

Aerial Surveys for Waterbirds and Seabirds in South West England and Wales: Autumn 2007

WWT Consulting
Report to
Department of Business Enterprise
and Regulatory Reform

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March 2008



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1. INTRODUCTION

- 1.1 Data on the numbers and distribution of waterbirds and seabirds in UK inshore waters are required for a variety of purposes, including strategic environmental assessment for the second round of offshore windfarm (OWF) development, the Environmental Impact Assessments required by Round 2 wind farms, compliance with licence conditions for constructed Round 1 windfarms, for monitoring of waterbird numbers and distribution in inshore waters, and identification of Special Protection Areas (SPAs).
- 1.2 Aerial surveys represent an important means of obtaining relevant data on waterbirds in inshore waters. Consequently the Department of Business Enterprise and Regulatory Reform (DBERR), commissioned WWT Consulting to carry out aerial surveys targeting key areas for waterbirds and seabirds around South West England and Wales as part of the SEA monitoring process.

Objective

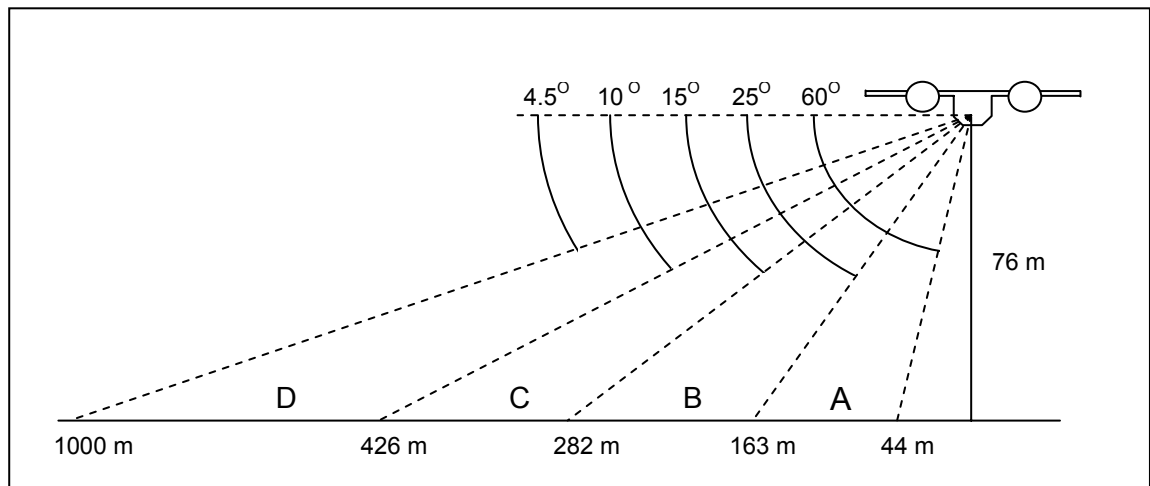
- 1.3 The objective of this project was to undertake aerial surveys of waterbirds and seabirds in inshore waters of South West England and Wales.

