

Numbers of wintering waders in non-estuarine habitats along the North Sea and Baltic Sea coasts of Germany in winter 1997/98

J. Blew, K. Günther, J.J. Kieckbusch & H-W. Nehls

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Data on the numbers of waders wintering on the German non-estuarine coast are presented separately for the North Sea coast (282 km non-estuarine, 986 km estuarine) and the Baltic Sea coast (2,048 km all non-estuarine). On the North Sea coast, counts in January 1998 yielded 106,176 individuals of 15 wader species, with 385,555 individuals on the remaining estuarine sites. With the exception of Eurasian Oystercatcher *Haematopus ostralegus* and Eurasian Curlew *Numenius arquata*, all species occur in lower numbers in January in comparison to autumn and spring. Counts in the North Sea area were conducted over high tide and for some species (Red Knot *Calidris canutus*, Dunlin *Calidris alpina*, Bar-tailed Godwit *Limosa lapponica* and Eurasian Curlew), the numbers recorded in non-estuarine areas at this time are likely to be greater than those using these areas for feeding during the intertidal period. The counts of Sanderling *Calidris alba*, Purple Sandpiper *Calidris maritima* and Ruddy Turnstone *Arenaria interpres* are probably more representative. On the Baltic Sea coast, 1,681 individuals of 13 species were counted. This supports previous studies that have shown that the German Baltic Sea coast plays only a minor role for waders in winter.

Length of non-estuarine coast	Coverage	Representative of	Winter	Population estimate	Reliability
282 km	~75%	North Sea coast	1997/98	Minimum estimate	Average
2,048 km	100%	Baltic Sea coast	1997/98	Complete count	Average

Introduction

The European Non-Estuarine Coastal Waterbird Survey (Europe-NEWS) was organised for the winter of 1997/98, aiming to provide Europe-wide estimates of wader populations utilizing and wintering in non-estuarine habitats. For Germany, the survey and analysis was undertaken separately for the North Sea and the Baltic Sea coasts (see Figure 1), because wader utilization and communities differ strongly between these areas.

The North Sea coastline stretches along the Wadden Sea and includes mainland coast with grazed and ungrazed saltmarshes, islands with sandy shores on their seaward sides and mudflats on their leeward sides and outer sands or uninhabited islands. As an exception, the island of Helgoland, located in the German Bight some 40 km off the coast, has a rocky shoreline. The North Sea habitats are exposed to a tide with an amplitude between 1.50 and 3.50 m (Jensen 1998), though most mainland and some island areas are protected with dykes.

The German Wadden Sea is of international importance for 32 of the 41 waterbird species (waders, divers, grebes, cormorants, herons, wildfowl, rails, gulls and terns) covered by national monitoring programmes (Blew *et al.* 2005b). For 12 species, the area supports over 10% of the species' biogeographic populations at some time in the year. During autumn

migration, winter and spring migration respectively, some 2 million, 0.5 million and 1.5 million coastal birds may use the German Wadden Sea simultaneously. Taking into account turnover, total numbers using the German Wadden Sea may well exceed 4 million coastal birds (Frederiksen *et al.* 2001, Hötker & Frederiksen 2001, Blew *et al.* 2005b).

The Baltic Sea coast consists of long stretches of sandy beaches, interrupted by stretches of steep coast, shallow inlets, bays and sandy hooks and spits (Berndt *et al.* 2002). As a result of glacial processes, at some places the coast rises high above the beaches with bordering agricultural or forest areas; at other places the transition to the mainland is more gentle. There is little tidal influence, though water level may be low in certain weather conditions causing some temporal "windflats", or high due to heavy winds. These differences in water level may greatly influence the presence of waders which use available areas opportunistically (Kube & Struwe 1994).

The Baltic Sea and its coast support 35 species of waterbirds, numbering around 9 million individuals; some additional 30 species also utilize the area during migration (Helbig & Kube 1996). The German part of the Baltic Sea, however, represents only a fraction of this area, even though providing offshore feeding grounds for many species (Helbig & Kube 1996). In addition, the vast majority of these birds



Figure 1. The North Sea and Baltic Sea coasts of Germany.

are divers, ducks, geese, swans and gulls. Waders do not reach high numbers in winter, using mainly salty meadows, coastal lakes, shallow inlets, “windflats” or sandy hooks and spits. However, during autumn and spring migration, higher numbers of waders may use the German Baltic coast (Kube & Struwe 1994, for Dunlin *Calidris alpina*: Kube *et al.* 1994a, Eurasian Golden Plover *Pluvialis apricaria*: Kube *et al.* 1994b, Pied Avocet *Recurvirostra avosetta*: Kube & Graumann 1994).

