

WADER AND WATERFOWL COUNTS IN THE INTERNATIONAL WADDEN SEA AREA: THE RESULTS OF THE 1981-82 SEASON

by Cor Smit

Introduction

For more than 15 years, counts of a national level have been carried out in parts of the Wadden Sea, and some recent publications (Busche 1980; Meltofte 1980; Smit & Wolff 1981) present data on total numbers, distribution, and temporal variations in wader numbers in the Danish, Schleswig-Holstein and Dutch part of the Wadden Sea. Only a few, marginally successful, attempts have been made to cover the whole Wadden Sea area simultaneously. Results of only three counts have been published (Prater 1974; 1976a).

In spring 1980 a 3-4 year programme of simultaneous wader and waterfowl counts was agreed upon. Besides the annual midwinter count, 2-3 complete counts should take place annually including all waterfowl from divers to gulls and terns. Due to a joint effort of about 200 observers and coordination by Hans Meltofte, Karsten Laursen and Bent Otto Poulsen (Denmark), Peter Prokosch and Günther Busche (Niedersachsen) and Piet Zegers (The Netherlands) during the 1980/81 season, we succeeded in carrying out five simultaneous surveys in the Danish, German and Dutch parts of the Wadden Sea (Fig.1). In this paper the results of these counts will be given and, for some species, the established numbers will be compared with estimated flyway population sizes.

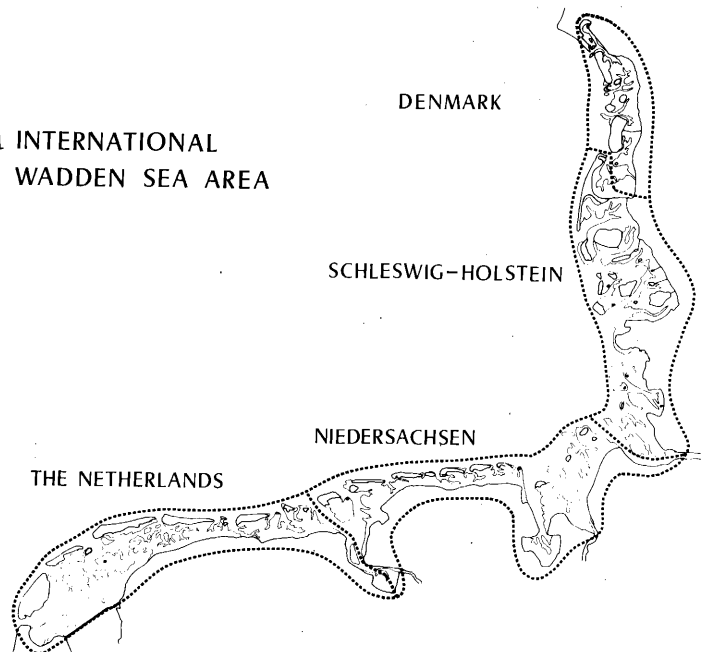
Methods

Because of a 7 hours difference in high tide between Den Helder in the west and Ho Bugt in the north, it is only possible to carry out a complete survey of the Wadden Sea area in one weekend when high tide is early in the morning in its extreme western part. Because of short days in winter, it is sometimes impossible to cover the whole area in one weekend.

The Dutch and Niedersachsen part of the Wadden Sea differ distinctly in character from the part in Schleswig-Holstein and Denmark. The western part of the Wadden Sea mostly is only 5-10 km wide, and the majority of the islands are inhabited. During high tide most estuarine birds gather at roosting sites in polders, salt marshes or on high sand flats, on the islands as well as on the mainland coast. Most of these areas can be covered by ground counts, although some uninhabited islands have to be visited by boats. Generally aerial surveys are only needed to assess numbers of grebes, ducks, gulls and terns. The eastern and northern parts of the Wadden Sea have a less distinct island chain. On the seaward side and between the inhabited islands some bare and uninhabited high sands are situated. Additional aerial surveys in this part of the Wadden Sea are a necessity to obtain a complete coverage of waders and other species. In the Dutch part of the Wadden Sea no aerial surveys have been carried out. As a consequence, the numbers of several duck species represent only a part of the numbers actually present.

