

adult Red Knots in New Zealand which had been banded in Victoria in the October-November period. One movement was within the same season. The flight from Queenscliff to Auckland is only 2 800 km and Red Knots would only need to reach 130 g in weight in order to fly this distance.

There have been two movements of first-year Red Knots banded in Victoria in June which were later controlled in New Zealand as 3+ birds. It is not known whether these birds spent their first non-breeding season in New Zealand and then moved to Victoria during the following southern winter or whether they stopped first in Victoria before moving on as second-year birds or adults to New Zealand.

#### ACKNOWLEDGEMENTS

It is our pleasure to thank members of the Australasian Wader Studies Group, the Victorian Wader Study Group and the Miranda Naturalists' Trust, New Zealand, for obtaining the data on which this paper is based. We would also like to thank William Dick and Brett Lane for their helpful comments on the first draft and Karen Barter for typing the various drafts.

#### REFERENCES

- Conover, H.B. 1943. The races of the Knot (*Calidris canutus*). *Condor* 45: 226-228.
- Cramp, S. and Simmons, K.E.L. (eds.) 1983. *The Birds of the Western Palearctic* Vol. 3 pp. 271-282. Oxford University Press.
- Dick, W.J.A., Pienkowski, M.W., Waltner, M. & Minton, C.D.T. 1976. Distribution and geographical origins of Knot (*Calidris canutus*) wintering in Europe and Africa. *Ardea* 64: 22-47.
- Flint, V.E. 1972. The breeding of the Knot on Vrangelya (Wrangel) Island, Siberia: comparative remarks. *Proc. West. Found. Vertebr. Zool.* 2: 27-29.
- Harrington, B.A. & Twitchell, D.C. 1982. Untying the enigma of the Red Knot. *Living Bird Quarterly* 1: 4-7.
- Lane, B. & Jessop, A.E. 1985. Tracking of migrating waders in north-western Australia using Meteorological Radar. *The Stilt* 6: 17-28.
- Lane, B.A. 1987. *Shorebirds in Australia*. Nelson.
- Matthews, G.M. 1913. *The Birds of Australia*. Vol. III pp. 270-273. Witherby.
- Morrison, R.I.G. 1975. Migration and morphometrics of European Knot and Turnstone on Ellesmere Island, Canada. *Bird-Banding* 46: 290-301.
- Portenko, L.A. 1972. *Birds of the Chukchi Peninsula and Wrangel Island*. Vol. I pp. 349-353. Amerind.
- Prater, A.J., Marchant, J.H. & Vuorinen, J. 1977. *Identification and Ageing of Holarctic Waders*. BTO Guide 17, Tring, U.K.
- Richardson, W.J. 1979. Southeastward shorebird migration over Nova Scotia and New Brunswick in Autumn: a radar study. *Can. J. Zool.* 57: 107-124.
- Ridgeway, R. 1919. The birds of North and Middle America. *U.S. Nat. Mus. Bull.* 50(8): 231-238.
- Roselaar, C.S. 1983. Subspecies recognition in Knot *Calidris canutus* and occurrence of races in Western Europe. *Beaufortia* 33(7): 97-109.
- Sagar, P. 1986. Wader counts in New Zealand. *The Stilt* 9: 32-33.
- Summers, R.W. & Waltner, M. 1979. Seasonal variations in the mass of waders in southern Africa, with species reference to migration. *Ostrich* 50: 21-37.
- Tomkovich, P.S. 1987. Preliminary data on geographic variation of Siberian Red Knots. Abstract only. *Wader Study Group Bull.* 51: 24.

## THE BIRDS OF ESTUARIES ENQUIRY - SOME RESULTS FROM THE 1987/88 WINTER

R.P. Prys-Jones & J.S. Kirby

The Birds of Estuaries Enquiry (BoEE) is the United Kingdom's scheme for monitoring estuarine bird populations. It is organised by the British Trust for Ornithology (BTO) and co-sponsored by the BTO, Nature Conservancy Council, Royal Society for the Protection of Birds and the Department of the Environment for Northern Ireland. The objectives of the BoEE are to document seasonal and annual trends in shorebird populations and to synthesize this information for scientific and conservation purposes. The eighteenth consecutive season of co-ordinated counts for the BoEE took place between July 1987 and June 1988. As usual, counts were made by over 1 000 participants on selected dates near the middle of each month, timed to coincide with the best tidal conditions for censusing estuarine birds. Coverage included almost all of the 119 estuarine sites in the United Kingdom defined by Salmon et al. (1988), as well as about 40 non-estuarine coastal sites. Detailed results for the winter period (November-March) are available in Salmon et al. (1988) Wildfowl and wader counts 1987-88, available from the BTO

(address below), price £1.50 (inc. p&p). Here we summarise the main findings for 1987/88.