2. METHODS

Aerial survey technique

- 2.1 Aerial surveys were undertaken using a methodology developed in Denmark by the National Environment Research Institute (NERI) (Kahlert *et al* 2000; see also Camphuysen *et al* 2004). This involved a 'distance sampling' approach (see Buckland *et al* 2001), whereby the distance to each bird/flock of birds was recorded. Because birds further from the observer will be more difficult to detect, recording of distance allows the number of missed birds to be estimated. This approach allows statistical analyses of the data (*eg* confidence limits to be calculated for estimates of numbers) that are not possible with data collected using previous aerial survey methods. Further, using a combination of the time at which birds were encountered and the track flown by the plane (recorded using a Global Positioning System (GPS)), the locations of observed birds can be calculated with considerable accuracy (in most cases, to within a few hundred metres).
- 2.2 A number of Partenavia PN68 aircraft were used, flying at an altitude of 76 m and at a speed of approximately 200 km h⁻¹. The location of the plane was recorded every five seconds using a GPS.
- 2.3 A series of transects spaced 2 km apart was designed to cover nearshore waters in the required areas. Ideal survey design is for transects to be oriented perpendicular to major environmental gradients (primarily sea depth). However, transects that run north-south reduce the effect of glare during the survey and aid the detectability and identification of birds. North-south transects were therefore flown, along grid lines of the Ordnance Survey of Great Britain.
- 2.4 Aerial surveys were undertaken by experienced observers at WWT Consulting. For each bird or flock of birds, the species, number, behaviour, distance band and the time at which it was perpendicular to the flight path of the plane were recorded using a dictaphone. Using a clinometer, birds were located in one of four distance bands covering an area from 44 m to 1,000 m either the side of the plane (Figure 1); birds beyond 1,000 m from the flight path of the plane were not recorded. The survey method assumes that all birds in distance Band A were detected, and effort was concentrated on this band. Inevitably, birds further from the plane in other bands are missed owing to their distance from their plane and the need for the observers to concentrate observation on the area of sea nearest the flight line.
- 2.5 Surveys were generally made during a four-hour period centred on midday GMT to minimise the effects of glare on counts. Surveys were undertaken in good weather conditions, generally with winds of 15 knots or less.

Figure 1– Distance bands used for aerial survey (not to scale)



- 2.6** Survey was suspended during the turns between the end of one transect and the start of the next, though significant observations, *eg* cetaceans or large flocks of birds, were sometimes recorded on an *ad hoc* basis.
- 2.7** A cautionary approach was taken with regard to species identification, such that only those individuals that were observed clearly were identified to species level; otherwise, birds were identified as belonging to a species group. In the case of large, near mono-specific flocks, such as Common Scoter *Melanitta nigra*, individual, similar, but less common species, may not have been identified, particularly in the further distance bands.
- 2.8** Shearwaters *Puffinus* spp. not identified to species level were recorded as ‘shearwater spp.’. Caution is exercised given the possibility of confusion between Manx Shearwaters *Puffinus puffinus* and other *Puffinus* spp. and the relative inexperience of observers in seeing other species from the air. The vast majority of shearwaters encountered during the survey are believed to have been Manx Shearwaters and are identified as such.
- 2.9** Scoters at large distances are not easily identifiable as Common Scoter, as they are indistinguishable from Velvet Scoter *Melanitta fusca* at that range. However, experience has shown that the vast majority of birds in Bands A and B can be identified to species – and any Velvet Scoter, even out to B and C, can be readily distinguished. As only small numbers of Velvet Scoters have been recorded in previous years, it has been assumed that the vast majority of scoters present were Common Scoters.
- 2.10** Divers *Gavia* spp. not identified to species level were recorded as ‘diver spp’. Caution is exercised given the possibility of confusion between Red-throated and Black-throated Divers *Gavia arctica* and the relative inexperience of observers in seeing this species from the air. The latter species is rarely encountered in the areas surveyed to date. Great Northern Divers *Gavia immer* are readily separated from both Red-throated and Black-throated Divers and very few, if any will have been overlooked within those birds recorded as ‘diver spp.’.
- 2.11** Terns *Sterna* spp. not identified to species level were identified as belonging to one of the following two species groups: tern or ‘commic tern’ (Common Tern *Sterna hirundo* or Arctic Tern *Sterna paradisaea*).
- 2.12** Gulls not identified to species level were identified as being in one of the following species groups: ‘grey gull’ (Common Gull *Larus canus* or Herring Gull *Larus argentatus*), ‘black-backed gull’ (Lesser Black-backed Gull *Larus fuscus* or Great Black-backed Gull *Larus marinus*), ‘large gull’ (Herring Gull, Lesser Black-backed Gull or Great Black-backed Gull), ‘small gull’ (Black-headed Gull *Larus*

ribidundus, Common Gull, Little Gull *Larus minutus* or Kittiwake *Rissa tridactyla*) or gull (*Larus* spp. or Kittiwake).