In spring and early summer the Wadden Sea islands accommodate thousands of breeding pairs of Black-headed Larus ridibundus, Common L.canus, Lesser Black-headed L.fuscus, and Herring Gulls L. argentatus. In the Netherlands and Germany, these breeding colonies are not generally visited during the counts. The figures yielded in spring therefore are highly inaccurate for these species. Much the same is true for the tern colonies.

Fig. 1 INTERNATIONAL
WADDEN SEA AREA



Results of the counts

Count 1: 18-21 April, 1980 (Table 1). Weather conditions during the count were bad. There was a strong gale with showers of rain, snow and hail (wind force 8-9B) from the NW, resulting in high water levels all over the area. Salt marshes and high sands mostly were completely flooded. As a result, the birds concentrated strongly. In some places however, they roosted far inland out of sight of the observers. Visibility between the showers was good. In Niedersachsen, the Leybucht-area could not be visited. In the German and Dutch parts of the Wadden Sea, breeding gulls and terns were partially missed because they were already present on the breeding grounds on the islands and in the mainland coast salt marshes. In The Netherlands these species are totally excluded from the results.

Count 2: 13-16 September, 1980 (Table 2). During the whole weekend there was a NW storm (up to 8-9B on Saturday). Salt marshes were flooded over the whole area. Though weather conditions were slightly better than during the April count, the same remarks on accuracy can be made. In the Dutch section it was impossible to visit some of the uninhabited islands. Normally at this time of the year about 18-21% of the estuarine bird population of the Dutch part of the Wadden Sea is in the non-visited part. The percentage of missed birds in other parts of the area is unknown, but the Danish totals are considerably smaller than those recorded in previous years.

Count 3: 6-10 November, 1980 (Table 3). Weather conditions changed considerably during the days of this count. On Saturday the count was hampered by fog and low water levels, especially in the Dutch section. As a result on some small uninhabited islands and about 10 km of the mainland coast no birds could be counted. Areas not visited normally contribute 19-23% to the total number of waders of the whole Dutch Wadden Sea area and 16-20% of non-wader species. In Denmark and Germany weather conditions on Saturday were moderate to good. On Sunday weather and water conditions were excellent all over the area. More birds than ever before were observed in the Wadden Sea.

Count 4: 10-22 January, 1981 (Table 4). Due to short days and the difference in high tide between the western and northern parts of the Wadden Sea, it was impossible to survey the whole area in one weekend. In the Dutch section the count was carried out on 10/11 January and in the Danish and German part on 17/18 January. On both weekends weather conditions were calm and good. Just before the first weekend and in the period in between the first and second, storms swept the Wadden Sea with wind forces of 8B and more. In the Dutch part, some uninhabited areas remained unvisited. The number of birds thereby remaining uncounted, however, only amounting to about 4-5%.

Count 5: 7-22 March, 1981 (Table 5). Weather conditions during the March count were very bad. Locally the wind was strong (7-9B) while it was almost continuously raining. In Denmark fog hampered bird counting. As a result, in the Dutch part of the Wadden Sea several uninhabited islands remained unvisited. Some coastal areas could be counted only two weeks later. Consequently, not only did the counting dates in The Netherlands range from 7 March to 22 March, but as many as approximately 23-27% of all birds remained uncounted. Since part of the Herring Gull population in The Netherlands was already present in the breeding colonies, this species was excluded from the Dutch totals.