Material and methods

Study area and habitat¹

There is no straightforward definition of non-estuarine sites in Germany. The North Sea coast is dominated by the Wadden Sea. Here, where the rivers Ems, Weser and Elbe flow into

the North Sea and in the lee of islands, habitats are considered estuarine. Non-estuarine habitats are found on the sandy shores on the seaward sides of islands, the outer sands and the island of Helgoland. The North Sea coastline, including islands and the mainland, stretches a total length of 1,268 km, divided between the two federal states of Niedersachsen (526 km) and Schleswig-Holstein (742 km)². Of this, the non-estuarine coastline totals 282 km or 22.2% (Niedersachsen 148.5 km [28.3 %], Schleswig-Holstein 134 km [18.0 %]).

On the Baltic Sea coast, the river Oder forms a large estuary, but this mainly belongs to Poland. Smaller rivers such as the Trave and Recknitz do not possess true estuaries. Even though some areas in the lee of islands and coastal lakes are included, for the scope of this report the entire coastline of the German Baltic Sea is considered non-estuarine. The coastline of the Baltic Sea stretches 2,048 km, divided up between the

Table 1. Organization of the counts in 1998^a.

Region	Institution	Co-ordinator / Data manager
Niedersachsen ^b North Sea coast	Staatliche Vogelschutzwarte, Hannover	Peter Südbeck / Jan Blew
Schleswig-Holstein North Sea coast	Nationalparkverwaltung Schleswig-Holsteinisches Wattenmeer, Tönning & Naturschutzgesellschaft Schutzstation Wattenmeer e.V., Husum	Klaus Günther / Kai Eskildsen
Schleswig-Holstein Baltic Sea coast	Ornithologische Arbeitsgemeinschaft für Schleswig-Holstein und Hamburg e.V., Kiel	Bernd Struwe-Juhl / Jan Jacob Kieckbusch
Mecklenburg-Vorpommern Baltic Sea coast	Ornithologische Arbeitsgemeinschaft Mecklenburg-Vorpommern, Rostock	Hans-Wolfgang Nehls

^a In Germany, the 16 federal states carry out their own monitoring programmes. For the North Sea, counts are carried out within the framework of the Trilateral Monitoring and Assessment Program (TMAP); for the Baltic Sea, counts are carried out within the framework of the International Waterbird Census (IWC). Nationally, the umbrella organisation “Dachverband Deutscher Avifaunisten (DDA)” coordinates the monitoring programmes, compiles the monitoring data, carries out regular nationwide analyses and is responsible for responding to international data requests such as for the IWC.

^b Includes waterbird data for Hamburg.

¹ The measurement of coastline lengths varies with scale; thus, different values are found in the literature. For the purposes of this paper, measurements were taken using 1:50,000 maps

² The federal state of Hansestadt Hamburg lies in between Niedersachsen and Schleswig-Holstein. The sandy islands of Scharhörn and Nigehörn belong (administratively) to Hamburg, but waterbird data are included with those for Niedersachsen.

federal states of Schleswig-Holstein (569 km) and Mecklenburg-Vorpommern (1,515 km) (Nehls & Struwe-Juhl 1998).

Organisation and methods

Co-ordination and organisation of the counts was divided into four regions (see Table 1). Counts were predominantly carried out on the weekend of 17/18 January 1998 as part of the standard midwinter census. For the North Sea coast, other counts within 8 days were also included in the data analyses (making sure that only one count per site was considered). For the Baltic Sea coast, data were only obtained for 17/18 January.

Counters walked the count sites or used a bicycle, covering stretches of varying length within the time available. The survey aimed to cover the entire coastline (rather than just selected sites). The counts on the North Sea coast were carried out during a time interval of ± 90 minutes relative to high tide, when most of the birds congregate at roosting sites and are thus easier to survey (Koffijberg *et al.* 2003). Thus the counts may have included birds which used non-estuarine habitats for roosting but which used different habitats for feeding (see

Discussion). Due to the negligible tidal amplitude, counts on the Baltic Sea coast were carried out at any time during the weekend of 17/18 January.