- 2.13** Auks are not readily identified to species level during aerial survey and most observations are recorded as ‘auk sp’. The majority of auks encountered during the survey are believed to have been Guillemots *Uria aalge*, with fewer numbers of Razorbills *Alca torda*. Whilst only one Puffin *Fratecula arctica* was specifically identified, a small proportion of observations were suspected to be of this species.
- 2.14** Cormorants *Phalacrocorax carbo* and Shags *Phalacrocorax aristotelis* can be difficult to distinguish from each other during aerial survey. Any birds not identified to species level were recorded as ‘Cormorant spp.’.
- 2.15** Other species groups were also used as appropriate, where specific identification of birds to species level was not possible, eg ‘grebe spp.’, and ‘passerine spp.’.

Survey area

- 2.16** The extent of the total survey area as requested by DBERR covered the South Wales, Devon and Dorset coasts.
- 2.17** Survey blocks were designed around the maximum coverage possible in one day by a single plane and survey team (1200km²). This necessitated four survey blocks in South Wales and North Devon, and two in South Devon and Dorset (Figure 2).

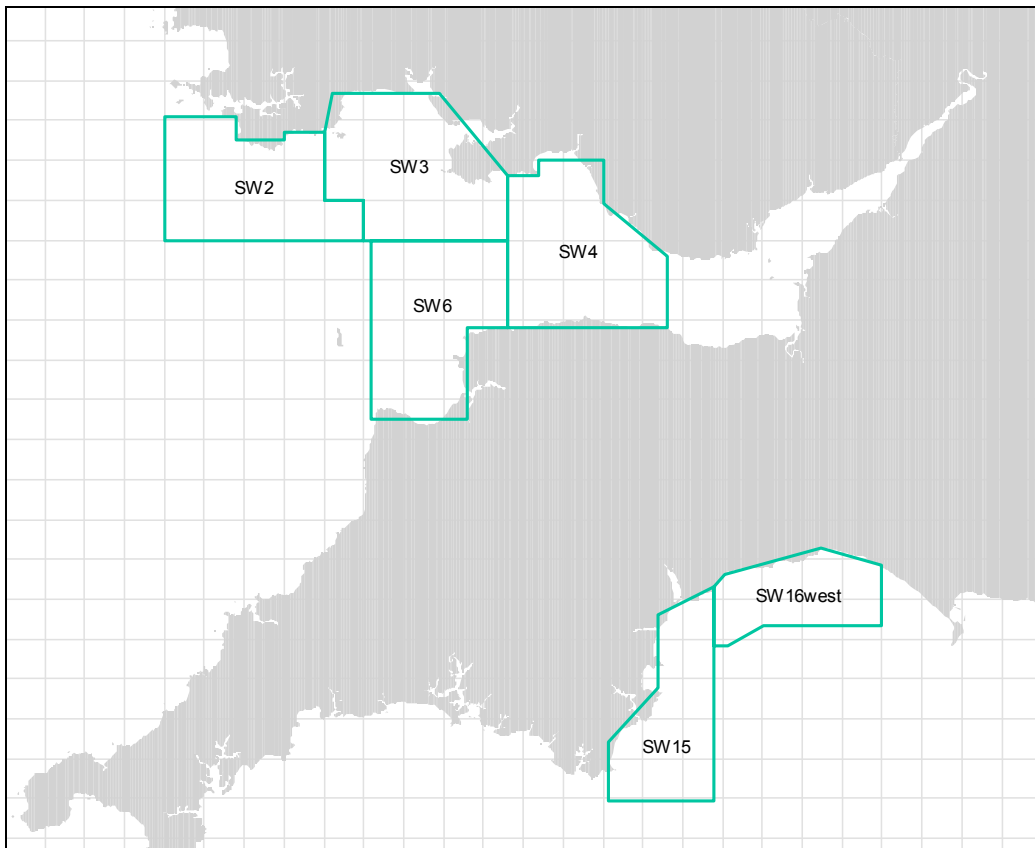
Coverage

- 2.18** Given the external constraints on guaranteeing the appropriate conditions and the requirement for autumn surveys, a window of one month from 29 August 2007 was allowed for the survey Period.
- 2.19** The dates of flights in each survey Block are given in Table 1.
- 2.20** Due to adverse weather conditions and military activity it was not possible to survey the area around the Portland Bill, Dorset (SW16east) as requested by DBERR.