Table 1: Results of the 18-22 April 1980 count

	DK*	SH*	NS*	NL*	TOTAL
<u>B.leucopsis</u>		4700	6000	660	11360
<u>B.bernicla</u>	23470	58841	14475	56410	153196
<u>T.tadorna</u>	6170	3679	6909	8730	25488
<u>A.penelope</u>	12100	4150	1013	14665	31928
<u>A.crecca</u>	488	448	1141	2390	4467
<u>A.platyrhynchos</u>	1280	476	2006	2250	6012
<u>A.acuta</u>	520	90	511	520	1641
<u>S.mollissima</u>	2740	5676	2480	16270	27166
<u>H.ostralegus</u>	32800	41442	63252	65110	202604
<u>R.avosetta</u>	724	1307	1476	4540	8047
<u>C.hiaticula</u>	205	186	454	450	1295
<u>C.alexandrinus</u>	22	26	251	22	321
<u>P.apricaria</u>	11500	7968	6098	15060	40626
<u>P.squatarola</u>	2580	3404	3836	8270	18090
<u>V.vanellus</u>	1470	125	2628	?	4223+
<u>C.canutus</u>		284451	505	32750	317706
<u>C.alba</u>	151	144	690	490+	1475+
<u>C.alpina</u>	142000	320455	116649	139145	718249
<u>L.lapponica</u>	8810	27361	1926	29050	67147
<u>N.arquata</u>	3080	13061	16392	29155	61688
<u>T.erythropus</u>		15	230	285	530
<u>T.totanus</u>	2950	3013	7888	13940	27791
<u>T.nebularia</u>	167	53	59	140	419
<u>A.interpres</u>		112	535	1915	2562
Wader sp.	24		12000		12024
<u>L.ridibundus</u>	9830	16161	17068	?	43059+
<u>L.canus</u>	5240	2120	1959	?	9319+
<u>L.argentatus</u>	9510	13520	76074	?	99104+

Other species: G.stellata 4, G.arctica 1, Gavia sp. 4, T.ruficollis 6, P.cristatus 14, S.bassana 21, P.carbo 10, A.cinerea 78+ (this species was not counted in the German part), P.leucorodia 27, C.olor 60, A.fabalis 10, A.brachyrhynchus 220, A.albifrons 26, A.anser 1427, A.strepera 8, A.querquedula 391, A.ferina 26, A.fuligula 196, A.marila 1, C.hyemalis 2, M.nigra 106, M.fusca 11, B.clangula 112, M.albellus 2, M.serrator 252, M.merganser 76, F.atra 219+, C.dubius 2, C.minuta 189, C.ferruginea 3, C.maritima 260, P.pugnax 169, G.gallinago 129+, L.limosa 669+, N.phaeopus 159, T.ochropus 5, T.glareola 2, T.hypoleucos 36, L.minutus 16, L.fuscus 236+, L.hyperboreus 1, L.marinus 555, Gull sp. 250, S.sandvicensis 1153+, S.hirundo 245+, S.paradisaea 84+, S.albifrons 23+, C.niger 2, S.hir./parad. 986 (Lapwing and most gull and tern species were not counted in the Dutch part).

Total number of estuarine birds: 1,906,047

Total number of waders (excl. V.vanellus, P.apricaria, G.gallinago): 1,441,442.

* DK = Denmark, SH = Schleswig-Holstein (FRG), NS = Niedersachsen (FRG), NL = The Netherlands.

Table 2: Results of the 13-16 September 1980 count

	DK	SH	NS	NL	TOTAL
<u>P. carbo</u>	3	13	87	850	953
<u>B. bernicla</u>	857	361	253	29	1500
<u>T. tadorna</u>	10200	42987	61283	28705	143175
<u>A. penelope</u>	12300	29942	4685	7955	54882
<u>A. crecca</u>	1490	8232	3008	12240	24970
<u>A. platyrhynchos</u>	1620	9475	11876	15115	38086
<u>A. acuta</u>	276	1252	1427	3500	5714
<u>S. mollissima</u>	3740	17954	22615	7405	51714
<u>F. atra</u>	169	782	195	1445	2591
<u>I. ostralegus</u>	22600	115288	210193	161485	509566
<u>R. avosetta</u>	1140	2265	10008	13800	27213
<u>C. hiaticula</u>	218	2298	1754	1100	5370
<u>P. apricaria</u>	12500	8508	3307	11550	35865
<u>P. squatarola</u>	837	11271	8864	15415	36387
<u>V. vanellus</u>	16100	4863	3323	4905	29191
<u>C. canutus</u>	22	207655	42264	32600	282541
<u>C. alba</u>	58	2049	2035	2140+	6282+
<u>C. ferruginea</u>	340	1	824	975	2140
<u>C. alpina</u>	67500	261705	129382	148500	547087
<u>P. pugnax</u>	76	473	129	270	948
<u>G. gallinago</u>	534	66	635	615	1850
<u>L. lapponica</u>	4290	11897	8525	28150	52862
<u>N. arqata</u>	1800	17786	33886	44265	97737
<u>T. erythropus</u>	13	963	1238	1145	3354
<u>T. totanus</u>	1920	3912	7216	16010	29058
<u>T. nebularia</u>	192	763	1214	1310	3479
<u>A. interpres</u>	33	578	284	2175	3070
<u>Callidris sp.</u>			73600		73600
<u>Wader sp.</u>		70100	1650		71750
<u>L. ridibundus</u>	18900	33730	24152	43675	120457
<u>L. canus</u>	10100	4538	9762	18210	42610
<u>L. fuscus</u>	4	43	46	2755	2848
<u>L. argentatus</u>	26900	39174	156814	46970	269858
<u>L. marinus</u>	710	2246	5007	2970	10903
<u>Gull sp.</u>		38180	27600	3535	69315