Missing sites

On the North Sea coast some sites, mainly outer sands and some sandy shores, were not counted at all in January 1998. However, no effort was made to interpolate or fill in missing values for these sites, either because there were no previous count data or because it was believed that any birds missed from these sites would not have contributed much to the overall results (see Discussion).

The counts at the Baltic Sea coast were complete both in Schleswig-Holstein and in Mecklenburg-Vorpommern.

Results and discussion

North Sea

The count in January 1998 is considered representative for a mild winter (Blew *et al.* 2005a). Fifteen wader species were recorded on non-estuarine sites, yielding a grand total of

Table 2. Totals for non-estuarine and estuarine sites on the North Sea coast.

Species ^a	Non-estuarine sites			Estuarine sites January 1998	Biogeographic population size ^b	1% threshold
	January 1998	% of the Jan. 1998 count of the German North Sea coast	% of biogeographic population			
Eurasian Oystercatcher <i>Haematopus ostralegus</i>	39,452	16.6	3.9	198,728	1,020,000	10,200
Eurasian Golden Plover <i>Pluvialis apricaria</i>	95	4.5	0.1	2,015	140,000–210,000	1,750
Grey Plover <i>Pluvialis squatarola</i>	506	8.3	0.2	5,577	247,000	2,500
Northern Lapwing <i>Vanellus vanellus</i>	3	0.2	0.0	1,424	5,100,000–8,400,000	20,000
Red Knot <i>Calidris canutus</i> ^c	33,106	60.9	7.4	21,291	450,000	4,500
Sanderling <i>Calidris alba</i>	737	67.7	0.6	351	123,000	1,200
Purple Sandpiper <i>Calidris maritima</i>	96	100	0.1	0	50,000–100,000	750
Dunlin <i>Calidris alpina</i> ^c	24,727	37.2	1.9	41,824	1,330,000	13,300
Common Snipe <i>Gallinago gallinago</i>	1	33.3	0.0	2	>2,500,000	20,000
Bar-tailed Godwit <i>Limosa lapponica</i> ^c	1,636	22.0	1.4	5,805	120,000	1,200
Whimbrel <i>Numenius phaeopus</i>	0	0	0.0	26	190,000–340,000	2,700
Eurasian Curlew <i>Numenius arquata</i> ^c	5,570	6.6	0.7	78,750	700,000–1,000,000	8,500
Common Redshank <i>Tringa totanus</i>	61	2.4	0.0	2,435	150,000–400,000	2,800
Common Greenshank <i>Tringa nebularia</i>	0	0	0.0	25	190,000–270,000	2,300
Ruddy Turnstone <i>Arenaria interpres</i>	186	38.1	0.1	302	100,000–200,000	1,500
Total	106,176			358,555		

^a Only occasional Pied Avocet, Kentish Plover *Charadrius alexandrinus*, Common Ringed Plover *C. hiaticula*, Curlew Sandpiper *Calidris ferruginea*, Ruff *Philomachus pugnax* and Spotted Redshank *Tringa erythropus* occur in Germany in winter.

^b After Wetlands International (2006). (Following Ramsar guidelines, where more than one subspecies/population occurs in a country, the relative importance of the country for the species is gauged relative to the estimated population size of the more numerous race.)

^c Counts of these species are almost all of roosting birds.

106,176 birds counted (Table 2). The count on the remaining estuarine sites yielded a total of 385,555 waders. Data show that, for most species, populations do not peak in winter (i.e. January). With the exception of Eurasian Oystercatcher *Haematopus ostralegus* and Eurasian Curlew *Numenius arquata*, all species occur in lower numbers in January in comparison to autumn and spring (Blew *et al.* 2005a).

Data may be misleading, since almost all counts in the North Sea area were conducted over high tide in order to count congregations of waders which during the low tide period may be distributed over very large intertidal feeding areas. For some species (Red Knot *Calidris canutus*, Dunlin, Bar-tailed Godwit *Limosa lapponica*, Eurasian Curlew), the numbers recorded at high tide on the non-estuarine sites are likely to be greater than those using these areas for feeding during the intertidal period. The counts of Sanderling *Calidris alba*, Purple Sandpiper *C. maritima* and Ruddy Turnstone *Arenaria interpres* are probably more representative as these species show a preference for feeding in non-estuarine habitats. However, the overall numbers of these species were low and only represent small fractions of their biogeographic populations (Table 2). In very cold winters with extensive ice cover, it is thought that many of these non-estuarine habitats may be deserted as birds are unable to feed. However, no count data exist to support this assumption (see van Roomen *et al.* 2008).

