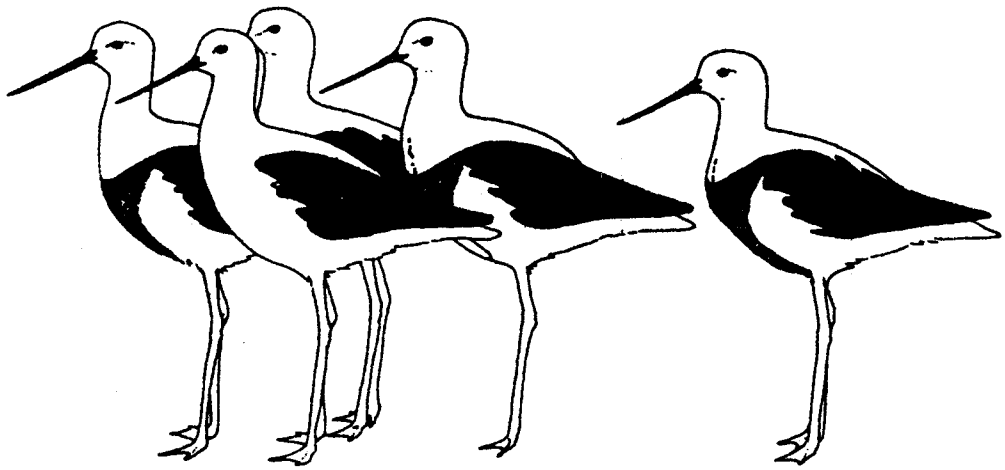
The Stilt



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BULLETIN OF THE AUSTRALASIAN WADER STUDIES GROUP

OF THE

ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

Number 23 OCTOBER 1993

OBJECTIVES OF THE AUSTRALASIAN WADER STUDIES GROUP OF THE ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

1. To develop or assist with plans for wader research in Australasia in conjunction with other interested bodies

2. To co-ordinate and encourage counting, banding, feeding studies and other scientific programmes involving amateur and professional skills.

3. To encourage and assist with the publication of results.

4. To maintain effective communication between wader enthusiasts within Australasia and with similar groups overseas.

5. To formulate and promote policies for the conservation and management of waders and their habitat.

VIEWS AND OPINIONS EXPRESSED IN "*THE STILT*" ARE THOSE OF THE AUTHOR(S) AND NOT NECESSARILY THOSE OF THE AWSG.

Subscriptions for 1993:

Australasia	AUS $15
Overseas	AUS $20
Libraries	AUS $25

BACK ISSUES OF *THE STILT*

Back issues of *The Stilt* are available from the Administration Secretary. Prices are:

Australia and New Zealand
Single Copies - $A 6.00 surface post paid
Complete set (1-22) - $A80.00 surface post paid

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Single copies - $A 7.00 surface post paid
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Please forward payment as a bank draft or money order in Australian currency.

Stilt No. 7 contains the Index for Nos. 1-6
Stilt No. 13 the Index for Nos. 7-12
Stilt No. 19 the Index for Nos. 13-18.

ALL ENQUIRIES SHOULD BE DIRECTED TO BRENDA MURLIS, ADMINISTRATIVE SECRETARY.

NEWS VIEWS REVIEWS NEWS VIEWS REVIEWS

EDITORIAL

The later part of 1993 has witnessed two significant events for Australasian wader enthusiasts. The first of these was the recent publication of Doug Watkin's report A National Plan for Shorebird Conservation in Australia and the second the current release of Volume 2 of the Handbook of Australian, New Zealand and Antarctic Birds (HANZAB).

The Conservation Plan (more on which elsewhere in this issue) is a work of major importance for the future of waders in Australia and will be extremely useful as a tool in working for the preservation of wader habitat. Amongst the many useful assets of the report are the state/territory important area accounts, which list areas of international or national importance for each state or territory and the species for which they are important. In addition this section also lists the conservation status of the areas of importance. With this information now available in such an accessible form it will be far easier for those involved in wader conservation to lobby for the protection of these sites.

The publication of Volume 2 of HANZAB is obviously an historic event for Australasian ornithology and if it maintains the standard of Volume 1 will be the major source of information on the life histories of those species included in it. Volume 2 includes all waders from the Plains-wanderer to the Lapwings. The remainder of the wader species will be included in Volume 3.

Jeff Campbell

Please note new address for Editor. See inside back cover.

ELECTION OF OFFICE BEARERS

The term of office of the current Committee expires on May 31, 1992.

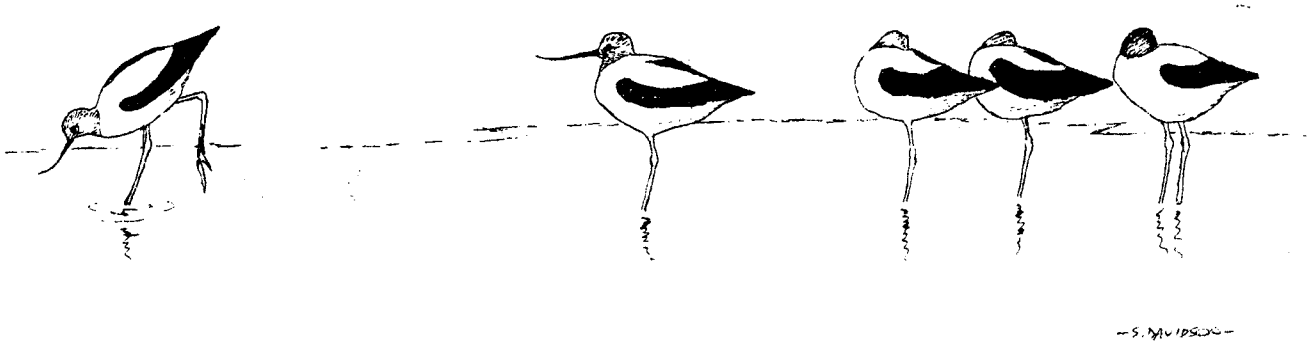
In accordance with Rule 7 of the Rules of the Australasian Wader Studies Group of the Royal Australasian Ornithologists Union, written nominations for committee positions, seconded by a member of the Group, shall be sent to the Chairperson by January 31 1994. The new Committee shall take office on June 1 1994 and shall have a term of two years.

The position and names of the current office bearers are listed below:

Chairperson	Mark Barter
Administrative Secretary	Brenda Murlis
Treasurer	David Henderson
Research Coordinator	Danny Rogers
Membership/Liaison Officer	Hugo Phillipps
Editor	Jeff Campbell
Committee Members	Clive Minton
	Mick Murlis

Should an election be necessary, ballot papers will be included in the April 1994 edition of *Stilt*.

Brenda Murlis



RECENT LITERATURE

The following is a selected list of articles dealing with waders from recent publications. Reprints of items of interest to be included would be welcome, please forward same to the Editor.