Other species: G. stellata 5, T. ruficollis 44, P. cristatus 98, P. auritus 3, P. nigricollis 12, S. bassana 16, P. aristotelis 2, A. cinerea 168+ (not counted in the German part), P. leucorodia 96, C. olor 180, A. fabalis 53, A. brachyrhynchus 15, A. albifrons 1, A. anser 817, B. canadensis 4, B. leucopsis 1, A. strepera 265, A. querquedula 41, A. clypeata 497, A. fuligula 197, A. marila 58, M. nigra 158, M. fusca 20, B. clangula 81, M. serrator 27, M. merganser 1, Duck sp. 316, C. dubius 3, C. alexandrinus 318, C. morinellus 1, C. minuta 275, C. temminckii 2, C. maritima 54, L. linosa 98, N. phaeopus 307, T. ochropus 15, T. glareola 36, T. hypoleucos 164, P. lobatus 1, P. fulicarius 1, S. parasiticus 5, S. skua 2, L. minutus 6, L. sabini 1, R. tridactyla 45, L. ridib./can. 3800, G. nilotica 2, S. sandvicensis 487, S. hirundo 762, S. paradisaea 710, S. albifrons 86, C. niger 32, S. hir./parad. 610.

Total number of estuarine birds: 2,668,524

Total number of waders (excl. V. vanellus, P. apricaria, G. gallinago): 1,753,724

Table 3: Results of the 6-10 November 1980 count

	DK	SH	NS	NL	TOTAL
<u>B. leucopsis</u>	5	9159	4730	11255	25149
<u>B. bernicla</u>	7572	11034	3511	15850	37967
<u>T. tadorna</u>	33200	60651	89081	57950	240882
<u>A. penelope</u>	30400	55089	11112	65320	161921
<u>A. crecca</u>	10250	3521	2671	10675	27117
<u>A. platyrhynchos</u>	27300	35814	31130	20065	114309
<u>A. acuta</u>	292	257	923	6570	8042
<u>A. clypeata</u>	578	871	60	845	2354
<u>S. mollissima</u>	12300	84693	27523	2965	127481
<u>Duck sp.</u>	5470	4005	113	9588	9588
<u>H. ostralegus</u>	29500	133778	276426	196060	635764
<u>R. avosetta</u>	2	756	7872	2035	10665
<u>C. hiaticula</u>	17	66	344	43	470
<u>P. apricaria</u>	9330	3655	3786	11265	28036
<u>P. squatarola</u>	219	4486	4243	6930	15878
<u>V. vanellus</u>	6660	2829	3002	3275	15766
<u>C. canutus</u>	1430	110849	55989	39290	207558
<u>C. alba</u>	188	188	408	1990+	2586+
<u>C. alpina</u>	38800	157376	288687	102900	587763
<u>G. gallinago</u>	301	77	1044	1965	3387
<u>L. lapponica</u>	5830	15081	3383	11635	35929
<u>N. arqata</u>	1950	30502	40585	40120	113157
<u>T. totanus</u>	1400	2398	2471	11670	17939
<u>A. interpres</u>	11	309	404	1485	2209
<u>Wader sp.</u>	160	11860	3881	15904	15904
<u>L. ridibundus</u>	3670	7283	7345	8030	26328
<u>L. canus</u>	6460	2867	3171	21360	33858
<u>L. fuscus</u>	5	4	100	1035	1144
<u>L. argentatus</u>	22100	35901	110361	41425	209787
<u>L. marinus</u>	400	915	2842	4010	8167
<u>Gull sp.</u>		4531	400	1360	6291

