought that birds do not have preferred migratory corridors but instead have broad front movement across areas.

The principal areas used are the northern, central and southern North Sea areas (Regional Sea 1 and 2) which are crossed by many species of birds travelling between Britain and mainland Europe or Scandinavia, as well as the Channel (Regional Sea 3 and 4) which is also a favoured crossing point not only for birds from Britain, but also for birds from Ireland which cross the Celtic/Irish Seas, before crossing to mainland Europe, or birds moving south from Arctic areas.

Not all migrating land birds can be described here, but a few illustrative examples are given below (Wernham *et al*. 2002):

- Redwing (*Turdus iliacus*): this species breeds in northern and eastern Europe and winters in northern and southern Europe. British and Irish birds that move east to breed have been recovered from Norway to Russia. Autumn migration peaks in October, when many birds move into southern Norway and the southern North Sea coasts of eastern Britain, Belgium and the Netherlands. Numbers in these areas

decrease in November as birds move into western Britain, Ireland and particularly southwest France and Iberia. Travel can be recorded through the northern, central and southern North Sea (Regional Seas (RS) 1 and 2) the Channel (RS 3 and 4) and also the Irish Sea (RS 6).

- Swallow (*Hirundo rustica*): a summer visitor to Britain migrates from Britain (and Ireland) to South Africa for the winter. Late August sees the commencement of a southward movement, with birds appearing to move short distances every few days to settle at more southerly roosts. Irish birds probably cross the Irish Sea and move to Wales and southern England during autumn, but most leave Britain in September/early October. The Channel (RS3 and 4) and the southern North Sea (RS2) appear to be the most highly used crossings for birds leaving the UK.
- Song thrush (*Turdus philomelos*): these breed across most of Europe. The majority of British and Irish birds are sedentary but others make large-scale movements. Some British breeders winter in France, Spain and Portugal, utilising the Channel (RS3 and 4) as a crossing point, while other British breeders winter in Ireland, crossing the Irish Sea (RS6), which is also extensively used. The large numbers found In Britain during autumn may also include Scandinavian birds on passage.
- Long-eared owl (*Asio otus*): ringing recoveries suggest birds arriving in Britain and Ireland for the winter originate from Fennoscandia, with smaller numbers from Russia and elsewhere in eastern Europe. Movement appears to principally be across the central and southern North Sea (RS1 and 2) and also from Orkney across to mainland Europe (RS1).
- Osprey (*Pandion haliaetus*): seen in Britain between April and October. After breeding females leave first usually in the second half of August/ early September, followed by the eldest chick. Males remain until last of the brood is ready to leave. Birds migrate individually and not as a family group. A southward movement through north western France, into Spain and Portugal and on to Morocco, before reaching West Africa. Sightings and recoveries from Ireland and south west England suggest they make a long sea crossing to and from France or Spain. As well as being faithful to breeding sites, ospreys are also thought to prefer to winter in the same areas in successive winters. These birds are thought to use the Channel (RS3 and 4) as a crossing point. As well as native populations, ospreys from Fennoscandia also occur in both Britain and Ireland, traversing the northern, central and southern areas of the North Sea (RS1 and 2) as well as the northern section of the Irish Sea (RS6/7).

A3a.6.15 Recent SEA and other bird surveys

In order to provide data to inform several areas, including Strategic Environmental Assessment, , Environmental Impact Assessments for individual Round 2 offshore wind farm development projects, and the identification of marine Special Protection Areas, WWT (Wildfowl and Wetlands Trust) Consulting were commissioned to undertake a series of aerial surveys from 2004 which covered nearshore waters in northwest England (from Anglesey to the Solway Firth) in the Greater Wash and in the Thames (from Flamborough Head, Yorkshire, to Sandwich Bay, Kent).

There have also been a series of boat based seabird (and marine mammal) surveys conducted by Cork Ecology, the aim of which was to update existing European Seabirds at Sea (ESAS) data on seabird distributions and to fill some gaps in survey coverage, identified by the SEA Gap Analysis. These have focused on areas in the Outer Moray Firth, Central North Sea and the Dogger Bank

The locations of recent aerial and boat based surveys are shown in Figure A3a.6.6 overleaf.

Aerial surveys of strategic areas for R2 renewable licensing round

The WWT undertook surveys in Liverpool Bay, the Thames Estuary and parts of the Greater Wash between 2001/2002 and 2003/2004, primarily in winter and recorded large numbers of common scoter at several sites in the Irish Sea, notably Carmarthen, Cardigan and Liverpool Bays (Regional Sea 6). Common scoter distribution regularly extended up to 10km from shore and at one site, Shell Flat, up to 20km from shore, and most birds were found in waters less than 10m deep. Distribution was found to be broadly similar within and between winters, although there was some evidence of a gradual movement to deeper water during the course of a winter (Cranswick 2003, Cranswick *et al*. 2004).

A programme of aerial surveys, the aim of which was to inform the environmental impact assessment of offshore wind farms and aid potential marine Special Protection Area identification, was then initiated by the WWT's Wetlands Advisory Service (WAS) from winter 2004/05 to provide large-scale survey data covering the nearshore waters in Northwest England (from Anglesey to the Solway Firth), waters in the Greater Wash and the Thames (from Flamborough Head, Yorkshire, to Sandwich Bay, Kent). Survey periods were as described in Table A3a.6.34.

Figure A3a.6.6 – Areas of recent boat based and aerial surveys

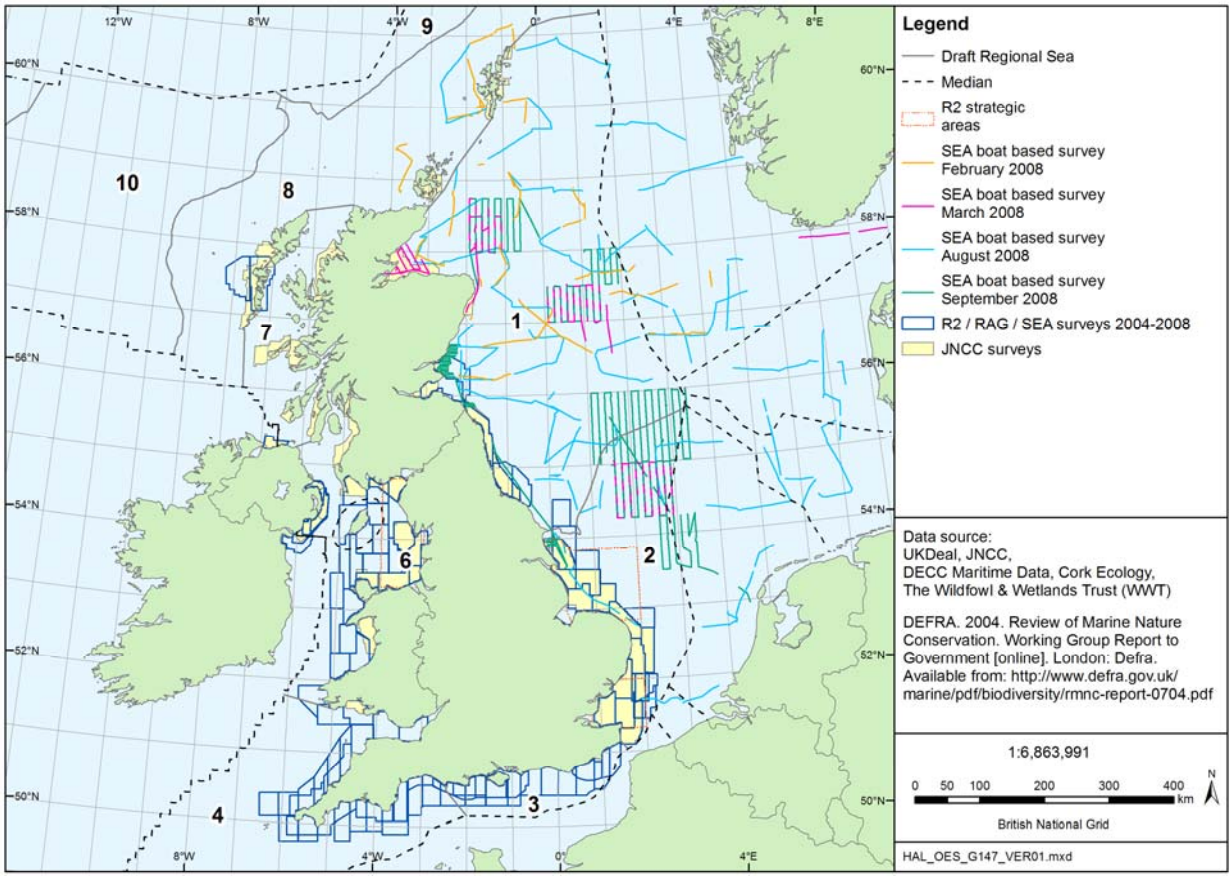


Table A3a.6.34 – Summary of aerial surveys in R2 strategic wind farm areas

Survey period	Description	2004/05	2005/06	2007
1	Early winter	23rd Oct – 21st Nov	17th Oct – 20th Nov	-

Survey period	Description	2004/05	2005/06	2007
2	Mid winter (1)	22nd Nov – 31st Dec	21st Nov – 31st Dec	-
3	Mid winter (2)	1st Jan – 9th Feb	1st Jan – 12th Feb	14th Jan-4th Feb
4	Late winter	10th Feb – 11th Mar	13th Feb – 12th Mar	18th Feb-17th Mar
5	Breeding: incubation	9th May – 5th Jun	8th May – 4th Jun	-
6	Breeding: chick rearing	6th Jun – 10th Jul	5th Jun – 9th Jul	-
7	Post fledging/moult	11th Jul – 21st Aug	10th Jul – 20th Aug	-

A report in May 2006 published final results from surveys undertaken between October 2004 and September 2005, while the report published in September 2007 details the final results from surveys conducted between October 2005 and August 2006. The reports also contain brief comparisons with previous studies. Table A3a.6.35 summarises waterbird distribution from these areas.