A peak United Kingdom population exceeding 1.25 million waders from December 1987 to January 1988 averaged 18% higher than for the equivalent period in 1986-87. The January index (calculated only for those sites counted in both January 1987 and January 1988) showed striking increases for most species: Oystercatcher (+26%), Ringed Plover (+23%), Grey Plover (+50%), Knot (+7%), Sanderling (+21%), Dunlin (+17%), Curlew (+57%), Redshank (+45%) and Turnstone (+20%). The only species whose January index decreased in 1988 was the Bar-tailed Godwit (-15%), a reverse in its trend between 1986 and 1987.

The 1987/88 winter was generally mild throughout, whereas the 1986/87 winter had an exceptionally severe cold spell in January. One result of this is that the recorded index changes for Curlew and Redshank must be interpreted with great caution. The dips in their index values between 1986 and 1987, followed by sharp increases in 1988, almost

Table 1. Total numbers of the main wader species recorded by the BoEE at coastal sites in the United Kingdom during winter 1987/88.

	November	December	January	February	March
Oystercatcher	206 709	251 654	262 299	261 390	148 744
Ringed Plover	9 854	9 861	8 790	8 012	3 250
Golden Plover	28 521	44 484	40 370	34 026	12 584
Grey Plover	25 305	30 123	31 173	29 990	25 398
Lapwing	109 061	152 717	126 379	117 798	13 179
Knot	216 935	223 540	250 923	256 571	116 156
Sanderling	5 610	5 846	6 810	4 532	5 493
Dunlin	254 353	338 434	335 932	327 975	118 085
Black-tailed Godwit	4 412	4 933	3 553	5 727	5 551
Bar-tailed Godwit	27 026	35 427	53 321	40 184	6 919
Curlew	53 576	51 973	74 431	82 350	56 995
Redshank	78 294	80 811	75 436	86 227	64 856
Turnstone	17 801	18 857	18 606	21 298	17 414

certainly more closely reflect short-term redistributions of their populations away from BoEE sites during the severe weather rather than pronounced changes in mortality and/or productivity. This tendency is exhibited to a much greater degree by Lapwing and Golden Plover, for which indices are not calculated both because high proportions of their wintering populations occur inland and because they are highly prone to cold weather movements. Totals of Lapwings and Golden Plovers on BoEE sites remained high through February in winter 1987/88, in marked contrast to the striking decrease in their numbers which occurred in January 1987.

Despite the January 1988 index for Dunlin showing an increase relative to the nadir reached a year previously, wintering Dunlin numbers still remain well down on those present in the UK in the 1970s. The major upward trends in Oystercatcher and Grey Plover numbers continued, with both species reaching new record index values. Using BoEE data, Moser (1988) has shown that Grey Plovers have increased greatly on some estuaries, mainly in the north of Britain, but not at all on other, predominantly southerly ones, suggesting that many of the latter are preferred sites on which the species had reached ceiling densities even at relatively low overall population levels. This finding has important implications for assessments of estuarine development proposals, because it provides information on the possibility that some neighbouring estuaries are not able to accommodate displaced birds.

All BoEE sites which either supported more than 20 000 waders in winter 1987-88, or have averaged more than 20 000 wintering waders over the past five years, are listed in Table 2. Notably high numbers were recorded on both the Wash and the Ribble in winter 1987-88. In the case of the Ribble, this was very largely the product of exceptional totals of around 50 000 Knot recorded in both November and December. Over 35 000 Oystercatchers, 8 000 Grey Plover and 7 500 Redshank on the Wash in February were also record counts for this site in winter.

Moser & Prys-Jones (1988) have provided up-to-date evaluations of the importance for wintering waders of all eight BoEE sites in Northern Ireland, of which only Strangford Lough figures in Table 2. They also give mid-winter population estimates and distribution patterns for waders along the entire coastline of Northern Ireland, based on a combination of BoEE and Winter Shorebird Count data.

