

study use of such extracted data was considered appropriate. Details of how prey values were selected are as follows:

Macoma. Energy content estimated for the median age class (shell height 4.62 mm) in January on Ythan Estuary as 9.53 cal (Chambers and Milne 1975, Tables 1 and 2). In calculating the median, *Macoma* in the smallest class (shell height 2 mm) were omitted since these would have been recorded as "very small items".

Nereis. Values for the 0-1 and 1+ year classes of 47 and 235 cal/item were used (Evans *et al.* 1979, Table 9).

Very small items. Extreme values of 0.12 cal and 2.5 cal were used; the former is for 0-1 year *Hydrobia ulvae* (Evans *et al.* 1979, Table 9) and the latter is as determined by Pienkowski (1982) for this prey type.

WADERS WORLDWIDE

Members of the British Trust for Ornithology (BTO) will know that towards the end of 1986, the Estuaries Programme of the BTO initiated a regular double-page feature entitled "Shorelines" in *BTO News*, in order to keep BTO members informed of developments in the wader world. Some articles in "Shorelines" relate to studies involving BTO staff and membership participation, whereas others are aimed at providing the global perspective necessary for an appreciation of wader biology. Among the latter is a continuing series providing

overviews of wader studies taking place in different parts of the world. We felt that these articles are of considerable interest to wader enthusiasts worldwide. With the agreement of the BTO, we will be reprinting some of these articles in the *Wader Study Group Bulletin*. The first of the series, on southern Africa, appears below.

The Editors

WADERS IN SOUTHERN AFRICA

Les Underhill

Reprinted from BTO News No. 152: 14-15 (Sept-Oct 1987)

The BTO ethos strongly permeates wader studies in southern Africa. Most ringers here are either first or second generation BTO-trained. First Clive Elliott and later Ron Summers provided professional leadership and input to the Western Cape Wader Study Group (WCWSG) since its inception in 1971, making it the first wader group in the southern hemisphere. Like the various wader groups in Britain, the WCWSG links and coordinates the activities of mainly amateur ringers.

Based on his pioneering work in eastern Scotland, Ron Summers coaxed the WCWSG into counting waders along the southern Africa coastline in 1975, long before he helped in motivating the Winter Shorebird Count in Britain. Due to the small teams of counters we could muster, the southern Africa coast was covered in a series of surveys over several years. The results of each survey have been published: an up-to-date list of these reports and papers may be found in *Wader Study Group Bulletin* 49: *Suppl.*: 15-34. A few sections of coast remain to be done. The coast of the Transkei is scheduled for December 1987, leaving only the diamond prospecting areas of southern Namibia and parts of the northern Cape unsurveyed for waders.

LANGEBAAN LAGOON

Important wader projects of the WCWSG completed in the past ten years have resulted in publications on the Curlew Sandpiper, Knot, Terek Sandpiper and Sanderling. The WCWSG has organised midwinter and midsummer counts at Langebaan Lagoon, on the Atlantic coast 100 km north of Cape Town and the most important wetland for waders in South Africa. A summary paper is in press (Underhill, *Ostrich* 1987).

Our efforts played at least a small part in the proclamation of Langebaan Lagoon as a National Park in 1985. The January wader population at Langebaan Lagoon averages 34 500 birds, placing it among the major wetlands for waders along the East Atlantic Flyway. Table 1 gives a comparison of the species composition and abundance of waders in January at Langebaan with that at Lindisfarne, an estuary on the northeast coast of England holding a similar number of waders. Some striking points emerge. These distant sites both hold seven of the top twelve waders. Much the most abundant waders at Langebaan and Lindisfarne respectively are the ecologically similar Curlew Sandpiper and Dunlin. Only one resident African wader, the White-fronted Sandplover, closely related to the Kentish Plover, appears among the top twelve at Langebaan.

The Percy Fitzpatrick Institute of African Ornithology at the University of Cape Town is the local equivalent of the Edward Grey Institute at Oxford. There, Phil Hockey and Alison Bosman are doing fascinating work on predator-prey relationships between African Black Oystercatchers and limpets. They have found that limpets grow bigger and faster on offshore islands where the run-off after rain is enriched by the guano of the seabird colonies. Oystercatcher densities are about five times higher on these islands than the adjacent mainland. They remove mostly medium-sized limpets - the largest ones are left to breed and the smallest to grow.

In Port Elizabeth, on the Cape south coast, Paul Martin is completing a PhD on the ecology of waders on the Swartkops estuary. He also holds the rare distinction of being the first person in Africa to observe a Hudsonian Godwit - this bird appeared on the estuary early in

Table 1. Comparison of species composition and abundance of waders at Langebaan Lagoon, western South Africa, and Lindisfarne, north-east England, based on January counts, 1975-86.

Langebaan	Median Count	Lindisfarne	Median Count
Curlew Sandpiper	20 672	Dunlin	21 000
Grey Plover	3 615	Bar-tailed Godwit	3 800
Sanderling	2 847	Oystercatcher	2 410
Knot	2 808	Redshank	1 830
Turnstone	1 976	Lapwing	1 235
Greenshank	443	Golden Plover	1 160
Whimbrel	441	Knot	1 100
White-fronted Sandplover	386	Curlew	700
Little Stint	303	Grey Plover	286
Ringed Plover	242	Turnstone	139
Bar-tailed Godwit	199	Ringed Plover	110
Curlew	137	Sanderling	91
Total	34 505		33 894

1987 and stayed for several weeks. Also in Port Elizabeth, Jean Spearpoint and Bruce Every are doing fortnightly counts of the waders along a 5 km stretch of rocky shore in Algoa Bay, this year completing a six years unbroken fieldwork. In addition, Tony Tree has ringed large numbers of waders in this area, as well as further north in Zimbabwe; he has a special interest in Greenshanks, and one of his colour-ringed birds from Zimbabwe has been sighted subsequently in France.