Table A3a.6.35 – Summary description of waterbirds in strategic wind farm areas (2005/06 final report)

Species	Description of distribution
Common scoter[1]	During winter, highest numbers recorded in the North West. Distribution was clumped. Peak numbers in the North West region was 25,000 birds (adjusted to 61,400 number of birds using "distance" estimate), in the mid winter period. Highest bird numbers located over Shell Flat, extending south to the mouth of the Ribble and in Colwyn Bay. The Solway held moderate numbers in early winter, falling as winter progressed. As winter progressed there appeared to be a gradual distribution shift southwards, with a movement to offshore areas in late winter. On the east coast, the majority of birds were in the Wash during early winter, with smaller numbers located off the North Norfolk Coast. Most birds occurred in the outer parts of the Wash. There was no obvious distribution changes as winter progressed and no apparent movement offshore. The Thames held the smallest and most variable number of birds during winter, with no birds during October-December. The peak of 273 birds (+ 955 birds from the Greater Wash area: adjusted to 1,868 number of birds) occurred in mid winter. Numbers of birds calculated using "distance" were between 1.5 and 3.5 times greater than actual counts, e.g. the periods with the greatest number of birds: Mid winter (2). NW total: No. of birds recorded = 24,424, Estimate = 61,416 birds Mid winter (1). East total (GW + TH) No. of birds recorded = 2,522 (all birds in GW), Estimate = 8,572 birds Few birds encountered in the North West during summer, with the majority of birds located less than 10km from the coast. Smaller numbers recorded off North Norfolk Coast during summer in similar areas to those in winter. Few were recorded in the Thames during summer, with most recorded off the coast of south Suffolk and north Essex.
Divers[2]	During much of the winter the Thames held the highest number of divers, with up to

Species	Description of distribution
	four times as many as the other strategic areas combined. Birds were generally widely distributed through the survey areas, with highest concentrations occurring off estuarine mouths and in inshore areas. Low densities of birds were recorded far from shore. Birds were often recorded in flocks of >10 near channels and sand banks mid way between Kent and Essex. There was some variation between mid and late winter: fewer birds were found in the south and in offshore parts of the north of the survey area, with birds appearing to concentrate in central areas and move inshore in the north. *Ca*. 100 birds recorded in Greater Wash during the winter, increasing to *ca*. 300 from January to March. During winter, small numbers of birds occurred far from shore (up to 50km). There appeared to be a general movement offshore in late winter. Birds were present in the North West, in low, but consistent numbers, throughout winter. Birds were widely distributed throughout the area with highest concentrations from the Ribble Estuary along the North Wales coast to Conway Bay and in the Solway. Smaller numbers were present in areas offshore from Morecambe Bay (birds found up to 30km from shore). During early winter, Solway was the most important area, holding almost 75% of birds recorded, with numbers dropping in in mid winter and remaining low for rest of winter. Numbers of birds along North Wales coast up to the Ribble Estuary increased in mid winter and remained stable during winter. The periods with the greatest number of birds were: Mid winter (1). NW total: No. of birds recorded = 187, Estimate = 1,518 birds Late winter. East total (GW + TH) No. of birds recorded = 1,733 (majority of birds, 1,361 in Thames area), Estimate = 8,572 birds No divers were recorded in the survey areas during summer surveys.
Little gull	In early winter, large numbers of little gulls were recorded in the Greater Wash area, with moderate numbers present in the Thames. Numbers here decreased during the rest of winter, with only small numbers present off the east coast. Birds showed a relatively continuous distribution over distinct areas, with few birds falling outside these areas. During mid winter there was a fairly continuous, even distribution off the North Norfolk coast between Hunstanton and Blakeney Point. Virtually no little gulls were recorded in the North West between Oct and Dec, with moderate numbers from Jan to Mar. During winter, little gulls in offshore areas from Cumbria to the Dee Estuary, gradually moved closer to shore from the Ribble Estuary southwards. The period with the greatest number of birds was: Mid winter (2). NW total: No. of birds recorded = 51 Early winter. GW total: No. of birds recorded = 222 Early winter. TH total: No. of birds recorded = 59 No birds were recorded in any of the survey areas during summer.

Species	Description of distribution
Eider	Large numbers of birds were recorded throughout the winter, with highest numbers in the Greater Wash (peak number of 2,358) during mid winter. Very few birds were recorded in the Thames (highest of 3 recorded in mid winter). The majority of birds were found at the mouths of large estuaries, with smaller numbers in shallow inshore waters. In the Greater Wash numbers were fairly constant through the winter, except in mid winter when numbers doubled and almost all of the birds were located in the Wash, mainly in shallow water off the northeast coast, with none being found more than 10km from shore. During winter the majority of birds recorded in the North West (peak in NW of 986 birds in mid winter) were in the outer parts of Morecambe Bay, with small numbers around Walney Island. Small numbers were also present in Conwy and Colwyn Bay, off the mouths of rivers Conwy and Clwyd. During summer all eider recorded occurred around the outer part of Morecambe Bay.
Manx shearwater	Moderate numbers of bird were recorded in the North West during summer, with a peak of 337 birds. Highest numbers occurred offshore from Blackpool and the Ribble Estuary. Small numbers occurred offshore from Cumbria and off North Wales, especially offshore from Conwy Bay and close to Great Ormes head, one of the few areas where they occurred close to shore. No birds recorded during winter.
Gannet	Large numbers of birds were observed in the Thames, with a peak count of 2,404 in mid winter. By late winter, and into summer, only small numbers were present (e.g. peak of 5 birds). Small numbers of birds occurred well offshore. Moderate numbers occurred in the Greater Wash areas in early winter (199 birds) and late summer (230 birds), with distribution varying between the two periods: higher numbers being recorded in the south in early winter. In the North West, moderate numbers of birds (278) were recorded in the summer. Highest numbers in mid to late summer (peak count 357). Small numbers were recorded in early winter (96 birds), and these dropped as winter progressed. Birds occurred offshore from Fleetwood to the Ribble Estuary and off North Wales, with birds off the Cumbrian coast occurring closer to shore. Highest densities were recorded offshore.
Gulls[3]	Birds were found in large numbers at coastal and inland sites. I The Thames held the largest numbers, followed by the Greater Wash area in winter. The Thames held similar numbers throughout the winter (*ca*. 4,700 and 6,100) except during mid winter, when there was a large increase to 16,156 birds. Birds showed a widespread distribution throughout the winter. Throughout winter, numbers of birds in Greater Wash area varied greatly, with no obvious pattern to the variation. In summer the number of gulls in the Thames decreased, with birds distributed in small concentrations throughout survey areas.
Kittiwake	Moderate to high numbers of birds were recorded over the winter, with highest numbers in Greater Wash in early winter (506 birds) then decreased in mid winter

Species	Description of distribution
	(201 birds) where they remained stable. In the Thames peaks of 537 (period 2) and 951 (period 3) birds were seen in mid winter. Summer numbers were fairly variable and displayed a more clumped distribution with an obvious shift to offshore areas, with few birds near the coast. Throughout the winter, and during summer, small numbers were recorded in the North West, with peaks of 325 birds (mid winter) and 281 (early summer) seen. There was little variation in the numbers of birds during winter. High numbers of birds were recorded off North Wales but low numbers off Blackpool. During summer, distribution was far patchier and areas off North Wales continued to hold large numbers, with more birds off Blackpool than in winter and few birds off Cumbria.
Terns	Large numbers of birds were recorded in the Greater Wash area during summer. Birds occurred throughout most of the Greater Wash area, with highest densities close to shore near Skegness, Lincolnshire, Scolt Head, Holkham NNR and Blakeney Point, North Norfolk and Winterton, Great Yarmouth. Distribution was similar in early and mid summer with slightly more birds in offshore areas in the early breeding period. The Thames held small numbers of birds during the summer with high variation seen between months: few birds were recorded in early summer, none in midsummer and small numbers in late summer. Highest numbers were found in offshore areas, with few high concentrations close to shore. Bird numbers were lowest in the North West but fairly stable throughout the year. Highest concentrations were almost all in nearshore areas, with few small isolated concentrations in offshore areas. Away from shore, birds were widely distributed in small concentrations extending well offshore.
Auks	Highest numbers of birds were recorded in the North West, with peak numbers in early and mid winter, then numbers dropped slightly. Birds showed clumped distribution in early winter with large concentrations off Anglesey and offshore from the mouth of the Solway. Concentrations dispersed through the winter, few birds were recorded in inshore areas. During summer birds were evenly distributed in the North West, then changed to clumped distribution (mid-late summer) with concentrations in offshore waters off Blackpool and inshore areas around Great Ormes Head. Large numbers were recorded throughout winter in all survey areas. The Greater Wash held highest numbers of birds in early winter. Numbers then dropped through winter and into midsummer, followed by an increase in late summer. In early winter, the majority of birds were located off the mouth of the Wash and during mid to late winter bird distribution shifted to the offshore area. There were small clumped concentrations of high density present in most survey periods, the position of which varied greatly. In summer, few birds were recorded in the Greater Wash area and these were located mainly in the north. In late summer, numbers of birds increased with birds occurring mainly in offshore areas, with large congregations off east Norfolk.

Notes: [1] The west coast held significantly higher numbers than east coast. [2] Red-throated, black-throated, great northern and those not identified to species. [3] Six species of gull, black-headed gull, common gull, lesser black-backed gull, herring gull, greater black-backed gull and kittiwake
Source: BERR (2007)

The results of survey work conducted between 2007 and 2008 have still to be published. Initial results indicate that few birds (mainly pelagic species and gulls) were observed in the Greater Wash in early winter 2007/08. In February 2008, large numbers of divers (*ca*. 160 birds) were observed offshore from Great Yarmouth, while moderate numbers of terns were observed offshore from Flamborough and Spurn Point in summer 2008 (WWT Consulting 2008). Figures A3a.6.7, 6.8, 6.9 and 6.10, show winter results from published, and the as yet, unpublished report. Full details of previous aerial surveys, including additional maps can be found in DTI (2006) and BERR (2007).