After the rapid expansion in the scope of the BTO Estuaries Programme in the previous year, 1987-88 was more one of consolidation. Work proceeded on a major 18-month contract, funded by the Energy Technology Support Unit (U.K. Department of Energy), to investigate the potential impact on intertidal birds of the proposed Severn tidal barrage. Under the organization of Nigel Clark, a team of 40 volunteer counters carried out 14 comprehensive low-tide surveys throughout the entire Severn estuary during winter 1987-88, providing unprecedented insight into intra-estuary distribution patterns of feeding birds on the Severn. In addition, it was gratifying to find that the peak winter count estimate for waders based on the low-tide surveys was only 5% lower than that based on the BoEE high-tide counts, despite problems posed by the vast extent of the intertidal flats of the Severn. In December 1987, Robin Ward joined the Estuaries Programme on a 15-month contract to investigate the probable effects on intertidal birds of development proposals in Poole Harbour. His arrival was balanced by the departure of Paul Rose and Ian Shepherd, who in June 1988 successfully completed 15-month contracts assessing the implications for birds of proposed power station developments on the Humber and Southampton Water.

BTO Estuaries Programme publications during 1988 are listed below:

Goss-Custard, J.D. & Moser, M.E. 1988. Rates of change in numbers of Dunlin, *Calidris alpina*, wintering in British estuaries in relation to the spread of *Spartina anglica*. *J. appl. Ecol.* 25: 95-109.

Kirby, J.S. 1988. Tracking estuarine bird populations. *Shooting and Conservation*. Autumn 1988: 32-33.

Kirby, J.S., Cross, S., Taylor, J.E. & Wolfenden, I.H. 1988. The distribution and abundance of waders wintering on the Alt estuary, Merseyside. *Wader Study Group Bull.* 54:

Mitchell, J.R., Moser, M.E. & Kirby, J.S. 1988. Declines in midwinter counts of waders roosting on the Dee estuary. *Bird Study* 35: 191-198.

Moser, M.E. 1988. Limits to the numbers of Grey Plovers *Pluvialis squatarola* wintering on British estuaries: an analysis of long-term population trends. *J. appl. Ecol.* 25: 473-485.

Table 2. Wader counts at principal BoEE sites in winter.

	Peak winter count 1987/88	Average peak winter count 1983/84 to 1987/88
Wash	217 491	179 197
Morecambe Bay	160 594	154 635
Thames	80 058	84 578
Dee (Eng./Wales)	91 142	83 452
Humber	80 406	82 583
Ribble	122 989	82 159
Solway	64 881	65 545
Severn	57 051	54 283
Alt	56 942	53 581
Srangford Lough	42 825	47 613
Chichester Harbour	-	39 487
Langstone Harbour	44 611	38 811
Forth	41 658	37 204
Burry	36 097	35 464
Swale	37 651	33 193
Mersey	25 125	32 434
Lindisfarne	28 935	28 941
Medway	(34 162)	28 732
Stour	27 731	25 743
Blackwater	20 195	22 965
Duddon	24 172	22 171

Totals in parentheses refer to sites lacking any complete counts in winter 1987-88. No counts were received from Chichester Harbour.

Moser, M.E. & Prys-Jones, R.P. 1988. Population estimates, distribution patterns and site evaluations for waders wintering on the coast of Northern Ireland. *Irish Birds* 3: 551-568.

Moser, M.E. & Prys-Jones, R.P. 1988. The numbers game. Pp.83-102 in Soper, A. (ed.) *Go Birding*. BBC books, London.

Prater, A.J. & Prys-Jones, R.P. 1988. The importance of intertidal areas for wintering and passage waders. *Proc. Salt Marshes and Intertidal Areas Symposium, RSPB Reserves Conference 1987*: 1-25.

Prys-Jones, R.P. 1988. Birds of estuaries: the BTO Estuaries Programme. Pp.247-252 in Pemberton, J.E. (ed.), *The Birdwatcher's Yearbook and Diary 1989*. Buckingham Press, Buckingham.

Salmon, D.G., Prys-Jones, R.P. & Kirby, J.S. 1988. *Wildfowl and wader counts 1987-88*. The Wildfowl Trust, Slimbridge.

Robert Prys-Jones and Jeff Kirby, *British Trust for Ornithology, Beech Grove, Station Road, Tring, Hertfordshire, HP23 5NR*.