Other species: G. stellata 27, Gavia sp. 2, T. ruficollis 95, P. cristatus 69, P. griseigena 1, P. auritus 7, P. nigricollis 7, P. carbo 34, A. cinerea 195+ (not counted in the German part), C. olor 228, C. columbianus 378, C. cygnus 37, A. fabalis 350, A. brachyrhynchus 183, A. albifrons 119, A. anser 2031, A. indicus 1, Goose sp. 1, A. strepera 193, A. querquedula 18, A. ferina 614, A. fuligula 674, A. marila 37, C. hymnalis 142, M. nigra 162, M. fusca 7, B. clangula 594, M. albellus 2, M. serrator 302, M. merganser 24, F. atra 2050, C. minuta 43, C. maritima 78, L. minutus 5, P. pugnax 57, N. phaeopus 2, T. erythropus 115, T. nebularia 101, T. ochropus 2, T. hypoleucos 41, Callidris sp. 17, S. parasiticus 1, L. hyperboreus 1, L. ridib./can. 125.

Total number of estuarine birds: 2,742, 565

Total number of waders (excl. V. vanellus, P. apricaria, G. gallinago): 1,646,280

Table 5: Results of the 7-22 March 1981 count

	DK	SH	NS	NL	TOTAL
<u>A. brachyrhynchus</u>	8520	61	360		8914
<u>A. albifrons</u>	10	1166	6274	380	7830
<u>B. leucopsis</u>	28	10342	909	23080	34359
<u>B. bernicla</u>	1250	5030	6385	32750	45419
<u>T. tadorna</u>	13900	12184	21272	19170	66526
<u>A. penelope</u>	7800	9567	15289	35105	67761
<u>A. crecca</u>	68	626	2151	2620	5465
<u>A. platyrhynchos</u>	9940	7758	20611	8160	46469
<u>A. acuta</u>	3130	458	2861	2310	8759
<u>S. mollissima</u>	9310	2533	4017	5490	21350
<u>H. ostralegus</u>	25900	30317	173678	100090	329985
<u>R. avosetta</u>	61	1346	1346	2500	3907
<u>C. hiaticula</u>	76	74	1799	235	2184
<u>P. apricaria</u>	38	71	7062	8830	16001
<u>P. squatarola</u>		48	809	3115	3972
<u>V. vanellus</u>	888	651	6150	6155	13844
<u>C. canutus</u>	6010	720	1576	89835	98141
<u>C. alba</u>	5		483	985+	1473+
<u>C. alpina</u>	7530	37947	120700	109015	275192
<u>L. lapponica</u>	7070	1402	1486	23355	33313
<u>N. arguta</u>	319	5882	30091	34160	70452
<u>T. totanus</u>	250	332	3212	7425	11219
<u>A. interpres</u>		9	557	1240	1806
<u>L. ridibundus</u>		4000	650		4650
<u>L. canus</u>	2400	1032	10902	15880	30214
<u>L. fuscus</u>	4540	1868	6628	8020	21056
<u>L. argentatus</u>	1	28	1450	56	1535
<u>L. marinus</u>	14300	17374	84698	?	116372+
<u>L. ridib./can.</u>	129	630	1532	925	3216
<u>Gull sp.</u>		3300	5200	5500	5500
				415	8915

Other species: G. stellata 4, G. arctica 2, T. ruficollis 72, P. cristatus 23, P. griseigena 1, P. auritus 16, P. nigricollis 6, P. carbo 23, A. cinerea 61+ (not counted in German part), P. leucorodia 4, C. olor 80, C. columbianus 250, C. cygnus 208, Cygnus sp. 62, A. fabalis 160, A. anser 1856, B. canadensis 16, Goose sp. 101, A. strepera 9, A. clypeata 263, A. ferina 318, A. fuligula 550, A. marila 49, C. hyemalis 9, M. nigra 344, M. fusca 22, B. clangula 1083, M. albellus 68, M. serrator 131, M. merganser 1326, Duck sp. 8320, F. atra 1842, C. maritima 48, P. pugnax 36, G. gallinago 128, L. limosa 318, N. phaeopus 3, T. erythropus 17, T. nebularia 9, T. ochropus 1.