Figure A3a.6.7 – All birds in south west area – winter (Period 3, 2007)

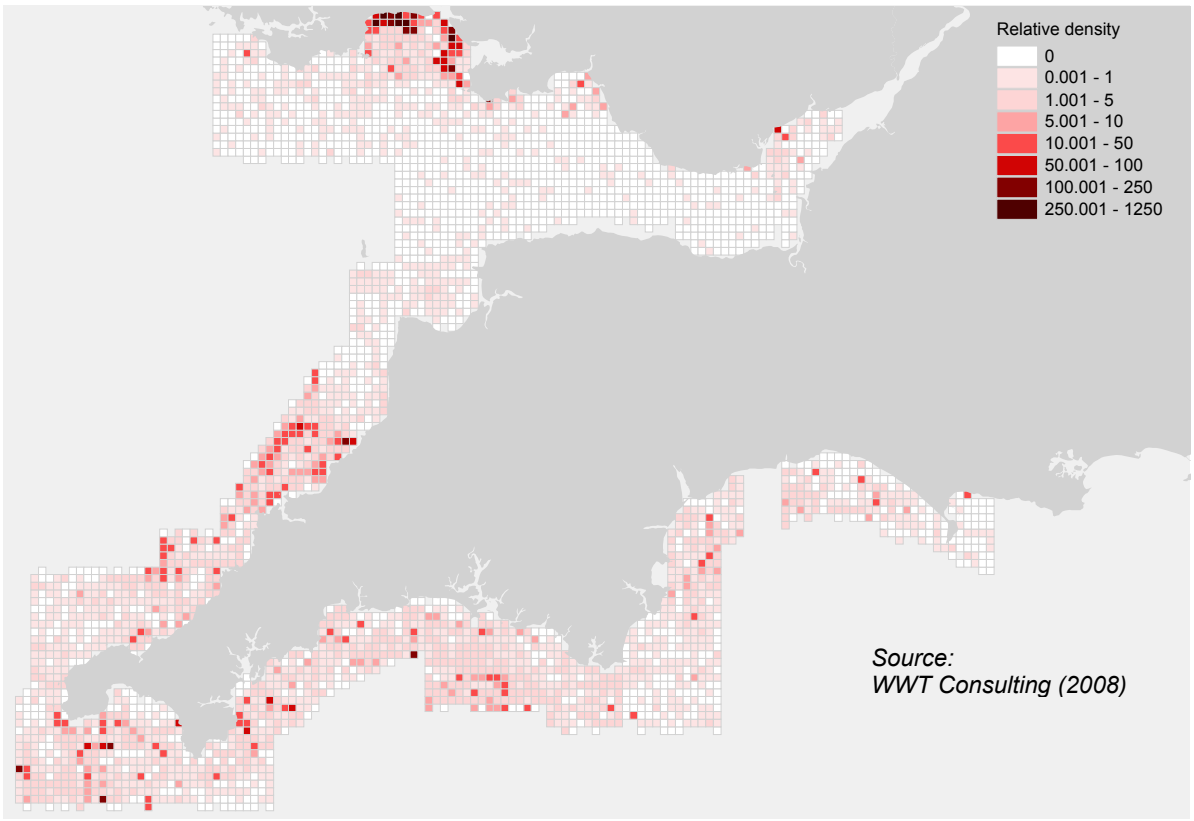
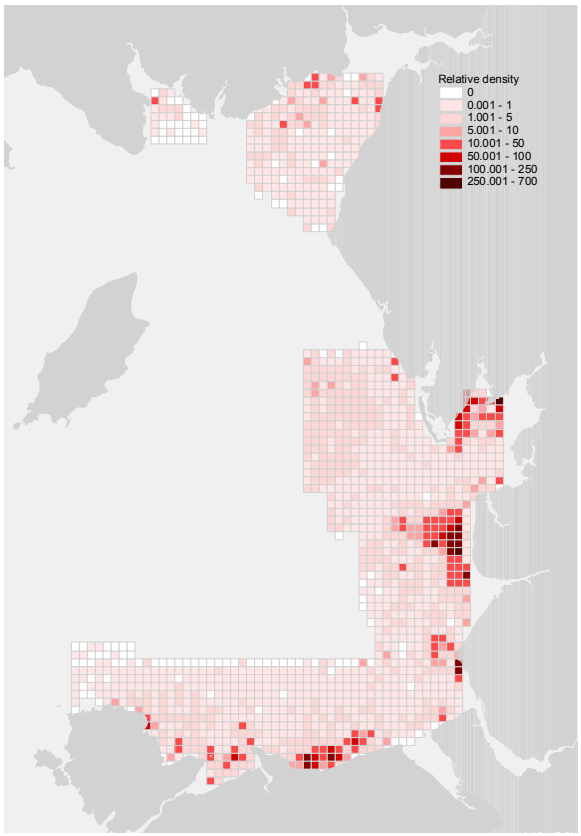
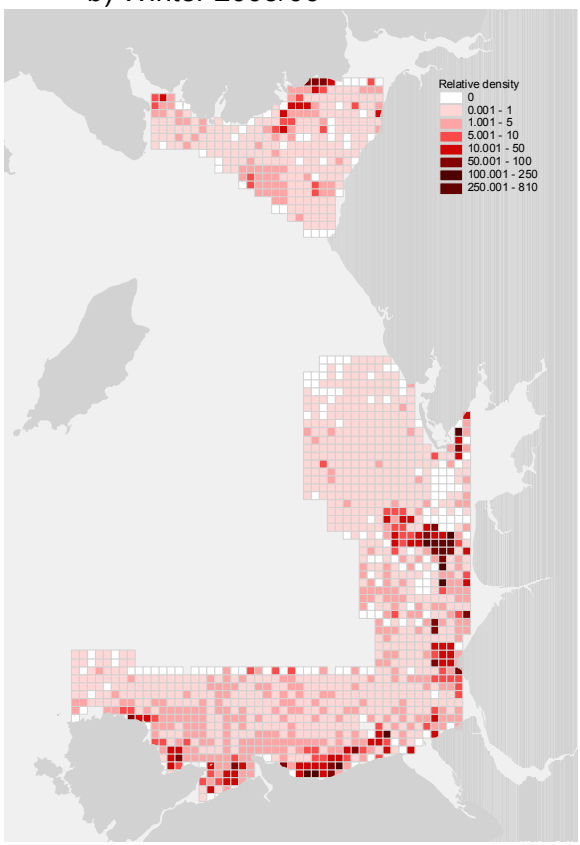


Figure A3a.6.8 a-c – All birds in north west areas – winter

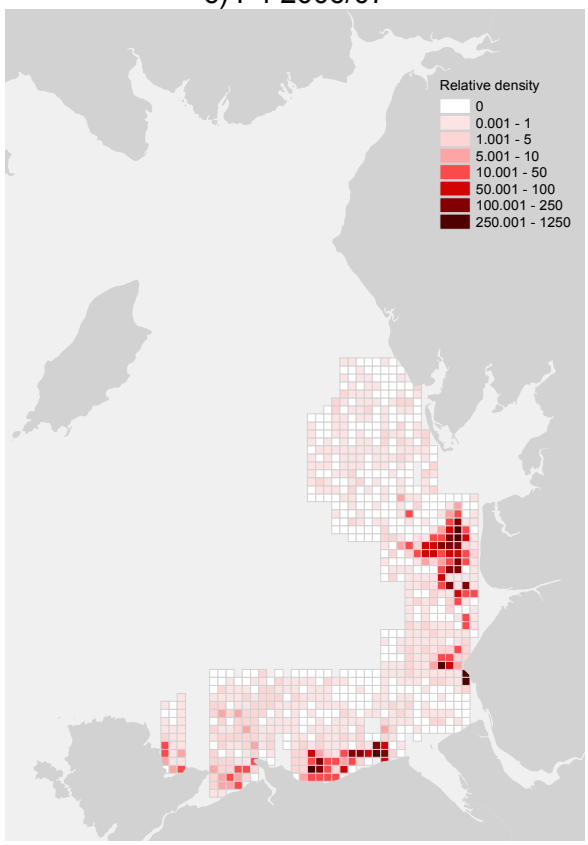
a) Winter 2004/05



b) Winter 2005/06



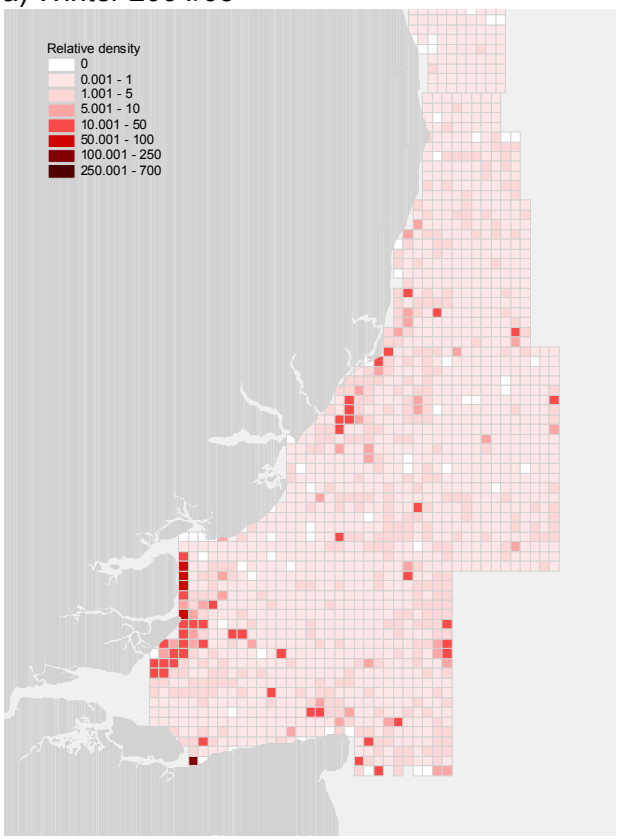
c) P4 2006/07



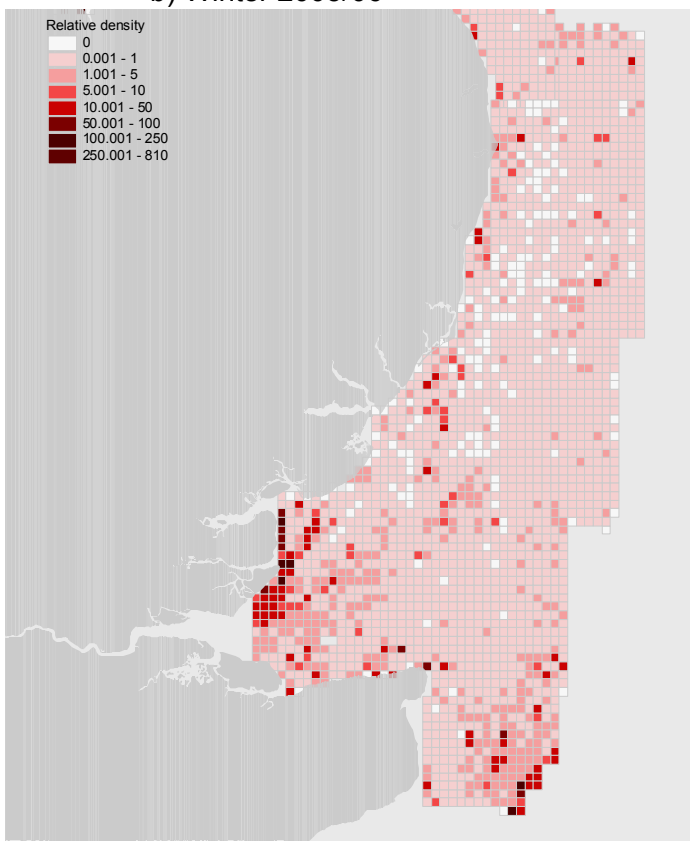
Source:
WWT Consulting (2008)