Barlow, M.1993. New Zealand Dotterel: South Island historical notes and Southland coastal records. Notornis 40, 15-25. (38 Filluel St., Invercargill, NZ). *Charadrius obscurus.*

Batty, L. 1993. Computer analysis of wader morphometric data. Wader Study Group Bulletin 70, 23-27. (Dept. Applied Biology, Univ. Hull, Hull HU6 7RX, UK).

Beckon, W.N. 1990. First record of the Pectoral Sandpiper in Fiji. Notornis 37, 106. (Dept. Zool., Univ. California, Davis 95616, USA). *Calidris melanotos.*

Calvo, B.& R.W. Furness. 1992.A review of the use and the effects of marks and devices on birds. Ringing & Migration 13, 129-151. (Applied Ornithology Unit, Dept. Zool., Univ. Glasgow, Glasgow G12 8QQ,UK).

Christian, P.D., L.Chritidis & R.Schodde. 1992. Biochemical systematics of the *Charadriiformes* (shorebirds): relationships between the *Charadrii, Scolopaci* and *Lari*.Australian Journal of Zoology 40, 291-302. (CSIRO, Div. Entomol., PO Box 1700, Lyneham, ACT, 2601, Aust.).

Christian, P.D., L.Christidis & R.Schodde. 1992. Biochemical systematics of the Australian Dotterels and Plovers (*Charadriiformes : Charadriidae*). Australian Journal of Zoology 40, 225-233.

Dann, P.1993. Abundance,diet and feeding of the Whimbrel *Numenius phaeopus variegatus* in Rhyll Inlet, Victoria. Corella 17, 52-57. (Penguin Res. Com.of Management, PO Box 97, Cowes, Phillip Island, Vic., 3922, Aust.)

Dann, P. 1993. Data Exchange: Sexual dimorphism in bill lengths of Whimbrel *Numenius phaeopus variegatus.* Corella 17,57.

Deblinger, R.D., J.J. Vaske & D.W.Rimmer. 1992. An evaluation of different predator enclosures used to protect Atlantic coast Piping Plover nests. Wildlife Society Bulletin 20, 274-279. (The Trustees of Reservations, 572 Essex St., Beverly, MA 01915, USA).*Charadrius melodus.*

Dowding, J.E. & E.C. Murphy. 1993. Decline of the Stewart Island population of the New Zealand Dotterel. Notornis 40, 1-13. (Dept. Conservation, Private Bag, Christchurch, NZ). *Charadrius obscurus.*

Evans, P.R., N.C. Davidson, T.Piersma & M.W. Pienkowski. 1991. Implications of habitat loss at migration staging posts for shorebird populations. Acta XX Congress International Ornithology Vol. IV, 2228-2235. (Dept. Biol. Sci., Univ. Durham, Sci. Lab., South Rd., Durham, England DH1 3LE).

Kaletja, B.1992. Time budgets and predatory impact of waders at the Berg River, South Africa. Ardea 80, 327-342. (Percy FitzPatrick Inst. of African Ornithol., Univ. of Cape Town, Rondenbosch, 7700, South Africa).

Klomp, N.I. & R.W. Furness. 1992. A technique which may allow accurate determination of the age of adult birds. Ibis 134, 245-249. (School Appl. Sci., Charles Sturt Univ., PO Box 789, Albury, NSW, 2640, Aust.). A.o. *Tringa totanus.*

Lindstrom, A.& T.Piersma. 1993. Mass changes in migrating birds: the evidence for fat and protein storage re-examined. Ibis 135,70-78. (Zoological Lab., Univ. Groningen, PO Box 14, 9750 AA Haren, The Netherlands.)

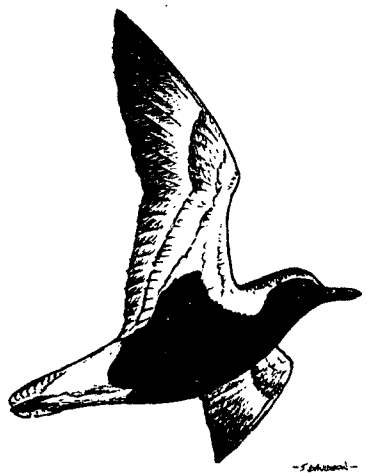
Lauro, B.& E. Nol. 1993. The effect of prevailing wind direction and tidal flooding on the reproductive success of Pied Oystercatchers *Haematopus longirostris.* Emu 93, 199-202. (Dept.Biol., Queen's Univ., Kingston, Ontario, Canada, K7L 3N6).

Minton, C.D.T. 1993. Stress myopathy in waders.Wader Study Group Bulletin 70, 49-50. (165 Dalgetty Rd, Beaumaris, Vic., 3193, Aust.).

Tipper, R.1993. Waders in Hong Kong.British Birds 86, 231-242.(The Old Bakehouse, Hanging Birch Lane, Waldron, East Sussex TN21 OPA, UK).

Velasquez, C.R. & P.A.R. Hockey. 1992. The importance of supratidal foraging habitats for waders at a south temperate estuary. Ardea 80, 243-253. (Percy FitzPatrick Inst.of African Ornithol., Univ.of Cape Town, Rondenbosch, 7700, South Africa).

Editor



NEW PUBLICATION ON SHOREBIRD CONSERVATION IN AUSTRALIA

The most significant report for shorebird conservation in Australia in the past five years has just been published!

It has been produced by the Australasian Wader Studies Group with funding from the World Wide Fund for Nature. The report is titled *A National Plan for Shorebird Conservation in Australia* and was prepared by Doug Watkins.

The report focuses on the identification of areas of international and national importance for shorebirds based on criteria contained in the Ramsar Convention. Identification of these areas is fundamental to the conservation of shorebirds in Australia.

The main criterion used to identify important areas is the supprot of 1%, or more, of the population of a species. Use of this criterion required minimum population estimates to be developed for each species. The data used is primarily from RAOU/AWASG projects (Shorebird, Population Monitoring and Regular Count) along with other published counts since 1980.

The Report estimates that a minimum of 1.1 million resident and 2 million migrant shorebird occur in Australia.

The Report identifies 180 areas of international importance and an additional 21 areas of national importance using the important site criteria.

The three most important areas in Australia are identified as:

- the south-east Gulf of Carpentaria in Queensland,
- Roebuck Bay in Western Australia, and
- Eighty Mile Beach in Western Australia

Each of these areas is internationally or nationally important for between 19 and 23 species.

Detailed accounts are given for 43 species of shorebirds and include population estimates, the areas of international and national importance, status, movements and conservation concerns for each species.

Areas identified as being of international or national importance for shore birds are also presented on a State/Territory basis. All of the count data presented is fully referenced.

The Report examines the conservation status of the important areas for shorebirds and finds that:

- 21% are fully within conservation reserves,
- 28% are partly in conservation reserves or otherwise have some protection under planning provisions, and
- 51% have no formal recognition of their conservation values.