Table 1 - Dates of survey flights in South West England and Wales, Autumn 2007

Survey Period	SW2	SW3	SW4	SW6	SW15	SW16west
Period 8 (Autumn)	31 Aug	29 Sep	6 Sep	7 Sep	29 Aug	15 Sep

2.21 Figure 2– Survey Blocks



3. RESULTS

Overall numbers and distribution

- 3.1 Table 2 gives the total numbers of all species encountered during the Autumn Period.
- 3.2 Overall numbers of birds differed between survey Blocks, as did their species composition. By far the largest numbers of birds occurred in SW2 (7,257), largely due to pelagic species such as auks, Gannets, Kittiwakes and shearwaters. Moderate numbers occurred in SW3 (half comprising Common Scoters), SW6 (pelagic species) and SW15 (largely gulls associated with fishing vessels), with smaller numbers in SW4 and SW16west.

Common Scoter

- 3.3 Moderate numbers of Common Scoters (1,773) were observed in the northern parts of Carmarthen Bay, Carmarthenshire, with the main concentrations stretching from Pendine in the north west, to Pembrey in the east, where birds occurred in moderate numbers up to 10 km offshore.
- 3.4 Few scoters were recorded outside of Carmarthen Bay.

Shearwaters

- 3.5 Moderate numbers of shearwaters (1,080) were recorded, with the vast majority occurring in SW2 and SW6. In SW2 numbers were evenly distributed in offshore waters to the west and south of the survey Block, but with two single observations of 100 birds offshore in the east.
- 3.6 In SW6 the distribution was more discrete, with birds largely concentrated within central parts of Bideford Bay, North Devon, but with one flock of 120 close to shore near Buck's Mills. An

additional 350 Manx Shearwaters were observed off-transect (during the turn onto the adjacent transect) about 300 m south of the latter flock, but are excluded from Table 2.

- 3.7 Few shearwaters were observed elsewhere.

Gannets

- 3.8 Gannets were observed in moderate numbers (>300 per Block) in SW2, SW6 and SW15. Areas holding the largest concentrations stretched from western parts of SW2 eastwards into Carmarthen Bay, where birds were evenly distributed from the shore to offshore limits; Bideford Bay, North Devon, and around headlands and offshore areas in SW15.

Gulls

- 3.9 Six species of gull – Black-headed Gull, Common Gull, Lesser Black-backed Gull, Herring Gull, Greater Black-backed gull and Kittiwake – were recorded during the surveys. The first five species are found in large numbers at coastal and inland sites, whereas Kittiwakes are generally pelagic and are therefore discussed separately.
- 3.10 Large numbers of gulls (c2,400) were recorded in SW15, where birds were patchily distributed with larger concentrations off Berry Head, South Devon, and in interspecific flocks around fishing vessels. Moderate numbers were found throughout the other survey blocks, with other concentrations occurring at coastal sites off Pembrey (SW3), Swansea Bay (SW4), Bideford Bay (SW6) and Lyme Bay (SW16east), again, often associated with fishing vessels.

Kittiwakes

- 3.11 Moderate numbers of Kittiwakes (880) were observed, with the largest numbers distributed throughout SW2, south western parts of Carmarthen Bay, and in Bideford Bay (SW6). Much smaller numbers were observed in SW4 and SW15.