Figure A3a.6.9 a-c – All birds Thames – winter

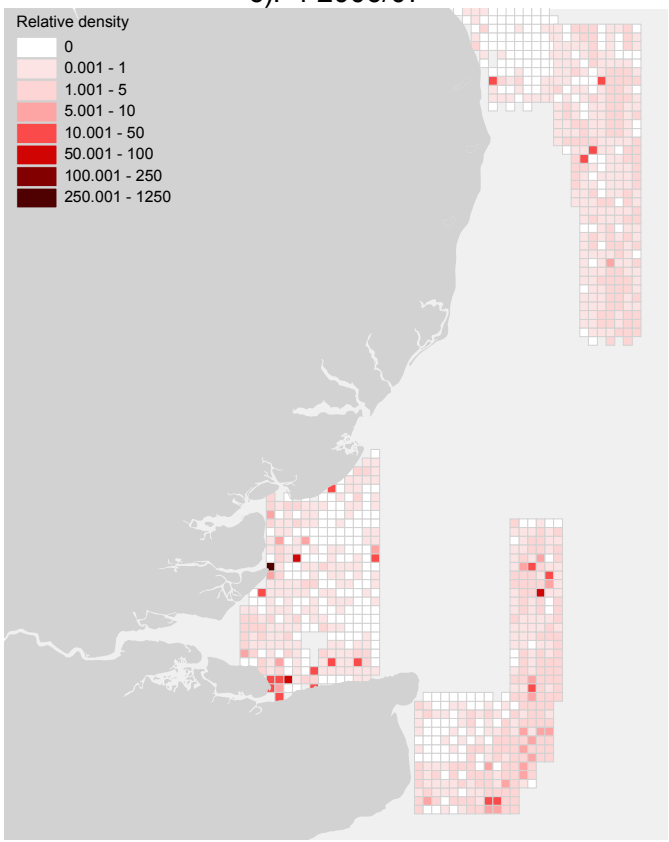
a) Winter 2004/05



b) Winter 2005/06



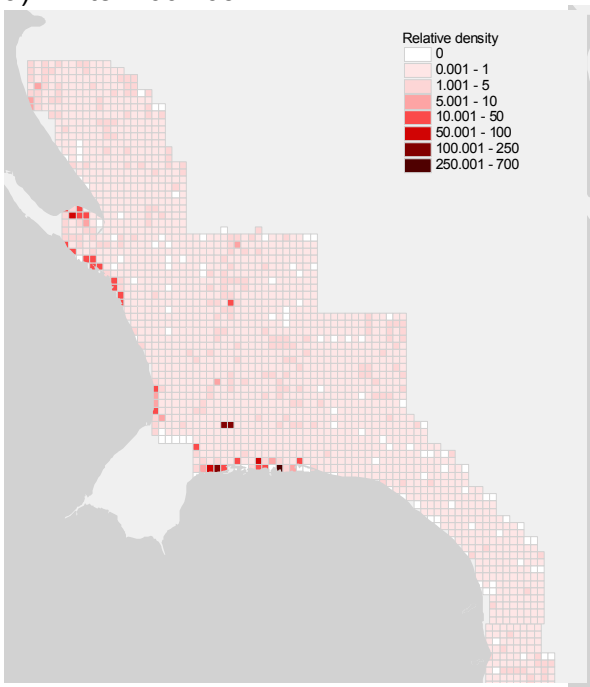
c)P4 2006/07



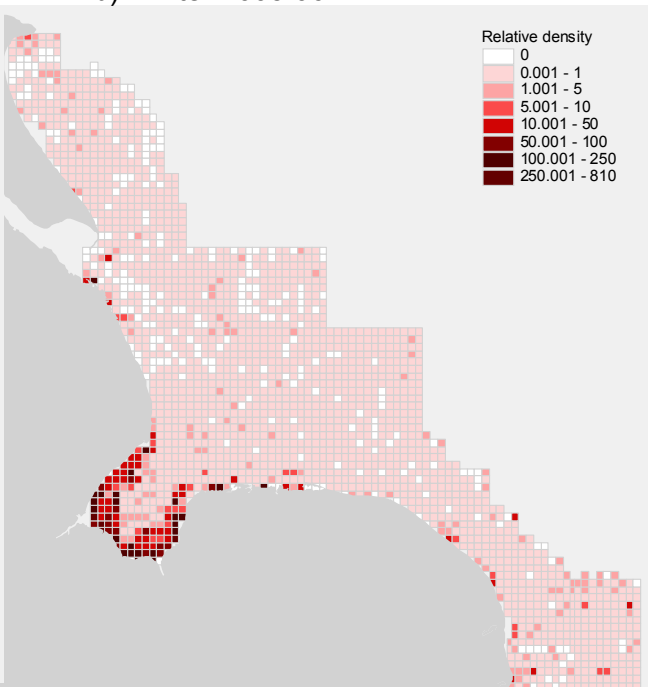
Source:
WWT Consulting (2008)

Figure A3a.6.10 a-c – All birds Wash – winter

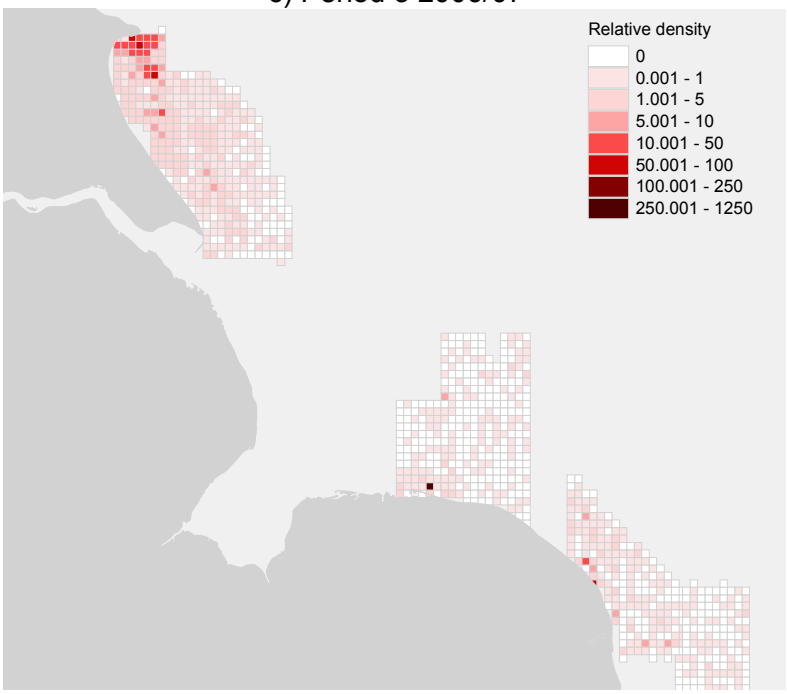
a) Winter 2004/05



b) Winter 2005/06



c) Period 3 2006/07



Source:
WWT Consulting (2008)

Surveys from the South West and Wales Strategic Area were undertaken between January and March 2007 and a further survey was conducted in autumn 2007, and these augmented surveys carried out during the same programme in the North West (which covered Shell Flat to the Dee Estuary and Red Wharf Bay), Greater Wash and Thames Strategic areas (WWT Consulting 2008). Survey dates are described in Table A3a.6.33 above.

Overall distribution was found to be similar to those observed during previous survey programmes, with high densities of birds in inshore areas, in areas where scoters occurred and in offshore waters of the Thames in late winter.

During mid winter over 13,000 common scoter were observed, with highest densities in the northwest and southeast of Carmarthen Bay within *ca*. 6km of the coast. Moderate numbers (1,773) were also recorded during autumn, again in northern parts of Carmarthen Bay, with the main concentration stretching from Pendine in the north west to Pembrey in the east, where birds occurred in moderate numbers up to 10km offshore.

In late winter 221 Manx shearwaters were recorded, predominately recorded in a strip approximately 12km off the north west coast of Cornwall, with smaller numbers off the north of the Land's End peninsula and off the south coast of Cornwall. Large numbers of gannet (1,362) were recorded during mid winter, mainly distributed off the north west coast of Cornwall, south of Land's End and south of Plymouth. Moderate numbers of this species were recorded during late winter in Carmarthen Bay and waters to the west of the Bay.

Auks were recorded in large numbers off the south west during both surveys. In mid winter, some 8,646 birds were counted, the highest density off Trevose Head and off Plymouth. Birds were also distributed, in smaller numbers, in Carmarthen Bay, the west and south coasts of Cornwall and along the Devon coast. In late winter 8,353 auks were recorded. Numbers had increased off the north Cornwall and south Devon coasts, with a corresponding decrease along the south coast of Cornwall.