Only 15% of the areas of international importance are listed under the Ramsar Convention.

An action plan is presented containing 29 recommendations for the Commonwealth, State and Territory Governments and community conservation organisations. These cover increasing community awareness, improving land management, reviewing local and regional planning schemes, monitorinaga the development approval process, increasing the conservation reserve network, improving information on shorebirds and the continuing need to review the listings of important areas.

This report should enable more informed decisions to be made concerning the potential for existing and proposed land use and land management activities to affect shorebirds.

Do purchase a copy. You will be able to see the work that has been done by volunteer counters, inform yourself on shorebird conservation needs and be able to contribute to a future review of the Report.

Doug Watkins.

POPULATION MONITORING NEWS

Ken Harris has taken over from Luke Naismith as coordinator of the AWSG's Wader Monitoring Project. Job demands, and recent elevation to fatherhood, has made it increasingly difficult for Luke to devote the time required to maintaining this very important project.

Ken can be contacted as follows:

59 Strickland Drive
Wheeler's Hill
VIC 3150
Tel: (03) 561 6863

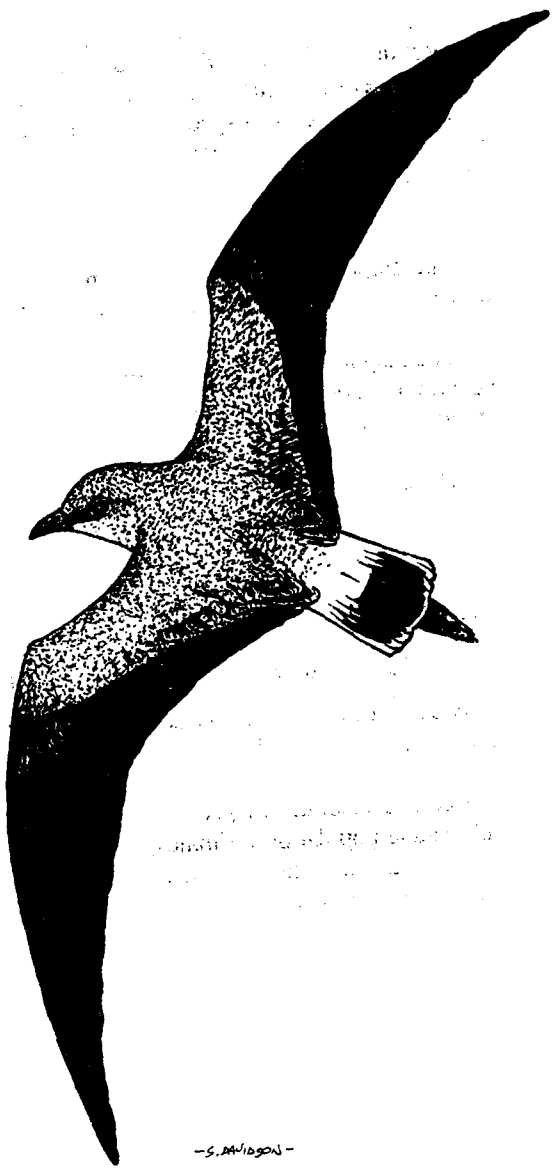
As a means of reducing the project coordination workload, approaches have been made to the state wader study groups or, where these do not exist, to major birding organisations to take on the responsibility of running the twice-yearly counts in their own states. The response has been excellent.

The new coordination system also provides the opportunity to increase coverage in states such as Queensland and New South Wales, where counting activities are being expanded.

Broome Bird Observatory has received funding from tha Australian Nature Conservation Agency to carry out summer and winter counts on a fixed 15 km stretch of Eighty Mile Beach and to make monthly wader catches at Broome to provide year round biometric information for species and races which occur mainly in north-western Australia.

We are hopeful of obtaining funds to pay for analysis of the AWSG/RAOU population monitoring data collected since 1981. The tasks involved will be to set up a conventional database, carry out the data analysis and advise on how the project can be improved. The database will be designed in such a way that it will be able to take data (eg. opportunistic counts, monthly counts by an individual) which are not part of the twice-yearly counts, so that this is available for research and conservation use.

Mark Barter



BOOK REVIEW

The Migration of Knots. Piersma, T. & N. Davidson (Eds) 1992. Wader Study Group Bulletin 64, Supplement. [209 A4 pages. 25 Pounds including postage, available from Wader Study Group, PO Box 247, Tring, Herts. HP23 5SN, UK]

This book, as its subtitle says, is 'largely the proceedings of a workshop on "Recent advances in understanding Knot migrations"', held in Denmark in 1986. Where the authors write Knot they mean *Calidris canutus*, widely referred to as Red Knot in Australia. Where they write recent, they mean recent! Less than thirty years ago, migrations of Knots were not well understood, for they are not easy to study. They undertake very long migrations (even by wader standards), their taxonomy is complicated and different populations appear to mix in some staging areas; their nests are virtually unfindable and the distribution of their Arctic breeding grounds only sketchily known. Yet Knots are now one of the best-known long-distance migrants; a great deal has been learned about their migration since the development of wader study groups, rocket- and cannon-netting.

Wader banders have not been the only birders involved in the advances in Knot knowledge, and this book also presents results from arcane disciplines such as molecular genetics, aerodynamics and radar. The information is presented in 28 papers, arranged logically in the following five symposia.

Origins and Distributions of Subspecies (Four papers)

The most important paper in this section is a major review of taxonomy and geographical variation in Knots (by Pavel Tomkovitch); it provides a framework which makes the rest of the book easier to understand. On the basis of skins from the breeding grounds (including much Soviet Union material not used in earlier reviews), he has recognized five subspecies differing in measurements and in details of breeding plumage. The new one is *roselaari*, breeding on Wrangel I. and round north-west Alaska; it is suspected to migrate down the Pacific coast to winter in the Gulf of Mexico. Not too long ago it was thought that these birds were subspecies *rogersi* and that they migrated down to us. It now appears that *rogersi* only breeds on the Chukotsk Peninsula, and it is pretty certain that it gets to Australasia. Intriguingly, we may get another subspecies here too, nominate *canutus* from the New Siberian Islands. The breeding plumage of this population is like that of the Tamyr-breeding *canutus* migrating through Europe to Africa, but they are smaller birds than those captured on the western flyways. Accordingly they must migrate down the eastern flyway but as yet their non-breeding distribution is unclear. There have been no great changes to the taxonomy of subspecies *rufa*, breeding in the Canadian low Arctic, or to subspecies *islandica* of Greenland and the north Canadian Arctic. Another short paper shows birds of the north-west Canadian Arctic to be subspecies *islandica*.