There are special advantages associated with being based in the southern hemisphere. First of all, the action takes place in our summer (well, most of it). I call to mind a delightful night at Langebaan Lagoon in March 1986, three in the morning, absolutely still, taking waders out of nets in shorts and barefoot (me, not the waders), with Halley's Comet both overhead and reflected in the water at my feet. I compare that with the agony of a night a few days before Christmas on the Wash in 1979, and also with participating in the Tay Ringing Group's January 1985 expedition to help the Shetland Bird Club with the Winter Shorebird Count - the temperature remaining below freezing for days on end. Secondly, when the WCWSG started, little was known about waders in southern Africa. Almost whatever was tackled was new. There were few recoveries to demonstrate the breeding origins of our waders; there was very little quantitative information about numbers or distribution and even less understanding of biometrics, moult, feeding ecology and population dynamics. In particular, for those species that "winter" (from the British viewpoint) from the Arctic Circle southwards, there is the opportunity to compare how their annual cycle strategies vary in different latitudes. Ron Summers and I have amalgamated the Turnstone data of the Tay Ringing Group and the WCWSG. In eastern Scotland, the average Turnstone moults earlier and faster, completing primary moult near the end of October, before the onset of cold weather, whereas southern African Turnstones start later, take three weeks longer, and complete primary moult in February. Scottish Turnstones in January weigh about 12% more than their southern African counterparts - an insurance policy against feeding areas freezing over. Southern African Turnstones put on about 60 grams of fat as fuel for the first leg of the journey back to their Siberian breeding grounds; Scottish Turnstones average only a 30 gram increase. We are still a long way from addressing the fascinating question of how the components of survival compensate each other for these populations. Is the risk associated with flying an extra 20 000

km per year to spend winter in "summer" compensated for by better food resources, warmer weather or other factors? Opportunities for similar studies exist for several other species: for example, Knot, Sanderling and Grey Plover. We would be delighted to pool our data with anyone who shares the trans-hemispherical vision.

Thirdly, and this is an advantage we have not really exploited, we are at the end of the migration route. There are no complications such as influxes of birds on passage or movements southwards in hard weather. The system is simple: birds arrive, moult, fatten and leave. These are ideal conditions in which to study site fidelity and longevity.

Southern Africa also has a variety of breeding waders, including two jacanas, an oystercatcher, an avocet, a stilt, eleven plovers, a snipe, two stone-curlews and seven coursers and pratincoles. The smaller plovers usually lay two eggs, compared with four in northern species. This provides interesting comparisons: predation rates are higher in Africa and may be the reason for small clutch sizes - by laying a small clutch, birds may be able to relay a lost clutch faster and to lay more of them.

Recoveries add spice to life for ringers. Most recoveries of Palearctic waders ringed in southern Africa lie close to the great circle route to the Taimyr Peninsula, in northern Siberia, and especially around the Black and Caspian Seas. Knot, however, probably migrate around the bulge of Africa since our recoveries are from the west coasts of Africa and Europe: for example, we retrapped a Knot ringed in Mauretania at Langebaan Lagoon. A further British connection is provided by Sanderlings, with recorded movements between the Wash and south-western Cape. Although most Sanderling migration through Britain occurs along the west coast, none of our birds have been retrapped there. Our Sanderlings seem to migrate southwards, mainly along the great circle route, but more than half of the northward recoveries indicate a western route - recoveries from the Mediterranean Sea region suggest a Saharan crossing in spring. Southern African Ruffs have been recovered from the far east of Siberia, with an unusual recent recovery in South Africa of an Indian-ringed individual.

Perhaps the most exciting discovery of the WCWSG has been that lemming cycles in the Taimyr Peninsula have effects observable at the

southern tip of Africa, 13 000 km away. Many BTO members may have read "Lemmings I" (*Bird Study* 33: 105-108), Ron Summers' account of the apparent interrelationship between the circa three-years cycles of lemmings, Arctic Foxes and Dark-bellied Brent Geese. In "Lemmings II" (*Bird Study* 34: 161-171), Ron and I show that not only does the breeding production of Brent Geese, as measured by the percentage of first-year birds along the North Sea coasts, follow a three-year cycle, but the breeding populations of Curlew Sandpipers, Turnstones and Sanderlings, as measured in southern Africa, also follow a synchronized three-year cycle. The populations of these wader species that winter in southern Africa also breed in the Taimyr Peninsula. They Grey Plovers wintering in Britain also originate in the Taimyr, and I expect that the proportions of first-year birds in Britain can be shown to fluctuate on the same three-year cycle as the Brent Geese. Developing this international

theme further, irruptions of Curlew Sandpipers into Britain seem to occur mainly in the years of high nesting success on their Taimyr breeding grounds. For example, in the autumn of 1969 there was a major irruption of Curlew Sandpipers in Britain. That year, 65% of the WCWSG's catches of Curlew Sandpipers in the south-western Cape were first-year birds. That irruption was observed as far afield as New Zealand, where unprecedented numbers of Curlew Sandpipers occurred. 1985 was another very good breeding year in the Taimyr Peninsula, and in Britain there was the largest passage of Curlew Sandpipers since 1969 (*BTO News* No. 141) and we had the highest proportion of first-year birds (60%). Waders had turned the world into a global village a long time before we did!

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