Boat based surveys

Seabird and marine mammal surveys were conducted in the Outer Moray Firth, the central North Sea and the Dogger Bank between February and April 2008 and effort for these surveys are described in Table A3a.6.36. Three parallel transects, 27.8km in length, were proposed for each ¼ ICES rectangle which would result in 25km^2 effort, plus any additional effort gained when travelling between transects. At a minimum, target survey effort per ¼ ICES rectangle was set at 20km^2 to conform to the targets of previous studies (e.g. Pollock *et al*. 2000), as well as the recommendations of the SEA gap analysis (Pollock & Barton 2006).

Table A3a.6.36 – Survey effort between February and April 2008

Month	Survey vessel	No. of survey days	No. of ¼ ICES rectangles surveyed	Total survey effort (km^2)
February	*FRV Scotia*	19	78	451.42
March	*MV Luna A*	14	49	636.41
March	*MV Vos Northwind*	5	11	167.38
April	*MV Luna A*	1	6	26.55
Overall survey effort		39	130[1]	1,281.76

Notes: [1]. Some ¼ ICES rectangles were surveyed in more than 1 month.

Source: Cork Ecology (2008).

The survey areas were divided into two categories: core areas and supplementary areas (Table A3a.6.37) and three types of maps (density, abundance and sightings) were compiled to depict individual species abundance and distribution (Cork Ecology 2008).

Table A3a.6.37 – Survey effort in the three target study areas in February and March 2008

Priority	Study area	February surveys		March surveys			
		No. ¼ ICES rectangles	Total effort (km^2)	Target no. ¼ ICES rectangles	No. ¼ ICES rectangles	Targeted effort[1] (km^2)	Effort achieved (km^2)
Core	Outer Moray Firth	1	3.08	4	4	100	131.9[2]
	Central North Sea	1	6.93	6	6	150	157.84[2]
	Dogger Bank	-	-	9	9	225	231.19
Supplementary	Outer Moray Firth	2	10.72	5	2	125	26.94
	Central North Sea	3	19.35	8	3	200	6.76
	Dogger Bank	-	-	20	2	500	1.91

Notes: [1]. target was 25km^2 in 3 North-South transects per ¼ ICES rectangle. [2]. Some areas were re-surveyed in better conditions.
Source: Cork Ecology (2008).

Further survey work was carried out in the central and southern North Sea between 11th-22nd August 2008 (Cronin 2008a), the Dogger Bank between 1st-15th September 2008 (Leaper 2008) and the Outer Moray Firth, off the Firth of Forth coast and the central North Sea between 17th-30th September 2008 (Cronin 2008b). The survey results were broadly consistent with previous understanding of seabird distributions, though there were a small number of unexpected sightings/absences:

February-March 2008 surveys

- A single sooty shearwater was recorded to the west of Shetland on the 20th of February and while this is not an unusual species in UK waters in autumn, nor an unprecedented sighting, they should be breeding in the far south Atlantic at this time of year.
- Common gulls, unusual away from near-coastal areas, were sighted in February (single adults) feeding on fish west of the outer Moray Firth core area and in the south west of the central North Sea core area.
- In contrast to guillemot, very few razorbill were recorded during the February *Scotia* survey, with birds only recorded off the Aberdeenshire coast in low densities. Also during the March survey, razorbill, were not recorded in the central North Sea study area (guillemot were recorded in the central North Sea supplementary area).

11-22 August 2008 survey

- There was an unexpected paucity of birds in most areas, August is generally the peak month for bird migration but in virtually all areas visited there was little evidence of birds either being present or moving through.
- No particular unexpected species were encountered but the two Sabine's gulls and the two Balearic shearwaters were scarce migrants to the North Sea.

1-15th September 2008 (Dogger Bank) survey

- A high diversity of seabirds seen, with 22 species recorded in total and 21 of these within the Dogger Bank survey area. Numbers were much lower in the small part of the supplementary area which was surveyed.
- Bats are much less commonly encountered at sea, however 2 sightings were made in late morning on days when a number of migrant birds were recorded. Identification could not be made but they were judged to be larger than pipistrelles.

17th-30th September 2008 survey

- Outer Moray Firth area contained much higher densities of birds than noted on previous visits to the area: in particular significant numbers of guillemots were noted and large concentrations of fulmar on the 22nd (previous visits have only noted low numbers of auks)
- In the inshore areas off eastern Scotland, fewer divers and seaducks were recorded than had been expected and it could have been that these birds were only just beginning to return from their breeding areas, as evidenced by some of the red throated divers still being in summer plumage.

The main findings are summarised below.

From the February to March 2008 survey, a total of 28 species were recorded: guillemot and kittiwake the most common species and fulmar and gannet also frequent.

During February, highest densities of guillemot were recorded to the south west of Shetland and west of Orkney, near to the coast. High densities were also recorded east of the Aberdeenshire coast. Kittiwakes were scattered at low densities throughout the study area as were fulmar. Highest densities of gannet were recorded in the inner Moray Firth, north of Shetland and east of Orkney with low densities scattered elsewhere throughout the survey area. Both fulmar and gannet were often associated with the fishing vessel. Herring gull was the most frequently recorded gull species, with highest densities in the inner Moray Firth, an area which also recorded a significant concentration of great black-backed gull. Other species recorded on the February leg, in low to moderate numbers included: single sooty shearwater (west of Shetland); shag (west of Orkney and Shetland); common gull (west of the Outer Moray Firth); lesser black-backed gull (inner Moray Firth); Brunnich's guillemot (Norwegian sector of North Sea); razorbill (off Aberdeenshire coast); little auk (near Norwegian sector of North Sea) and puffin (south west of central North Sea).

In March, highest densities of guillemot were recorded in the Dogger Bank area, although distribution was more clumped than for other species observed. Densities were lower in the Outer Moray Firth and central North Sea. Low densities of kittiwake were recorded in the inner Moray Firth and central North Sea, while the Dogger Bank recorded high densities at this time: this species was the most numerous recorded over the Dogger Bank area during March. Low to moderate densities of fulmar were recorded throughout all the survey areas during this time, with densities higher in the Outer Moray Firth area. Gannet were recorded

in highest densities in the central North Sea (supplementary area) and Dogger Bank areas. Low densities of this species were found in the central North Sea and Moray Firth core areas. March saw low densities of herring gull in the Outer Moray Firth area, but no records in the central North Sea survey area and the species was also largely absent from the Dogger Bank area. Highest densities were seen in the inner Moray Firth.

Other species recorded on the March leg included: black-throated diver (inner Moray Firth); great northern diver (inner Moray Firth); cormorant (south east of Dogger Bank, inner Moray Firth); shag (inner Moray Firth); eider (inner Moray Firth); long-tailed duck (inner Moray Firth); black-headed gull (inner Moray Firth); common gull (central North Sea, Dogger Bank); lesser black-backed gull (west of Outer Moray Firth, Dogger Bank); great black-backed gull (Outer Moray Firth, Dogger Bank, central North Sea); razorbill (Dogger Bank, Outer Moray Firth); little auk (all three core study areas); puffin (all three core study areas, although distribution was patchy).

A3a.6.16 Other bird surveys

Aerial surveys Horns Rev

In recent years, with the advent of offshore wind farm developments in the Danish sector of the North Sea, a number of bird surveys have been conducted in the Horns Rev area.

As part of the approval for siting an 80 turbine wind farm at Horns Rev in 2002, conditions included programmes for establishing the environmental impacts of both the construction phase and also the initial operational phase of the farm. Surveys were carried out during 1999-2001 and reports describing bird numbers and distributions were published in 2000 (Noer *et al*. 2000, Christensen *et al*. 2001, as cited in Christensen *et al*. 2002). It was found from these surveys that the wind farm area did not appear to be of importance to the birds' exploitation of the Horns Rev area, with species such as divers, gannet, terns, auks and gulls generally showing scattered and variable distribution mainly in areas to the north and south of Horns Rev. Coastal areas were exploited by species such as eider and common scoter, although common scoter were found in the wind farm area during a spring time survey.

Other work

COWRIE (Collaborative Offshore Wind Research into the Environment), is a registered charity set up to advance/improve the knowledge of the potential environmental impacts of offshore wind farm development in UK waters. To date, three BTO prepared reports have been published by COWRIE. One looked at the potential use of viability analysis to assess the impact of offshore wind farms on bird populations (Maclean *et al*. 2007) and a second looked at the use of aerial surveys to detect bird displacement by offshore wind farms (Maclean *et al*. 2006). A third report examining the further use of aerial surveys to detect bird displacement by offshore wind farms has been prepared by BTO (Maclean *et al*. 2007).

Full scale trials have been conducted of high definition video survey technique for offshore wind farm sites – following an initial investigation into the use of this technique in 2007 (Mellor *et al*. 2007, Mellor & Maher 2008). COWRIE also published a report of the outcome of a workshop held on the cumulative impacts of offshore wind farm on birds (Norman *et al*. 2007).

There are several ongoing/forthcoming COWRIE projects relating to birds and renewables:

- Quantifying the relative use of coastal waters by breeding terns through visual tracking, colony transects and simulation modelling: towards effective tools for planning and assessing the impact of offshore wind farms. Project commenced in July 2008 with a completion date late 2009.
- Development of guidance on ornithological cumulative impact assessment for offshore wind farm developers. Project commenced in June 2008, due to complete in early 2009.
- A project to satellite tag whooper swans to better understand migration routes between breeding and wintering grounds and their relation to the location of UK wind farms.

There are also a large number of aerial and boat based surveys carried out by industry both as part of project specific Environmental Impact Assessments and as part of ongoing monitoring commitments on the operators. Below is a small sample of reports available, with the more extensive list and access to the reports available via the COWRIE website:

- Scira Offshore Energy ltd – aerial based survey undertaken at the site of the Sheringham Shoal Offshore Wind Farm
- Warwick Energy Ltd – aerial and boat based surveys undertaken at the site of the Thanet Offshore Windfarm, between November 2004 and September 2005 (total of 11 boat and 4 aerial surveys)
- Dong – 3 aerial surveys of birds in the area west of Walney Island in the Irish Sea.
- ECON – boat based surveys at the site of the Lincs Offshore Wind Farm
- Centrica – in fulfilment of FEPA licence requirements ongoing monitoring carried out covering the two wind farm sites (Inner Dowsing and Lynn) and a control site. Eight surveys carried out between July and December 2007.
- Kentish Flats Offshore Wind Farm – bird monitoring summary in fulfilment of FEPA licence monitoring requirements. Report covers results of 17 boat based surveys from December 2004 to November 2005 and aerial data collected over 6 surveys, during the same period.