A brief but interesting paper demonstrates that trace element profiles in feathers can be used to identify Knot populations. This method could be invaluable in Australia (where we may have two subspecies), for data collection consists of simply plucking a feather from birds caught for banding. Unfortunately, the paper does not specify which feather should be plucked (primary 8 was recommended but the author didn't note whether he considered the inner primary to be #1 or #10). It would also have been useful to mention how much the laboratory work for this procedure costs.

A major paper summarizes work on the molecular genetics of the genus *Calidris*. Chiefly on the basis of results from mitochondrial DNA, it is concluded that Knots diverged from the sandpiper lineage 4.6 to 6.1 million years ago. However, subspeciation appears to have begun in only the last 100,000 years, implying that fragmentation of an homogenous stock began with the onset of the late Pleistocene glaciation. Further work along these lines will help in separating Knot populations (especially on non-breeding grounds), particularly as it is now possible to sequence DNA from feather and skin samples.

Migration Systems Reviews (Four papers)

This symposium comprises clear overviews of the migration systems for four of the five subspecies of Knot. The omitted race is the newest subspecies *roselaari*; given that its non-breeding grounds have not been confirmed and its breeding range is probably not fully documented, the gaps for this race will take some filling! In addition, there is little information on the eastern (New Siberian Is) population of the nominate *canutus*; close examination of breeding plumage in Australia may clinch the migration destination of these birds.

The best known subspecies of Knot is undoubtedly *islandica*, which breeds in the high Canadian Arctic and Greenland and winters in western Europe (thereby running the gauntlet of numerous and experienced British and Dutch field-workers). Nearly all the population stages in Iceland during southward migration and the wintering grounds are well known and accessible, allowing pretty good estimates of population size to be made. The population of *islandica* declined from 609,000 in the early 1970s to 345,000 in in the mid-80s, perhaps because of several seasons of severe weather on the breeding grounds in the 1970s. Most of the 'mid-winter' population is concentrated in a few British estuaries, but the Wadden Sea is the most important area for non-breeding Knots during moult, and a few months later, during pre-migratory mass gain. They stage in Iceland and northern Norway on the northward migration. Although they have the shortest migration of any Knot subspecies (a mere 3,000 kilometres across the Greenland ice-cap), *islandica* store large fat and protein reserves before the final northwards migration step; it appears that these reserves help them get through the early period on their breeding territory before snow has melted. The use of northern Norway as a staging area was only discovered in the mid-1980s; there is some evidence of movement from this area to Iceland, an extra 1,500 km of migration, demonstrating that surprises exist even with this well known race.

Nominate *canutus* is dealt with in a paper on Afro-Siberian Knots. For a bird that stages in large numbers in western Europe, there are some surprising gaps in what is known.

Most glaringly, the location of the breeding grounds is unclear; it has always been assumed that they breed on the northern Tamyr Peninsula but there are now grounds to believe that the heart of the breeding area is inland and further east. *C. canutus* (except the New Siberian birds suspected to use the eastern flyway) migrates to Africa, 98% of the population of 512,000 spending the non-breeding season in either Mauritania (Banc d'Arguin) or Guinea-Bissau; the remainder go to southern Africa. Insufficient count data are available to comment on whether there have been population changes comparable to those in European wintering birds. Other problems are the staging areas used by birds spending the boreal winter in southern Africa and establishing the reasons for the somewhat paradoxical differences in pre-migratory departure masses of birds from different non-breeding areas.

Our subspecies *rogersi* (written up by Mark Barter) is not a well known bird. It appears, on the basis of biometrics, to breed on the Chukotski Peninsula, though direct proof is lacking. Almost all *rogersi* migrate to Australasia *via* a poorly understood route; the northwards route is hardly more clear although the Chinese coastline (first stop for birds leaving N.W. Australia) is undoubtedly of considerable importance. Pre-migratory mass gain in Knots leaving Australia is smaller than in *canutus* and *islandica*, suggesting their first stop-off is more benign and predictable to a hungry *rogersi* than are the stop-offs of *canutus* and *islandica*. There is a major need for more research even within Australia; staging areas of east coast and New Zealand birds are unknown (the Gulf of Carpentaria may be of critical importance) and the possibility that north-western birds are from a different breeding population needs thorough investigation.

The broad picture of Knot migration in the Americas is now becoming clearer. The bulk of the American birds are subspecies *rufa*. Breeding in the central Canadian Arctic, they migrate south using staging areas in James Bay and the eastern seaboard before flying directly to the north coast of South America, then across Amazonia to their non-breeding grounds in Patagonia and Tierra del Fuego. On northward migration staging occurs in Argentina and the coastal lagoons of south Brazil, then in two legs to north Brazil and Delaware Bay on the east cost of the U.S.A. before heading inland through James Bay. About 100,000 to 150,000 Knots are involved in this migration system. A few tens of thousands (perhaps the new subspecies *roselaari*) winter around the Caribbean.

***Islandica* Knots in Spring and Summer** (12 papers)

This section is of mostly recent research on European birds and thus of little direct use in our region, but it does give interesting ideas of what is possible. The papers consider:

- migration models (routes and timing);
- the recently-discovered staging areas in Norway;
- fat and protein storage before the final pre-breeding migration hop;
- energy consumption in the pre-breeding period;
- relations of numbers at the non-breeding grounds with climate conditions in Arctic breeding grounds;
- early 70s data from Iceland on mass gain and counts (analysed for the first time).

Autumn and Winter in Europe and Africa (6 papers)

As with last section, this is not directly relevant to Australasia. The papers cover banding and/or count data in Poland, South Africa, the Netherlands, and the U.K. (Norfolk).

Synthesis (2 papers)

The first paper gives an overview of migration patterns and annual cycles of different Knot populations. The most numerous races (*islandica* and *canutus*) 'overwinter' in the northern hemisphere; the trans-equatorial races (*rogersi* and *rufa*) carry breeding plumage for longer and fly much further. The great variation between races in non-breeding latitudes and the similarity in breeding times suggest that day length alone does not control the timing of breeding, moult and migration, and that the different races have separate internal 'clocks'. More research on this theme could lead to fascinating insights into how migration routes evolved.

The second paper discusses conservation needs and implications. It argues for a flyway conservation strategy. Despite increasing knowledge of key sites and extensive conservation safeguards in place, information is patchy (particularly outside the western flyway) and there are many threats to Knot populations through habitat loss and degradation. The paper poses four "deceptively simple" questions which need to be answered for effective conservation. Since these apply to all migratory species, they are worth quoting in full.

- Where are the sites used? (A recurrent theme in this book is that though widespread, the better-known subspecies of Knot have turned out to be dependent on a small number of crucial areas).
- What is the ecology and population dynamics of Knots?
- What role does each site play in the annual cycle, and how is it related to the usage of other sites in the flyway?
- What features of each site result in it being used by Knots?