Auks

- 3.12 Large numbers of auks (6,116) were observed, with the vast majority (5,464) occurring in SW2. Here, auks were observed in large numbers from just a few kilometres offshore up to the outer limits of the survey area, with particularly large concentrations in the south and west. Moderate numbers also extended further east into offshore areas of SW3 and the Bristol Channel (SW6 and SW4).
- 3.13 Small numbers of auks (85) were observed off the South Devon and Dorset coast.

Other significant species

- 3.14 Six divers were recorded throughout the whole area surveyed, four of which were seen off Worm's Head, Carmarthen Bay.
- 3.15 Small numbers of terns (44) were observed, distributed mainly in Carmarthen Bay (SW3).
- 3.16 Small numbers of Cormorants (25) were recorded around the Burry Inlet, Carmarthen Bay, and Shags (57), along the South Devon and Dorset coast.

4. DISCUSSION

- 4.1 Due to unforeseen circumstances only one observer was able to survey in SW3, resulting in coverage of only half of the survey block. The observed bird numbers are therefore likely to be a

considerable undercount. Indeed, numbers of Common Scoters may well have approached 3,500 birds should similar numbers have been present on both sides of the aircraft.

- 4.2** Large numbers of birds were found in northern parts of Carmarthen Bay due to Common Scoters, and offshore areas, specifically south western parts of SW2 off the Pembrokeshire Coast, Bideford Bay, North Devon, and off Berry Head, South Devon.

5. CONCLUSION

- 5.1** Aerial surveys were used in Autumn 2007 to determine the numbers and distribution of waterbirds and seabirds in specific areas of South West England and South Wales. The results present a snapshot of the birds utilising these areas on the dates surveyed, but for many species which move in response to mobile prey, numbers and distributions are likely to change throughout the season. Repeat surveys, together with detailed analysis of datasets between years are recommended to provide a clearer picture of numbers and distributions in these and surrounding areas.

6. REFERENCES

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- Kahlert, J, M Desholm, I Clausager & IK Petersen. 2000. *Environmental impact assessment of an offshore wind park at Rødsand*. Natural Environment Research Institute, Rønde.

7. TABLES

Table 2 - Total numbers of all species in South West England and Wales, Autumn 2007 (Total numbers are not absolute numbers of birds in the survey area, which need to be calculated using 'distance' analysis, to allow for the numbers of birds missed with increasing distance from the plane).

Species / species group	SW2	SW3*	SW4	SW6	SW15	SW16 west	Total
Common Scoter		1773		2			1775
diver sp.		4	1			1	6
grebe sp.					1		1
Fulmar	7		8	1	8		24
Manx Shearwater	625	9		354	4		992
shearwater sp.	84				4		88
Gannet	426	50	6	267	322	27	1098
British Storm-petrel				1			1
Guillemot			1				1
Puffin	1						1
auk sp.	5463	335	94	137	75	10	6114
Cormorant		25		3	1		29
Shag		4			50	7	61
Grey Heron					6		6
Oystercatcher		100			1		101
Arctic Skua	1				1		2
Great Skua				2	4		6
Black-headed Gull		52	4		3		59
Lesser black-backed Gull	5	10	10	5	3	6	39
Common Gull		9					9

Species / species group	SW2	SW3*	SW4	SW6	SW15	SW16w est	Total
Herring Gull	1	14	7	1	101	14	138
Great Black-backed Gull	2	2			15		19
Kittiwake	469	156	30	190	34	1	880
grey gull spp (Herring or Common)	73	11	5	2	13	3	107
black-backed gull spp	51	4	1	3	25	3	87
large gull sp.			11	9	22	62	104
small gull sp.	1	74	63	40	3	14	195
gull sp.	47	417	382	71	2155	217	3289
Sandwich Tern		3					3
Arctic Tern		1					1
Arctic/Common Tern	1	9	3	1			14
tern sp.		20	2	4			26
Carrion Crow		3					3
passerine sp.						5	5
Total no. birds	7257	3085	628	1093	2851	370	15284

* numbers of birds in SW3 are undercounts due to the presence of only one observer