Surveillance of winter and spring aggregations of seaducks, divers and grebes

The JNCC conduct a winter survey programme of winter aggregations of seaducks, divers and grebes in inshore waters around the UK. This aim is to collect data on non-breeding numbers and distributions of these species within UK coastal waters. This survey programme, along with the Wildfowl and Wetlands Trust aerial surveys (Austin *et al*. 2008), supports two international instruments: the African-Eurasian Migratory Waterbird Agreement (AEWA: established under the Convention on the Conservation of Migratory Species of Wild Animals – also known as CMS or Bonn Convention (CMS 1999) and the European Union Birds Directive (EUROPA website).

Lewis *et al*. (2008) describes the results from an aerial survey conducted between January and March 2007 and Söhle et al. (2006) describes results from the survey carried out between December 2005 and February 2006 (with additional surveys in May 2006) by the JNCC of wintering aggregations of seaducks, divers and grebes within a number of Scottish inshore areas of known importance for these groups: Aberdeen Bay; the Moray and Dornoch Firths; northern Orkney; the west coast of the Western Isles; Sound of Gigha and outer West Loch Tarbert, Coll; Tiree and the Sound of Mull, Firth of Clyde ad Loch Ryan and Luce Bay.

For the last two years data currently available (2005/2006 and 2006/2007), ten species of bird were recorded during the survey: red-throated diver, black-throated diver, great northern diver, greater scaup, common eider, common scoter, velvet scoter, long-tailed duck, common goldeneye and red-breasted merganser, while for both years there were no

observations of red-necked, great crested or Slavonian grebes, despite areas of known concentrations being surveyed. The number of each species recorded in the 2006/2007 survey are shown in Table A3a.6.38.

Table A3a.6.38 – Species recorded in aerial survey areas from inshore survey 2006/07

Date	Area	Greater scaup	Common eider	Common scoter	Velvet scoter	Goldeneye	Long-tailed duck	R-breasted merganser	R-throated diver	B-throated diver	G-northern diver	Unidentified diver
23/1/2007	Firth of Clyde	232	185	83		2	4	13	21		10	
23/1/2007	Luce Bay		36	177			2		3		17	1
25/1/2007	Firth of Clyde		583				5	3	25		9	
25/1/2007	Scapa + N Orkney		83	37			9	1	2		17	9
3/2/2007	Moray extended area		791	684	84		250		21		31	10
18/2/2007	Scapa + N Orkney		789	35			393	39	7		115	
18/2/2007	Sound of Mull		138				77		5		23	5
23/3/2007	Sound of Gigha		226	19	5		2	14			171	1
23/3/2007	Sound of Mull		10					11			12	
25/3/2007	Western Isles		526				41	31			128	
26/3/2007	Luce Bay		31	104	1	7		2	37	1	40	3
26/3/2007	Western Isles		130	7			1	1			24	
27/3/2007	Firth of Clyde	132	829	15			7	17	47	7	10	4
26/4/2007[1]	Aberdeen Bay		174	115			2	4	50			

Notes: [1] An additional survey of Aberdeen Bay was conducted in April to record spring aggregations
Source: Lewis et al. (2008)

The surveys showed highest numbers of great northern divers were found in areas including Orkney, Western Isles, the sound of Gigha and Luce Bay while highest numbers of red-throated diver continued to be recorded at Aberdeen Bay (with the Moray Firth also recording high numbers during 2005/2006).

In Orkney, the Moray Firth, Firth of Clyde, Western Isles, and Sound of Gigha, the 2005/2006 survey recorded larger numbers of common eider than that seen during the 2006/2007 survey, with the highest number recorded at the Western Isles (948 birds during 28-31 January 2006 survey), however these areas clearly remain important for this species (Söhle *et al*. 2006). Key areas for long-tailed duck included the Moray and Dornoch Firths (524 birds) and Orkney (300 birds) while the Moray Firth and Dornoch Firths wee also important for common scoter (205 birds) as was Aberdeen Bay (455 birds) and Luce Bay (182 birds) (Söhle *et al*. 2006) – sites which also recorded the highest numbers during the 2006/2007 survey. In contrast with the 2006/2007 survey, no velvet scoter had been recorded during the 2005/2006 survey in the Moray Firth area.

A3a.6.17 Evolution of the baseline

A3a.6.17.1 Seabirds

As well as obtaining accurate estimates of the population size and distribution of those 25 seabird species that breed in Britain and Ireland, Seabird 2000 also sought to determine whether small scale population trends observed within regions or individual colonies were representative of the wider populations; and to identify long-term (30 years) trends by comparing the findings from Seabird 2000 with those from the previous two censuses. Mitchell *et al*. (2004) showed that since the mid 1980s, contrasting trends have been evident in populations of seabirds breeding in Britain and Ireland. Within species, different trends have also been seen among regions.

Table A3a.6.39 – Changes in numbers of seabirds breeding in the UK 1969-2006 Coastal colonies only

Species[1]	% change since Seafarer (1969-70)	% change since SCR (1985-88)
Fulmar	74	0
Gannet	90	40
Shag	-5	-25
Cormorant	44	7
Arctic skua	106	-37
Great skua	213	26
Common gull	65	39
Black-headed gull	6	2
Herring gull	-57	-17
Lesser black-backed gull	83	42%
Great black-backed gull	-12%	-6
Kittiwake	-7%	-23
Sandwich tern	18	-11
Roseate tern	-65	52%
Common tern	-3	-2
Arctic tern	7	-29
Little tern	12	-25
Guillemot[2]	139	32
Black guillemot[3]	-	-
Razorbill[2]	29	23
Puffin	33	19

Notes: [1] All counts are of pairs unless otherwise stated, [2] counts of individuals, [3] counts of pre-breeding adults: pre-breeding surveys were not conducted during Operation Seafarer (1969-70).
Source: Mitchell et al. (2004), Mavor et al. (2008)

Through an ongoing programme of surveys, the Seabird Monitoring Programme identifies notable changes in seabird numbers or breeding performance, with Regional population trends assessed using population indices (with the proviso that colonies monitored may not be representative of British or Irish populations as a whole (Mavor *et al*. 2008).

The European Seabirds at Sea (ESAS) database and the JNCC seabird vulnerability index provide useful information at determining seabird distribution and seabird vulnerability,

however coverage is not complete and publications from the data are now dated, with some over 10 years old. In 2006 a report was published by Cork Ecology as part of the SEA process: An analysis of ESAS seabird surveys in UK waters to highlight data gaps in coverage (Pollock & Barton 2006). The analysis found that the ESAS dataset contained 24 years of data from March 1980 to August 2003, with almost 77% of the data over 10 years old (only 7% of the data were collected between 1999 and 2003). Highest survey coverage was in July with the lowest in December. Of the 59 species recorded during ESAS surveys, it was thought that 25 species were under-represented: 22 species found in inshore waters were under-represented due to lack of suitable surveys in these areas of which 2 species (Slavonian grebe and black-necked grebe), were not recorded by ESAS surveys. Three offshore species: storm petrel, Leach's petrel and grey phalarope were thought to also be under-represented and there were large data gaps found for offshore waters.

Although the recent aerial surveys have gone some way to address gaps from inshore waters, the aerial data are not yet included in ESAS database due to differences in data collection and analysis methodology. Vulnerability maps based on ESAS data therefore do not include this new data, much of which is concentrated on inshore waters and known "hotspots" for the presence of birds.

Recent and current survey work includes dedicated charters to survey areas of the Outer Moray Firth, Central North Sea and Dogger Bank in March 2008 and September 2008 (the survey for the Dogger Bank area commenced 1st September 2008). As well as these, in February and August 2008, seabird surveyors were present on FRV Scotia and Cefas Endeavour during the IBTS (International Bottom Trawl Survey) cruises in the North Sea.

Initial analysis of seabird data from RSPB coastal reserves indicates that 2008 was a poor breeding season for kittiwakes, Arctic terns and Arctic skuas, with few to no chicks reared to fledgling in the far north (RSPB website). There has been a steep population decline in many seabird species in recent years. In 2008, kittiwakes declined by 57% and 89% for the period 1999-2008 at the Copinsay and North Hill reserves respectively; while the Mull of Galloway and Bempton Cliff colonies showed a decline of 50% on 2005 and 13% on 2000 figures respectively (RSPB website). Shetland and Orkney reserves saw a 30% decline in the year for the Arctic skua to 65 pairs and Arctic tern colonies on the northern Isles at Mousa, North Hill and Copinsay failed to produce any young (RSPB website). These declines may be linked to changes in food supply resulting from alterations in sea temperature which have in turn influenced a regime shift in plankton and a further change in sandeel distribution (RSPB website) which has been linked to low success rates in seabirds in times of restricted availability (Mavor *et al.* 2008). Other seabird species including great skuas, gannets and cormorants have experienced modest increases in their numbers, while herring gulls have remained stable. Gannets and guillemots have shown increases in 2008 at Bempton Cliffs and Flamborough Head, though puffin populations have declined. The guillemot population in 2008 was recorded to be 60,000 pairs, a 25% increase since 2000 (RSPB website).

A3a.6.17.2 Waterbirds

The annual report "*The state of the UK's birds*" is now in its eighth year. This is a collaborative publication from three NGOs, the RSPB, the BTO and the WWT, and the UK Government's four statutory nature conservation agencies, Countryside Council for Wales (CCW); Environment & Heritage Service (Northern Ireland) (EHS); Natural England (NE) and Scottish Natural Heritage (SNH). The report is an amalgamation of data from annual, periodic and one-off surveys and studies and gives an overview of the health of bird populations in the UK, as well as its overseas territories.

A number of breeding and wintering bird species show trends (Table A3a.6.40 and A3a.6.41), with some showing a marked difference in their numbers.