In a book of this size, a reviewer is bound to find something that rankles. Our gripe is the frequent use of 'spring' and 'autumn'; the terms are particularly confusing when applied by muddled residents of the northern Hemisphere who think it is winter in January. Nevertheless, this is an impressive book that demonstrates the huge merits of attacking a species with expertise from more than one discipline. It also demonstrates the importance of compiling such reviews as they spell out gaps in knowledge that need most urgent filling for conservation.

Danny Rogers and Ken Rogers

BROOME BIRD OBSERVATORY REPORT

The highlight of the late dry-season months is watching wader numbers grow day by day as birds arrive on southward migration. The small species (Red-necked Stint, Large Sand Plover) arrived first this year, followed by the Eastern Curlew, which has been seen in numbers up to 500. It is good to see the tereks, tattlers, Grey Plovers and Oriental Plovers in good numbers again. Asian Dowitcher (easily seen in groups of up to 58 during the dry) are now difficult to find amongst the huge flocks of Godwit and Knot. The Little Curlew are back in good numbers with (300+) seen near Willie Creek in early October.

BBO is now banding and systematically counting waders throughout the year to more fully monitor wader populations in the north-west and build up the data set on young birds remaining in Australia; the age at which young birds enter the breeding population; and changes in breeding success and mortality. A recent banding highlight was catching nine Asian Dowitcher, including one retrap.

Several Victorian leg flags have been seen here recently - all on Red-necked Stint and Curlew Sandpiper.

Nell White from the Waderbirds' team was recently in Broome, treating us to a slide show of the performance at each venue. The Japanese section was particularly interesting - they did not like dressing up in mud and there was only one interpreter for the whole project!

During a recent course here, participants spotted three mystery birds at Cable Beach, with the I.D. consensus being "Cox's Sandpiper" (the first record for Broome). We were keen to catch them, but they were not seen again. They were, however, photographed and videotaped at extremely short range.

We are leaving for Tasmania in a few days. All the best to the AWSG, BBO and it's new Wardens and all attending the AWSG expedition. Keep up the good work!

Martina and Vaughan Pattinson

BBO Wader Catches: May - Oct 1993

	New	Retrap	Total
22/5 Quarry Beach			
Red-capped Plover	3	1	4
Red-necked Stint	1	-	1
TOTALS	4	1	4
27/5 Richards Point			
Bar-tailed Godwit	57	3	60
Asian Dowitcher	5	-	5
Black-tailed Godwit	4	-	4
Eastern Curlew	2	-	2
Great Knot	1	-	1
TOTALS	69	3	72
26/6 Eagle Roost (Lathams)			
Bar-tailed Godwit	43	2	45
Great Knot	35	-	35
Asian Dowitcher	8	1	9
Black-tailed Godwit	3	-	3
TOTALS	89	3	92
9/7 Wader Beach			
Greenshank	11	-	11
Eastern Curlew	5	-	5
Bar-tailed Godwit	2	-	2
Gull-billed Tern	1	-	1
TOTALS	19	-	19
20/7 Crab Creek			
Bar-tailed Godwit	36	1	37
Gull-billed Tern	26	-	26
Black-winged Stilt	12	-	12
Black-tailed Godwit	5	-	5
Lesser-crested Tern	2	-	2
Crested Tern	1	-	1
TOTALS	82	1	83
24/8 Quarry Beach			
Red-capped Plover	24	-	24
Red-necked Stint	1	-	1
TOTALS	25	-	25
6/9 Crab Creek			
Bar-tailed Godwit	32	4	36
Great Knot	23	0	23
Asian Dowitcher	1	-	1
TOTALS	56	4	60
8/9 Wader Beach Spit			
Large Sand Plover	26	2	28
Red-necked Stint	6	0	6
Red Knot	1	1	2
Curlew Sandpiper	1	-	1
TOTALS	34	3	37
30/9 Richards Point			
Red-necked Stint	41	4	45
Red-capped Plover	1	-	1
TOTALS	42	4	46
5/10 Crab Creek			
Bar-tailed Godwit	56	3	59
Black-tailed Godwit	1	-	1
Great Knot	2	-	2
Red Knot	-	1	1
Eastern Curlew	1	-	1
TOTALS	60	4	64
GRAND TOTALS	**480**	**23**	**503**

NEW SOUTH WALES WADER STUDY GROUP

1992/1993 Results

Table 1 lists the birds caught by the group during 1992/93. During this period we carried out banding activities at five locations within the Sydney area and the lower North Coast. The majority of the effort was concentrated on Kooragang Island because of its wide range of birds and large pool of birds which have been banded here over the past 25 years. Botany Bay, Forster and Mason Park were single visits assessing the sites while Pelican Island was visited twice during this period.

A total of 19 species of waders and two species of terns were banded. The proportion of birds retrapped was approx. 10% with some species showing stronger site fidelity than others ie. they come back to the same site each year when they return from their breeding grounds. In this period the bird with the strongest site fidelity is the Terek Sandpiper at Kooragang Island where the number of retraps is 48.5% of the total. Many of these Terek Sandpipers are retraps of birds banded many years earlier with the oldest having an age of 17 years.

The other sites will be visited again during the coming year with the exception of Botany Bay which has been destroyed by the third runway works. Pelican Island is proving to be a very interesting site with good numbers of waders in a wide variety of species.

Phil Straw

Table 1 - NSW Wader Study Group 1992-93 Banding Results

SPECIES	Botany Bay		Forster		Kooragang Is		Pelican Is		Mason Park		TOTAL	
	New	Retrap	New	Retrap	New	Retrap	New	Retrap	New	Retrap	New	Retrap
Little Tern							2				2	
Common Tern					2						2	
Masked Lapwing					2						2	
Lesser Golden Plover					3		23				26	
Mongolian Plover					3	1	12	3			15	4
Double-banded Plover	16	1					11				27	1
Red-capped Plover	9	5	10				7				26	5
Black-winged Stilt					74						74	
Red-necked Avocet					4						4	
Eastern Curlew					2						2	
Whimbrel					10		15				25	
Black-tailed Godwit					177	9					177	9
Bar-tailed Godwit					37	2	39	1			76	3
Grey-tailed Tattler					3	1					3	1
Greenshank					50						50	
Marsh Sandpiper					4						4	
Terek Sandpiper					70	34					70	34
Curlew Sandpiper					16	6			5		21	6
Red-necked Stint	5				1						6	
Sharp-tailed Sandpiper									4		4	
Red Knot					6		1				7	
TOTAL	30	6	10		464	53	110	4	9		623	63

QUEENSLAND WADER STUDY GROUP

Chairperson's Report, AGM 1993

The first year of the official QWSG has been the establishment of a local network of people who are all helping to define the functions and future directions of the Group. It was been an exciting time because we have achieved a lot in one year and build up a momentum that is drawing in more and more people with a commitment to our objectives.