Total number of estuarine birds: 1,383,665

Total number of waders (excl. V. vanellus, P. apricaria, G. gallinago): 836,726

Table 4: Results of the 10-22 January 1981 count

	DK	SH	NS	NL	TOTAL
<u>A. albifrons</u>			7088	305	7393
<u>B. leucopsis</u>	23	883	415	3610	4931
<u>B. bernicla</u>	1051	2382	1802	18305	23540
<u>T. tadorna</u>	9500	41058	18438	37305	106301
<u>A. penelope</u>	141	1595	7654	64295	73685
<u>A. crecca</u>		2559	619	2995	6173
<u>A. platyrhynchos</u>	19000	24977	41458	27670	113105
<u>A. acuta</u>	9	63	2681	7510	10263
<u>S. mollissima</u>	24600	30287	30411	7945	93243
<u>H. ostralegus</u>	13400	62795	170678	203585	450458
<u>R. avosetta</u>			136	170	306
<u>P. apricaria</u>			295	4045	4340
<u>P. squatarola</u>		259	1047	3835	5141
<u>V. vanellus</u>	158	8093	8	1860	1868
<u>C. canutus</u>	90	5	202	55135	71093
<u>C. alba</u>	5080	7268	46952	72265	131565
<u>C. alpina</u>	220	2730	2529	23375	28854
<u>L. lapponica</u>	1230	14101	34416	35305	85052
<u>N. arguta</u>	226	1117	3572	7125	12040
<u>T. totanus</u>		275	745	2325	3345
<u>A. interpres</u>	1450	1424	4609	5035	12518
<u>L. ridibundus</u>	5920	1685	2104	12170	21879
<u>L. canus</u>	15700	20091	52013	38910	126714
<u>L. marinus</u>	275	910	1512	2925	5622
<u>Gull sp.</u>	600	3175	9560	6240	19575

Other species: Gavia sp. 588, T. ruficollis 81, P. cristatus 18, P. griseigena 1, P. auritus 8, P. nigricollis 12, P. carbo 32, A. cinerea 69+ (not counted in the German part), C. olor 124, C. columbianus 724, C. cygnus 23, A. fabalis 2218, A. brachyrhynchus 32, A. anser 994, A. indicus 1, B. canadensis 29, Goose sp. 447, A. strepera 2, A. clypeata 273, A. ferina 1902, A. fuligula 740, A. marila 48, C. hyemalis 7, M. nigra 1639, M. fusca 30, B. clangula 1096, M. albellus 25, M. serrator 84, M. merganser 501, Duck sp. 1616, F. atra 2298, C. hiaticula 177, C. maritima 194, P. pugnax 10, G. gallinago 166, T. erythropus 4, T. ochropus 5, Wader sp. 161, L. fuscus 23, R. tridactyla 107, Uria aalge 23.

Total number of estuarine birds: 1,437,933

Total number of waders (excl. V. vanellus, P. apricaria, G. gallinago): 790,802

Discussion

In order to compare the results of the Wadden Sea counts with total population numbers, an attempt has been made to estimate the latter. The results are listed in Table 6. Most recent information on wader numbers wintering along the Mauritanian coast has been included, but there is still much uncertainty about numbers wintering along other parts of the West African coast. Besides much is uncertain on migration routes of waders wintering here. Consequently, perhaps some of the birds wintering along the West African coast should be excluded from what is called here East Atlantic flyway population (for further details see Engelmoer 1982).

It has been mentioned before that weather conditions were bad during three of the five counts. In fact, weather conditions only allowed the determination of reliable figures in November 1980 and January 1981. Data from the other three counts should, for most species, be regarded as minimum figures of the numbers actually present. Nevertheless, once more the significance of the Wadden Sea as a wintering and staging area for estuarine birds is clearly shown. During count 1 (April 1980) the number of Brent Geese *Branta bernicla* (153,000) is striking. In January 1979 the world population of *Branta b. bernicla* was estimated at 140,000 birds (Ebbinge et al. 1981). Our result makes it probable that during the count practically the whole world population of this subspecies was present in the area. High numbers were also recorded for Oystercatcher *Haematopus ostralegus* (approximately 25% of the estimated East Atlantic flyway population). Avocet *Recurvirostra avocetta* (11%), Grey Plover *Pluvialis squatarola* (11%), Dunlin *Calidris alpina* (31%), Bar-tailed Godwit *Limosa lapponica* (10%), and Curlew *Numenius arquata* (18%). Of the Knot *Calidris canutus* population, 43% was present in the Wadden Sea. Since, in this time of the year, birds present in W Europe are mainly from the Nearctic population, the proportion of the birds of this population was much higher and may even have amounted to up to 90%. The total number of waders comprises 21% of the estimated size of the total flyway population.