Table A3a.6.40 – Trends in common breeding waterbirds in the UK

Species	Long-term trend % (1970-2005)	BBS[1] Trend % (1994-2007)
Mute Swan	151[2]	0
Greylag goose	n/a	220
Canada goose	n/a	149
Little grebe	186[2]	21
Great crested grebe	n/a	18
Golden plover	n/a	1
Curlew	-54[2]	-36
Common sandpiper	-22[3]	-18
Shelduck	220[2]	-27
Mallard	98	27
Tufted duck	15[3]	67
Moorhen	-4	16
Coot	77[2]	32
Oystercatcher	n/a	-17
Lapwing	-47[2]	-18
Snipe	n/a	38
Redshank	n/a	-12

Notes: [1] Breeding Bird Survey, 2 the trend during the period covered solely by the Common Bird Census (prior to 1994) may be unrepresentative of the UK due to geographical or habitat-related bias. [3] Long-term trend 1975 to 2006
Source: Eaton et al. (2008)

Species like curlew, common sandpiper and lapwing are consistently showing a decline in numbers between surveys.

Table A3a.6.41 – Trends in wintering waterbirds in the UK

Species	Long-term trend % (1979/80-2004/05)	Ten-year trend % (1994/95-2004/05)
Mute swan	111	22
Bewick's swan	12	-30
Whooper swan	270	124
Pink-footed goose	238	19
European white-fronted goose	-60	-56
Greenland white-fronted goose	n/a	-20
Icelandic greylag goose	-1	-8
North-west Scotland greylag goose	n/a	81
Re-established greylag goose	900	92
Canada goose	178	37
Greenland barnacle goose	n/a	41
Svalbard barnacle goose	217	50

Species	Long-term trend % (1979/80-2004/05)	Ten-year trend % (1994/95-2004/05)
Dark-bellied Brent goose	27	-27
Canadian light-bellied Brent goose	n/a	14
Svalbard light-bellied Brent goose	210	62
Shelduck	-11	-13
Wigeon	71	9
Gadwall	396	52
Teal	62	23
Mallard	-30	-12
Pintail	-4	18
Shoveler	57	26
Pochard	-39	-41
Tufted duck	2	-5
Scaup	-6	42
Eider	-29	-3
Goldeneye	-1	-26
Red-breasted merganser	-1	-36
Goosander	8	-30
Ruddy duck	443	56
Little grebe	n/a	40
Great crested grebe	n/a	6
Coot	n/a	7
Oystercatcher	9	-3
Avocet	>1000	111
Ringed plover	-13	-26
Golden plover	271	63
Grey plover	79	-30
Lapwing	123	-11
Knot	28	5
Sanderling	-2	8
Purple sandpiper	-59	-62
Dunlin	-21	-31
Black-tailed godwit	268	73
Bar-tailed godwit	-10	-5
Curlew	40	-5
Redshank	22	3
Turnstone	-8	-22

Source: Eaton et al. (2008)

In Britain, numbers of wintering birds have been recorded as part of the Wetland Bird Survey for over fifty years. A system was subsequently developed (Underhill 2000, Atkinson *et al*. 2006) to provide a standardised method of identifying the changes in numbers at a variety of spatial and temporal scale for a range of waterbird species, with those species which have undergone major changes in numbers being flagged by issuing an alert (BTO website). These alerts are advisory and subject to interpretation and are used to direct research and conservation effort (BTO website).

The online WeBS Alerts System has site accounts for over 80 SPAs and 50 Sites of Special Scientific Interest which includes information on trends and percentage changes over 5, 10 and 25 years in the wintering waterbird species for which each protected site was designated for, with comparisons made between these site-specific trends with regional and national trends. WeBS has recorded that over the last three decades, many species have increased in numbers, however, declines are beginning to be detected in species such as dark-bellied Brent goose, shelducks, ringed plovers and turnstones, although the reasons for these declines are not discussed further in the WeBS report. These species are regularly found in one or more of the Regional Sea areas, and with the exception of turnstone which occurs at sites in Britain in nationally important numbers (13 sites, main site Tiree nearly 1,500 birds in 2006/07 and Thanet Coast >650) the remaining species occur at sites in internationally important numbers: dark-bellied Brent goose, 13 sites (main site the Wash >20,000, and Thames Estuary >8,000); shelduck, 10 sites (main site Mersey Estuary (>16,000) and Dee Estuary (England and Wales) (>10,000) and ringed plover, 1 site, Thames Estuary (>900) (Austin *et al*. 2008).

A3a.6.18 Environmental issues

Seabird population dynamics differ from those of most landbirds: annual adult survival rates are high and generally exhibit a relatively low variability among years; productivity is comparatively low due to small clutch sizes; juvenile survival is lower than adult survival and tends to be more variable between years and maturity is delayed, with some birds waiting several years before recruitment into the breeding population (e.g. *ca*. 2-3 for cormorants, 3 for terns, 4-5 for gulls, gannets and 9 for fulmars). The rate of recruitment in seabirds is low due to factors such as low productivity, immature survival and delayed age of first breeding, therefore the rate at which seabird populations can increase is relatively slow compared to most landbirds (Mitchell *et al*. 2004).

Variability in demographic patterns are visible across taxonomic groups of seabirds. Cormorants, terns and gulls have relatively low survival and high recruitment rates while the converse is true of families such as petrels, auks, gannets and great skuas. Seabird species with high survival rates/low recruitment are sensitive to changes in adult mortality, while those with low survival rates/high recruitment will be sensitive to parameters that determine recruitment rates (the rate at which immature birds join the breeding population for the first time).

Seabird and other waterbird populations can also decline due to other external factors including food availability, predation and habitat loss, disease, exploitation and pollution.

A3a.6.18.1 Seabirds

One of the variables that strongly affect seabird demography is food: its availability, abundance and distribution.

Adult survival rates tend to be less sensitive to reduction in food availability, however seabird breeding success can be significantly affected by a relatively small reduction in food availability, i.e. when food availability is low, seabirds will fail to breed or young will starve. As reproduction is costly in terms of energy expenditure, seabirds will not exert high breeding effort in years of poor food supply, thereby improving their chances of surviving to breed in subsequent years. Reduction in adult survival will occur in years of exceptionally poor food availability when there is insufficient food available for self-maintenance.

The affects of prey abundance on seabird reproduction success and adult survival will vary depending on the seabird species. Effects on species which have characteristics such as large foraging ranges and low foraging costs, including being able to exploit a range of prey species at a range of depths, will be less than on those species that for example are restricted to feeding close to colonies or unable to dive and instead have to feed on the surface of the water, as these will only be able to access a small proportion of the prey present and will not be buffered against a reduction in food abundance (Furness & Tasker 2000). Those species with shorter foraging distances will also be affected by food distribution, as seabirds need to nest on suitable habitat that is within foraging range of sufficient prey. If prey distribution changes, for example moving out with current foraging ranges, alternative nesting sites may not be found.

Intra and inter-specific competition will also affect food availability; thereby playing an important role in density dependant regulation of seabird population size. This can occur during winter when there is a widespread depletion of food resources, or during summer, when there could be a local depletion within the foraging range of a colony.

Anthropogenic activity has caused changes in the availability of food for seabirds. An increase in some seabird species may have been due, in part, to an abundance of food becoming available through fishing activity: with scavenging birds following fishing vessels and feeding on discards and offal from the boats. In recent years, the changes in fishing policies have seen a reduction in fishing effort, an increase in mesh size and a retention of offal for conversion to fish meal, thereby reducing this as an exploitable food source for seabirds. This is not only thought to be affecting breeding success, but is also thought to be having an affect on over winter survival of adults (Mitchell *et al*. 2004).

There is an increasing problem with seabirds being caught as bycatch in the longline fishing industry. This fishing method involves setting several kilometre long fishing lines with thousands of baited hooks, which can attract scavenging seabirds. These can then become hooked and then drown. Longline fishery occurs along the shelf edge off Norway, Scotland and Ireland, as well as round the Faeroes. The species most often caught on longlines in this area is fulmar, however other species including gannet, great skua and large gull species have also been reported.

Although greatly reduced from historic levels, persecution of seabirds still occurs in Britain and Ireland, with some killing of adults and removal of eggs of species such as herring gulls, great black-backed and lesser black-backed gulls in order to control numbers. Cormorant, are shot under licence, and there has been a history of shooting great and Arctic skua under licence on Fair Isle (Furness 1987, O'Donald 21983, as cited in Mitchell *et al*. 2004), while illegal egg collecting of species such as roseate tern, little tern, and Mediterranean gull, all of which occur in important numbers within one or more of the Regional Sea areas, can result in clutch losses.

Vulnerability to surface pollution

The vulnerability of seabird species to surface pollution at sea varies throughout the year and is dependant on a number of factors and varies considerably throughout the year. The Offshore Vulnerability Index (OVI) developed by JNCC and used to assess the vulnerability of bird species to surface pollution considers four factors:

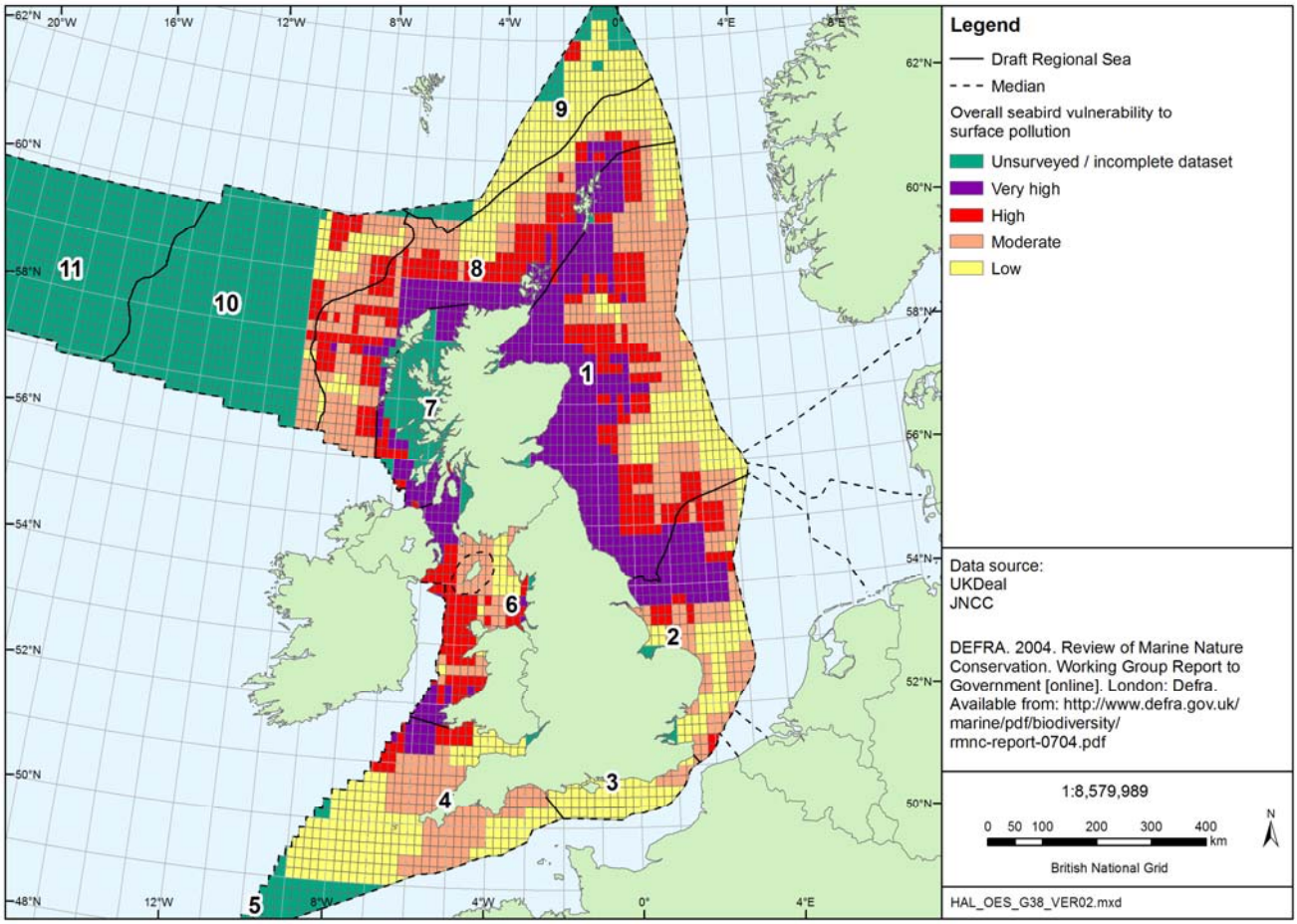
- the amount of time spent on the water
- total biogeographical population
- reliance on the marine environment

- potential rate of population recovery (Williams *et al*. 1995).

This index varies from 1, this being very high sensitivity to surface pollution (purple) to 4 which is low sensitivity (yellow). These are calculated in terms of overall vulnerability to surface pollutants (taking seasonal variability into account); and seasonal vulnerability (expressed as a numbers of months in which very high vulnerability occurs) and these, along with data gaps (defined as blocks for which two or more consecutive months are unsurveyed) are shown in Figures A3a.6.12 and A3a.6.13. The abundance data on which OVI is based are now almost 10 years old.

Of the species commonly present in the Regional Sea areas, gannet and auk species are the most vulnerable to oil pollution due to a combination of heavy reliance on the marine environment, low breeding output with along period of immaturity before breeding, and that some species congregate in large concentrations on the sea surface and are flightless due to annual moults. In contrast, the aerial habits of the fulmar and gulls, together with large populations and widespread distribution, reduce vulnerability of these species.

Figure A3a.6.11 – Overall vulnerability of seabirds to surface pollution



The majority of areas with the highest seabird vulnerability to surface pollution are located within the Regional Sea 1 area. Areas of very high seabird vulnerability are also present in Regional Sea 2, 4, 6 and 8 areas. Key areas for seabird vulnerability are the waters around the Northern Isles and to the south east of Shetland, the Moray Firth, the entire east coast of Scotland and north east coast of England, waters of St Brides Bay and off of the

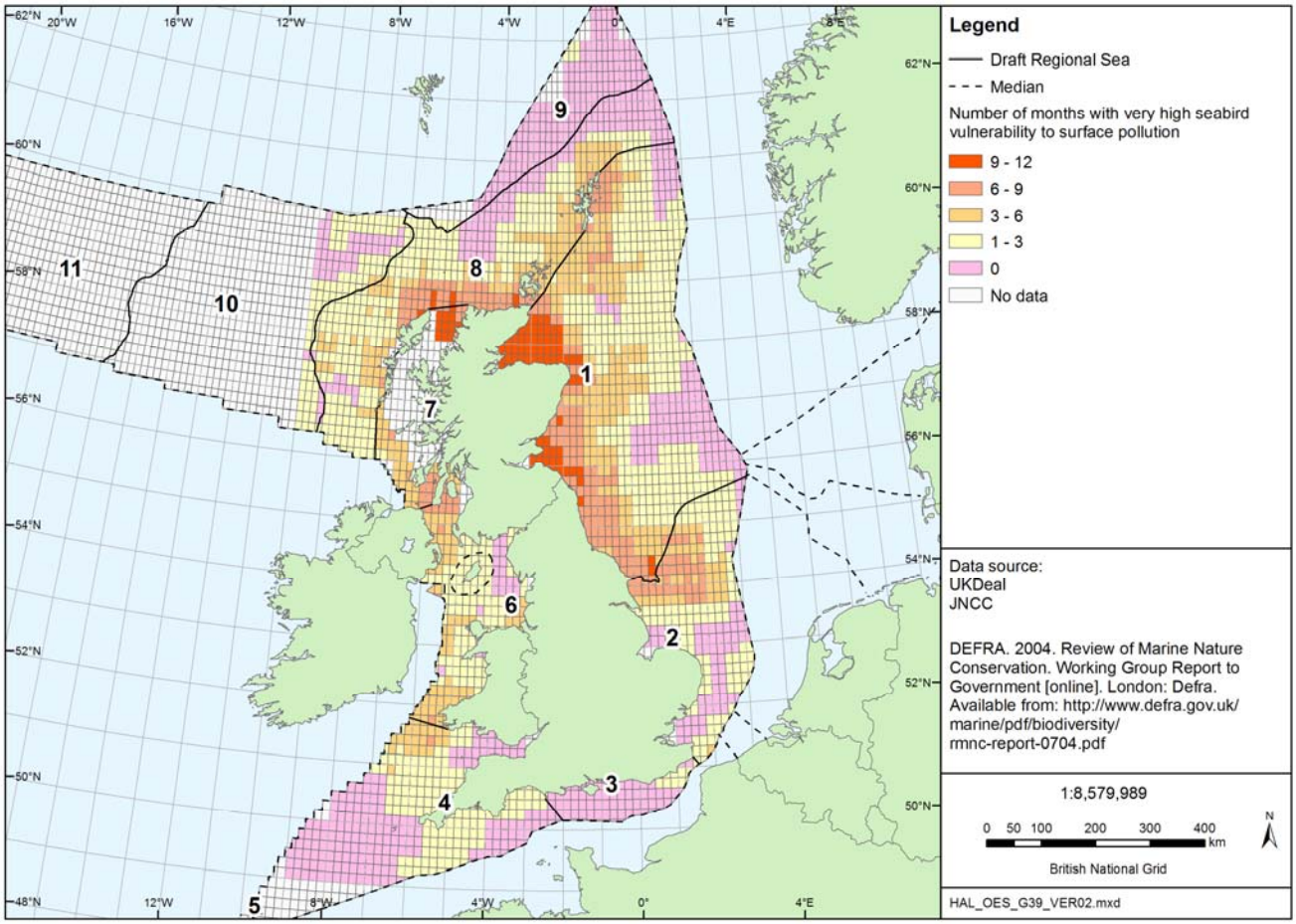
Pembrokeshire coast, the northern Irish Sea and the waters to the north of the Western Isles and north coast of Scotland.

Areas of high vulnerability are similar to those of very high vulnerability, extending further offshore, with additional areas located in the Irish Sea and to the west of the Western Isles.

Although there are many areas throughout the Regional Sea areas that record areas with very high seabird vulnerability to surface pollution, there are only small pockets around the coast where this vulnerability persists for between 9 and 12 months of the year, with many areas recorded as very highly vulnerable for shorter periods (Figure A3a.6.13).

The areas where vulnerability is persistent for between 9 and 12 months are mainly focused on the Scottish east coast and include the Moray Firth, off the coast of Peterhead, Firth of Tay, Firth of Forth, off the coast from Berwick-upon-Tweed and waters off the coast from Flamborough Head. The only area on the west coast with the same seasonal vulnerability is the northern Minch area off the north west coast of Scotland.

Figure A3a.6.12 – Seasonal vulnerability of seabirds to surface pollution (expressed as numbers of months in which very high vulnerability is present)



A3a.6.18.2 Waterbirds

Human disturbance during the breeding season, such as jet-skis, sailing and recreational use, e.g. walkers and dog owners, can have an effect on breeding success. Agricultural and other management of habitats such as coastal reedbeds, wet grassland and dunes are

important for breeding bitterns, waders and waterfowl populations in the region, as are different grazing regimes, the latter of which can alter the density and nesting success of breeding waders through effects on vegetation composition and structure (Craddock & Stroud 1995). Bitterns in the region have also been indirectly affected by nutrient enrichment, particularly phosphates from sewage treatment works, which inhibits normal reed development. Loss of nesting and feeding habitat for breeding waterbirds can occur through any incremental land claim, and this can also reduce feeding habitat for wintering waterbirds. This can be managed on designated sites, and each of the Regional Sea areas which contain land masses, contain designated sites. Wildfowling can occur in some estuarine areas where wintering waterbirds can be taken, however this is generally well regulated.

As for breeding waterbirds, disturbance, particularly during periods of cold can potentially impact on birds, with birds being excluded from feeding areas at a time when they need to feed on an almost continuous basis, while pollution including effluent discharges, dredging deposits and oil pollution are all potential threats to wintering waterbirds, particularly in areas where high densities of birds occur (Stroud & Craddock 1995, May & Law 1998).