QWSG has been busy monitoring wader numbers, banding and leg-flagging waders, producing a newsletter, seeking grant money, raising the public profile of waders, advocating conservation measures, maintaining equipment and fostering a network of counters. We are continuing a tradition of groups in other states that started up over a decade ago and we need to emphasise our connection with other groups, especially the Australasian Wader Studies Group. We must also be aware of the need to work with other types of non-government organisations and with relevant government departments. What we are doing requires a co-ordinated effort which is the best way to learn about waders and to protect them. A network of interested people, preferably extending throughout the Flyway , is mandatory if we are to be truly effective.

The big milestone for the year has been the sustained input of counts of waders at roost sites around the Bay. This has established the framework and rationale for continuing to gather these invaluable data. Anecdotal evidence indicates that developments and change around Moreton Bay have had many adverse effects on waders and their habitats in the past. From now on there will be some irrefutable facts to indicate just how numbers and the local distribution of birds are changing.

Our counters need help to sustain the good work and more and more people are taking an interest. It is because we enjoy watching the birds that we are able to count them for pleasure. This is the key to the success of wader study groups together with the fact that there are challenges and rewards in catching and working with the birds at close range. The knowledge that what is being done is being put to good use scientificaly, and in management, are added incentives. The network of participants in the Group goes hand in hand with raising public awareness and general interest in waders, and in encouraging more people to take an active role.

Results from the netting are slowly showing patterns of site fidelity and local movements of birds in the Bay as well as adding to our knowledge of the energetics and timing of migration. Long distance band returns and sightings of leg-flagged birds are slowly helping to fill in the picture. A major review of these data is needed and should be a priority for the Group over the coming 12 months.

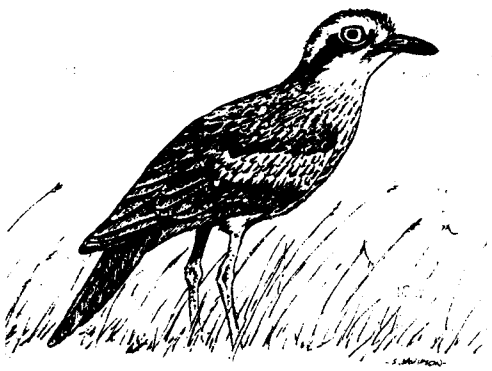
We have had success at banding Eastern Curlew, Grey-tailed Tattlers, Red Knot, Great Knot and high number of Bar-tailed Godwits. We have also successfully addressed some problems of injury and stress to birds being caught and are generally becoming more skilled and more successful in catching birds. There are many people in Brisbane now who could quite easily take a place on banding expeditions anywhere in Australia and overseas.

We are fully aware of what we need to aim for in tightening up our monitoring of roost sites around Moreton Bay, in reviewing existing data from other parts of Queensland and in establishing a wide network of counters throughout the state. We also need to encourage specific projects into particular aspects of wader ecology or biology through the universities or other institutions.

There have been many good times and delightful moments shared by people on field trips and at our meetings. Also, I imagine there are times when individually we each experience his or her own joy at being associated with waders. The regular trip reports in the newsletter serve to illustrate some of this good feeling and I thank the audience and speakers at the annual general meeting for generating such a positive atmosphere. Support from QOSI has been forthcoming and the arrangement we chose to follow of being a special interest group of QOSI appears to be working satisfactorily.

There are many people I could thank for their contribution and support over the last twelve months but three people have helped me personally the most, Andrew Geering, Gary Harch and David Stewart. I am also indebted to the patience of my family who have cheerfully borne the sacrifices I have imposed upon them.

Peter Driscoll



1994 NORTH WESTERN AUSTRALIA EXPEDITION

As announced in the Flyer sent out in the April edition of *Stilt*, the next expedition to continue the studies of waders in NW Australia will take place from **1 March to 30 April 1994.**

The principal objective of the extended visit (previous formal visits have been for a maximum of four weeks) is to gather in one season a comprehensive picture of the departure periods and migratory departure weights of all the species of waders which occur in the Northwest. This will be facilitated by daily visible migration watches at Broome (38,000 waders were observed departing during April 1993) and attempts to catch samples (mainly by cannon-netting, but with some mist-netting) of each species of wader during their departure period.

An additional objective will be to look for similar visible departures of waders from 80 Mile Beach and Port Hedland Saltworks. Regular counts of waders will be made at each location and Bush Point/Sandy Point (the largest wader roost in Roebuck Bay) will again be visited by hovercraft! There will also be some opportunities for wader photography (from hides) and bush bird banding.

A detailed itinerary will be prepared in October when the 1994 Tide Tables become available but, as in previous visits, time will be spent at three main locations (Broome 45%, 80 Mile Beach 35% and Port Hedland Saltworks 20%), with several periods at each spread over the nine weeks expedition.

Participation is welcomed from both experienced banders and "beginners". We hope to have a team of 15-20 people in the field throughout the expedition, with the usual strong overseas contingent of participants from New Zealand, Asia, Europe and North America. Intending participants should try to come for at least two weeks (preferably longer). They can join the expedition anywhere. Good flights are available to Broome and Port Hedland from Perth and Darwin, with regular buses from both passing 80 Mile Beach.

Costs are:-
(a) contribution of $100 per week (maximum of $300) towards hired 4WD transport
(b) $15 per day (flat rate) to cover food and other minor operating costs
(c) $5 per day camping costs at Broome Bird Observatory (only).

Climate in March/April should be hot (32°-38°C) and dry, with warm nights. Only very light clothing is, therefore, required.

Participants can expect to see in the field virtually all of the 44 species of wader regularly recorded in north western Australia and to see at least 30 species in the hand, with 5-7000 waders and terns expected to be caught.

Anyone interested in participating should contact me as soon as possible. They will then be sent fuller information.

Clive Minton and Doug Watkins - Joint Leaders
165 Dalgetty Road, Beaumaris VIC 3193 Australia
Tel: +61-(03)-589-4901

RED-NECKED STINT DATA ANALYSIS

At long last a computerised database has been compiled of banding information for the Victorian Wader Study Group's most commonly caught wader, the Red-necked Stint.

The result is that we now have a 60,000+ record of all the VWSG Red-necked Stint banding and retrap data since 1978. This is being added to as new data is collected - at an average rate of 4000 birds a year!!!

Although the Red-necked Stint is the commonest wader in Australia, and the most caught, relatively few papers have been published on the species. Those that have were based on the first few years data. We are now in a position to comprehensively analyse the data for incorporation in the third volume of the Handbook of Australian, New Zealand and Antarctic Birds, which will contain the Red-necked Stint account.

A start has already been made on estimating survival rates over the 1978-1993 period. Geoff Larmour, an Honours student at Charles Sturt University, is doing this. Plans are also being made to analyse the biometric data and to summarise breeding success over the period.