During count 2 (September 1980), a remarkable number of Shelducks *Tadorna tadorna* were counted: 143,175. Atkinson-Willes (1976) estimates the wintering NW European Shelduck population at 130,000. Most of the birds were present in Niedersachsen and Schleswig-Holstein where in late summer the great majority of the NW European Shelduck population moults flight-feathers. These moulting areas are left from mid-August on (Goethe 1981). Our count shows that a month later large numbers still are present in the Wadden Sea area, though somewhat dispersed. Though counting conditions were far from ideal, approximately 62% of the estimated East Atlantic Oystercatcher flyway population was present in the Wadden Sea. Of Avocet 38%, Grey Plover 23%, Knot 38%, Dunlin 24% Curlew 29%, and Spotted Redshank *Tringa erythropus* 11% were present. During the count at least 25% of the estimated total wader flyway population was present in the Wadden Sea.

The great surprise of count 3 (November 1980) was the presence of 240,000 Shelducks, and 635,000 Oystercatchers (approximately 78% of the East Atlantic flyway population). Other numerous wader species were Avocet (15%), Grey Plover (10%), Knot (28%), Dunlin (26%) and Curlew (33%). The total number of waders comprises 24% of the flyway population.

During count 4 (January 1981), considerably fewer birds were observed, compared to the counts in September and November. Among a total number of more than 1.4 million birds, about 791,000 waders were counted. This means that about 11% of the East Atlantic wader flyway population winters in the area. The number of wintering waders is somewhat higher than the estimates by Prater (1981) given in Table 6, which are based on data from 1978-81. Approximately 55% of the flyway population of Oystercatchers appeared to be present in the Wadden Sea. For Knot this was 10% (about 20% of the Nearctic population) and for Curlew 25%.

Count 5 shows that in March 1981 about 40% of the Oystercatcher flyway population was present in the area. By this time, these birds have already started to leave the Wadden Sea area for the breeding grounds. Other relatively numerous species were Knot (13%), Dunlin (12%) and Curlew (21%). The total number of birds approximates 12% of the total East Atlantic wader flyway population.

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Table 6: Number of waders (x1000) along the Atlantic coasts of Europe and Africa and in the Mediterranean basin. Numbers for Africa are estimates for the whole East Atlantic flyway population wintering there, based on midwinter counts in Morocco, Mauritania, Senegal, the Niger Valley, Namibia and South Africa.