Some sites were not counted during January 1998. For some sites in the western part of the German Wadden Sea

(shores of Borkum and Norderney), December counts exist, though the numbers recorded were small. The uninhabited island Scharhörn west of the mouth of the river Elbe and the outer sands and islands of Trischen, Blauortsand, Japsand, Süderoogsand and Norderoogsand in Schleswig-Holstein were not counted due to their inaccessibility. Since those sites are rarely ever covered in January, filling in (imputing) for these missing counts would be neither feasible nor appropriate. Intermittent counts of these outer sands have yielded totals, for Lower Saxony, of 2,000–6,000 Eurasian Oystercatcher, 2,000–4,000 Eurasian Curlew, 200 Common Redshank *Tringa totanus*, 200 Ruddy Turnstone; for Schleswig-Holstein, there are counts of up to 20,000 Eurasian Oystercatcher (in 1992), 3,000 Grey Plover *Pluvialis squatarola* (1992), 30,000 Red Knot (February 1998), 300 Sanderling (1992), 20,000 Dunlin (February 1998) and 2,000 Eurasian Curlew (1992). These numbers would contribute considerably to the known totals of common species (for Eurasian Oystercatcher, c.50%; for Red Knot, c.90%; for Dunlin, c.90% and for Eurasian Curlew, c.50%) and even more to the less numerous species (for Golden Plover >100%; for Grey Plover >100% and for Sanderling, c.40%).

Baltic Sea

A total of just 1,681 individuals of 13 species were recorded in January 1998 (Table 3). The results support previous studies that have shown that the German Baltic Sea coast plays only a minor role for waders in winter. The peak numbers recorded in earlier surveys mostly exceed the numbers recorded in 1998 (Kube & Struwe 1994). However, the low numbers are not thought to be the result of an underlying trend; particularly in the eastern area (Mecklenburg-Vorpommern), two facts apply: medium to bad counting conditions due to strong winds and waves and a cold-spell beginning in the middle of December initiating winter movements for some of the considered species.

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Table 3. Totals for the Baltic Sea coast.

Species ^a	January 1998	Maxima 1991–1995 ^b
Eurasian Oystercatcher	54	252
<i>Haematopus ostralegus</i>		
Eurasian Golden Plover	359	1,501
<i>Pluvialis apricaria</i>		
Grey Plover	0	60
<i>Pluvialis squatarola</i>		
Northern Lapwing	267	1,087
<i>Vanellus vanellus</i>		
Red Knot	3	6
<i>Calidris canutus</i>		
Sanderling	20	48
<i>Calidris alba</i>		
Purple Sandpiper	1	15
<i>Calidris maritima</i>		
Dunlin	463	1,911
<i>Calidris alpina</i>		
Common Snipe	6	15
<i>Gallinago gallinago</i>		
Bar-tailed Godwit	2	13
<i>Limosa lapponica</i>		
Eurasian Curlew	497	1,509
<i>Numenius arquata</i>		
Common Redshank	9	74
<i>Tringa totanus</i>		
Ruddy Turnstone	0	2
<i>Arenaria interpres</i>		
Total	1,681	

^a Pied Avocet, Kentish Plover, Common Ringed Plover, Curlew Sandpiper, Ruff and Spotted Redshank are excluded from the table as they only occasionally occur in Germany in winter; as are Whimbrel and Common Greenshank that were not recorded on the Baltic Sea coast.

^b Kube & Struwe (1994), Nehls & Struwe-Juhl (1998).

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Jan Blew, BioConsult SH, Brinckmannstraße 31, D-25813 Husum, Germany
Klaus Günther, Schutzstation Wattenmeer, Hafenstraße 3, 25813 Husum, Germany
Jan Jacob Kieckbusch, Lange Reihe 14d, 24244 Felm, Germany
Hans-Wolfgang Nehls, Bertold-Brecht-Straße 3, 18106 Rostock, Germany

Correspondence author: **Jan Blew**, email: j.blew@bioconsult-sh.de