Many people have been involved in putting the database together, including:

Alex Djurovich, who put much of the early data on a Monash University computer,

Mike Cullen, who converted the Monash data to dBASE III plus format,

Terry Barter, who has been entering all VWSG data from January 1987 onwards,

The Bird Banding Scheme, who entered much of the 1984, 1985 and 1986 data,

Peter Driscoll, who took all the above and merged it into a single database and, very importantly, identified where the major gaps still existed using Clive Minton's excellent catch summaries dating back to 1978,

and Geoff Larmour and myself, who have filled in those gaps.

A special vote of thanks must go to the Australian Nature Conservation Agency for contracting Peter Driscoll to summarise banding data and published literature for the Red-necked Stint, which was listed as a species of special interest at the 1991 Consultative Meeting of the Japan Australia Migratory Bird Agreement. This contract created the opportunity and the impetus to get all the data on computer.

Mark Barter

FORMATION OF THE NEW ZEALAND WADER STUDY GROUP (NZWSG)

It is now believed that the time is right to form a New Zealand Wader Study Group. After discussions with various people from the Ornithological Society of New Zealand (OSNZ) and the Miranda Naturalists' Trust (MNT) it has been agreed that the group known as the Miranda Banders should become known as the New Zealand Wader Study Group. This name has now been used since 1 July 1993. The NZWSG will remain closely linked with the Miranda Naturalists' Trust. It is believed that the new name better describes the groups aims, will be better understood overseas, and will hopefully give more weight when funding applications are made.

At this stage there are no plans to make the NZWSG a formal organization as the joint administrators, Adrian Riegen and Stephen Davies, have many other commitments. The following plans and aims are therefore put forward for at least the short term.

1 That the banding work that has been undertaken by the Miranda Banders since 1979 will continue under the NZWSG name.

2 To examine other methods of catching waders, such as mist nets and walk in traps, which could be used by smaller groups and at sites which do not favour cannon nets.

3 To assist other groups in NZ with equipment,materials, etc.

4 To publish information on the work of the NZWSG in the Miranda Naturalists' Trust Newsletter as offered by the trust.

5 To publish, once or twice a year, details on other wader studies being undertaken in NZ so as to bring together material giving an overall picture of wader studies throughout the country in one publication. This would appear in the MNT Newsletter and would be made available to anyone who wished to receive it. The material would also be made available for publication in The Stilt.

6 That at this stage no formal membership would be required. This will keep administration to a minimum. Naturally small donations will be gratefully received and large ones grabbed!

7 That the NZWSG, in conjunction with the MNT and OSNZ, will look at the possibility of holding mini-expeditions to places such as Parengarenga Harbour in the far north of NZ and to other regions where useful work could be undertaken.

8 To encourage the study of all aspects of wader biology in NZ.

9 To make information available to educational organizations and the MNT for its educational work.

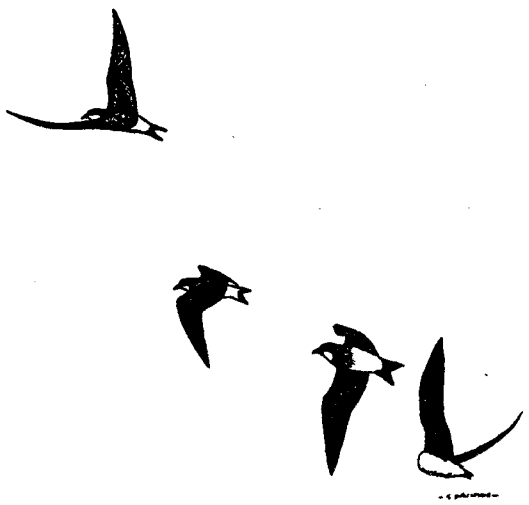
10 To publish, in conjunction with the MNT, tracts such as the migration brochure for sale or as handouts.

11 To act as a link with wader study groups in other countries.

If you have any comments we would like to hear from you. If you are not a financial member of the Miranda Naturaklists' Trust but would like to receive NZWSG news please let us know care of the following address.

Adrian Riegen and Stephen Davies

231 Forest Hill Road, Waiatarua,
Auckland 8,
New Zealand.
Phone 0-9-8149741.



AUSTRALIAN SECTION

HOODED PLOVERS - Further Breeding Information including Association with Pied Oystercatchers

Mike Newman. 7 Glenurie Close, Woodville, NSW 2321
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Introduction

Previous notes to this journal (Schultz 1988; Newman 1992) have described situations in which Pied Oystercatchers *Haematopus longirostris* and Hooded Plovers *Charadrius rubricolis* nest in close proximity. Both authors discuss such occurrences in terms of possible advantage to the smaller Hooded Plover. Consequently, it might be expected that the Pied Oystercatcher would lay before the Hooded Plover. However, during the 1992/93 season we discussed two instances in which Hooded Plovers laid before Pied Oystercatchers.

Sequence of Breeding Events

The first instance concerns nesting on the spit at the south end of Gorringes Beach, Mortimer Bay near Hobart, Tasmania. Both species (two pairs of oystercatchers and one pair of Hooded Plovers) traditionally nest at the spit, and all three pairs were involved in the replacement of earlier clutches. All the Pied Oyustercatchers were colour banded. Nest site locations are shown in Fig. 1.

One pair of oystercatchers (pair 1) nested at the base of the spit, their scrape being located in sand behind some small patches of salicornia. In a prior breeding attempt at this site earlier in the season three eggs were laid and hatched. All three young were last seen on November 13 when five days old. By November 17 they had been lost and the adults were observed to copulate. One went to the nest site area used previously and pressed briefly into the ground before returning to the beach, when copulation again occurred. During six further visits up to December 3, a number of scrapes were observed in close proximity to the original site, with up to three being active at any time. On December 5 the first egg was in the nest, which was the same location as the first attempt. From the appearance of this egg it was appraent that a new female was involved. This was confirmed, as she was colour banded. As we know that it is unusual for the pair bond to be broken in oystercatchers (Newman & Park 1992), it is assumed that the original female was killed between November 13 and 17, possibly defending the first clutch young.

The second pair of oystercatchers (pair 2) had two previous unsuccessful attempts. The first was on a small bank, partially covered by samphire, opposite the end of the spit, and separated by the entrance to a small tidal samphire flat. This clutch of two eggs was preyed upon about November 8, and was replaced by a clutch of three eggs in a scrape on the same bank. The second clutch was washed out on November 25 by high tides, almost immediately after completion.

The Hooded Plovers completed their first clutch, involving three eggs, about November 13. This clutch was lost about November 24 during the same sequence of high tides and windy conditions which caused the loss of the second clutch of pair 2 of the oystercatchers.

The replacement Hooded Plover nest was near the original nest and approximately 40 metres distant from oystercatcher pair 1, which nested at the base of the spit. Pair 2 nested for the third attempt a further 12 metres along the spit, but still some 20 metres from the tip. After the first plover egg was laid, a vehicle drove over the spit, its track mark touching the edge of the nest without damaging either the scrape or the egg.