	Denmark (excl. Wadden Sea) (Maltofte 1981)	Wadden Sea (Prater 1981)	The Netherlands, beach (Meininger & Becuwe 1979)	Delta (Baptist & Meire 1981)	Belgium, coast (Meininger & Becuwe 1979)	United Kingdom (Prater 1981)	Ireland (Prater 1981)	France (Prater 1981)	Spain (Prater 1981)	Portugal (Prater 1981)	Mediterranean basin (Prater 1965b)	Atlantic coasts of Africa (Engelmoer 1982)	GRAND TOTAL
<u>H.ostralegus</u>	0.1	310.0	3.1	107.0	0.4	300.0	32.0	46.0	1.5	0.8	0.8	15	817
<u>H.himantopus</u>	-	-	-	-	-	-	-	-	1.0	0.2	0.1	10	11
<u>R.avosetta</u>	-	2.1	-	0.4	-	0.1	-	17.0	3.5	12.7	15.0	20	71
<u>C.hiaticula</u>	-	+	+	+	+	12.0	7.5	6.0	2.5	3.0	0.1	200	231
<u>C.alexandrinus</u>	-	-	-	-	-	-	-	0.5	3.0	1.7	3.0	30	38
<u>P.squatarola</u>	-	4.0	0.1	4.1	+	15.0	1.2	19.5	3.0	7.1	3.0	100	157
<u>C.canutus</u>	-	25.0	-	21.0	-	250.0	30.0	19.0	1.2	0.5	0.1	400	747
<u>C.alba</u>	0.1	3.0	4.1	0.8	0.7	10.0	2.0	1.1	0.7	0.3	0.2	150	173
<u>C.minuta</u>	-	-	-	-	-	-	-	0.9	1.5	0.5	-	150	153
<u>C.maritima</u>	-	0.2	0.4	0.2	0.3	18.0	?	1.8	+	+	-	-	21+
<u>C.ferruginea</u>	-	-	-	-	-	-	-	-	-	-	-	400	400
<u>C.alpina</u>	3.2	120.0	0.6	74.0	0.7	500.0	115.0	330.0	25.0	52.0	70.0	1000	2291
<u>L.limosa</u>	-	-	-	-	-	5.0	9.0	13.6	18.0	10.8	10.0	150	216
<u>L.lapponica</u>	-	12.0	0.2	6.1	-	50.0	18.0	11.0	0.3	5.3	0.1	600	703
<u>N.arquata</u>	0.1	80.0	+	9.0	-	100.0	100.0	18.0	1.6	1.7	7.8	20	338
<u>N.phaeopus</u>	-	-	-	-	-	-	-	-	0.2	+	-	50	50
<u>T.erythropus</u>	-	+	-	+	-	0.1	+	+	0.1	0.2	0.8	25	26
<u>T.totanus</u>	0.9	17.0	0.1	3.0	+	100.0	14.5	6.0	3.0	4.6	9.0	200	358
<u>T.nebularia</u>	-	+	-	+	-	0.3	0.4	+	0.1	0.1	0.2	45	46
<u>A.interpres</u>	-	2.4	2.0	2.3	0.7	25.0	5.0	2.5	0.5	0.3	0.3	50	91

Estimated total of the East Atlantic Flyway population 6,938,000 waders

CURRENT COLOUR-MARKING SCHEMES

Projects listed in the WSG register of colour-marking schemes, covering the Old World (or wader populations which may migrate to the Old World) were given in full in WSG Bull 33 (pp.22-25) and updated in WSG Bull 34 (p.2). Further schemes registered since then are:

Oystercatcher *Haematopus ostralegus*

Isle of May, Scotland (M.P.Harris, Hill of Brathens, Banchory, Kincardineshire AB3 4BY, GB) colour-rings

Little Ringed Plover *Charadrius dubius*

Wrocław, Poland (T.Wesołowski, Dept. of Avian Ecology, Zoological Institute of Wrocław University, Sienkiewicza 21, 50-335 Wrocław, Poland) colour-rings

Ringed Plover *Charadrius hiaticula*

Vistula River, Poland (T.Wesołowski; see Little Ringed Plover) colour-rings

Kentish Plover *Charadrius alexandrinus*

SW Scania, Sweden (Paul E. Jonsson, Dept. of Animal Ecology, Ecology Building, University of Lund, S-223 62 Lund, Sweden) colour-rings

Golden Plover *Pluvialis apricaria*

Nottinghamshire, England (D.B.A.Thompson, Zoology Dept., Nottingham University, Nottingham NG7 2RD, GB) colour-rings
South Wales (P.N.Ferns, Dept. of Zoology, University College, Cardiff, GB) temporary colour-rings

Lapwing *Vanellus vanellus*

Sheffield, England (K.V.Tayles, 14 Blackbrook Road, Sheffield, S.Yorks S10 4LP, GB) colour-rings

Dunlin *Calidris alpina*

South Wales (Dr.P.N.Ferns; see Golden Plover) temporary colour-rings
Caithness, Scotland (Ms C.F.Tyson, 87 Eastern Avenue, Shoreham-by-Sea, West Sussex BN4 9PE, GB) temporary colour-rings

Curlew *Numenius arquata*

Castricum & Vlieland, Netherlands (J.L.Mulder, van Oldenbarneveldtweg 40, 1901 KC Castricum, Netherlands) colour-rings