The sequence of laying and hatching of replacement clutches for these birds is given in Table 1.

Figure 1: Nest sites at south end of Gorringes Beach, Mortimer Bay

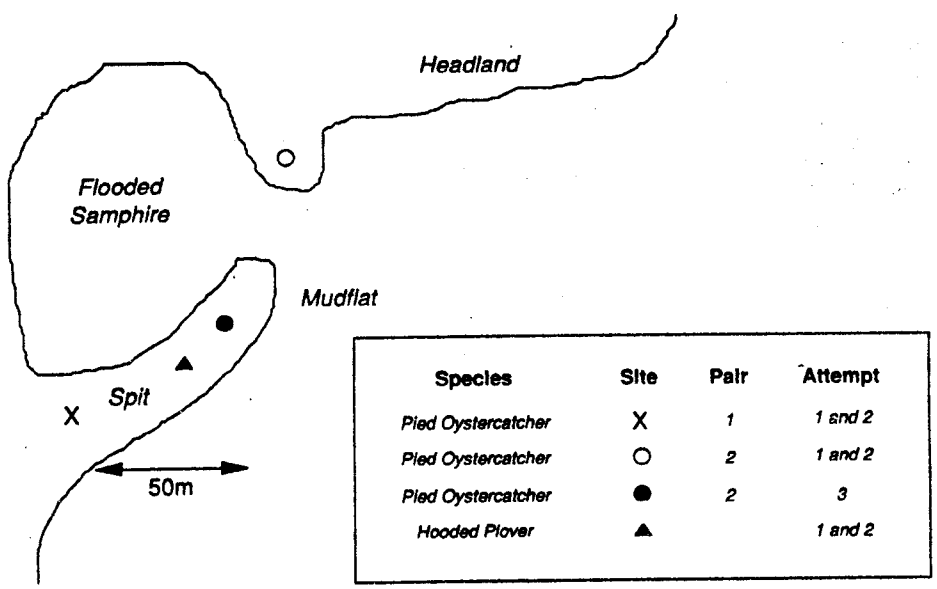

Table 1
Details of nest contents for replacement clutches of Hooded Plover and Pied Oystercatchers at the spit, Gorringes Beach, Mortimer Bay.

Date	Time	Pied Oystercatcher Pair 1		Pied Oystercatcher Pair 2		Hooded Plover	
		Eggs	Young	Eggs	Young	Eggs	Young
03/12/92	1100	0	0	0	0	0	0
05/12/92	1730	1	0	0	0	1	0
06/12/92	0530	1	0	0	0	1	0
06/12/92	1930	2	0	1	0	1	0
07/12/92	1230	2	0	2	0	1	0
08/12/92	0830	2	0	2	0	1	0
11/12/92	1430	2	0	2	0	2	0
02/01/93	0930	2	0	2	0	2	0
04.01/93	0900	2	0	1	1	2	0
04/01/93	2000	2	0	0	0	2	0
05/01/93	0930	2	0	0	0	0	0
05/01/93	2000	2	0	0	0	0	0
06/01/93	0730	1	1	0	0	0	0
07/01/93	0900	1	1	0	0	0	0
08/01/93	0830	1	0	0	0	0	0

On the morning visit of January 4 young were calling from within both the Hooded Plover eggs and there was a small hole in one egg. This situation was unchanged in the evening. The following morning, January 5, both eggs had hatched, the young remained in the nest. It was apparent that one egg had hatched first, as one young was dry, while the other was wet and presumably very recently hatched. Also one complete egg shell remained in the nest. An adult Hooded Plover quickly returned to the nest and brooded both young. When this adult was disturbed and left the nest it was noted that the shell had been placed outside the nest. By the evening both young had left the nest, and the shell had disappeared. During subsequent visits it was obvious from their behaviour that the adults still had young and both runners were seen on January 8.

The first laid and larger of the two eggs laid by Pied Oystercatcher pair 1 did not hatch. The other egg had commenced chipping by the morning visit on January 4, but a hole did not appear until the evening of January 5. The young had hatched by the following morning, January 6, when it was dry in the nest and the egg shell had been removed. The young was on the edge of the nest scrape 24 hours later.

Although chipping had not commenced on January 2, one young of Pied Oystercatcher pair 2 had hatched and was active in the nest scrape by the morning of January 4. Within 12 hours the other egg had hatched and both young and egg shells had been removed from the nest.

The Hooded Plover made three scrapes before laying its repeat clutch. The one chosen was nearest, but approximately 30 metres distant from the tip of the spit.

Pied Oystercatcher, pair 2, made three scrapes pre-laying, two on the spit, and one on a small bank on the opposite side of the inlet to the samphire marsh behind the spit, the site of its previous attempts. However, when the eggs were finally laid, a new scrape was made in the middle of the vehicle track. As indicated in Table 1, Pied Oystercatcher, pair 2, laid its first egg between 10 and 26 hours after the Hooded Plover.

The vehicle being driven beside the Hooded Plover nest did not cause desertion. Indeed one plover was observed to incubate the egg briefly during the morning visit on December 6. However, continued visits showed that it was at least 61 hours before the second egg was laid, which completed the clutch. Although the Hooded Plover laid its egg first the Pied Oysercatcher completed its two egg clutch more rapidly, the interval between the two oystercatcher eggs being in the range 16.5 to 50.5 hours.

On December 28 the Hooded Plover nest was almost trampled by horses, which were ridden over the spit, despite notices warning against such activities.

The first Hooded Plover clutch, which involved three eggs, was completed between December 10 and 13. The clutch was lost between November 20 and 24, the spit being completely covered at high tide on the latter date. This information puts the replacement period for the Hooded Plover between 11 and 15 days. Observations on the Pied Oystercatcher indicated that its second clutch was washed out on either the November 24 or early the following morning. Consequently, its clutch replacement period was 11 or 12 days, which is consistent with the previous observation in 1989 (Newman & Park 1992) that this pair of oystercatchers could replace a clutch in an 11 day interval.

Assuming that the Hooded Plover clutch was completed by laying the second egg shortly after the visit on December 8, the incubation period, defined as the interval between clutch and completion and hatching, was 28 days or less. This is significantly less than the 31 days previously recorded for Hooded Plovers nesting at this location (Newman 1986). Despite the interval of greater than 61 hours between the laying of eggs, hatching of the young was synchronised, which is consistent with the present observation and athe previous conclusion that intensive incubation does not comence until the clutch is completed (Newman 1992b).

The eggs of both Hooded Plover clutches were measured. The data are listed below:-

Clutch 1		Clutch 2	
36.4mm	27.7 mm	36.6mm	27.0mm
36.6mm	27.0mm	36.6mm	26.9mm
34.8mm	27.2mm		

Hooded Plovers tend to sit tight while incubating, as demonstrated by a bird remaining on its nest while a Brown Falcon flew over.

Both juvenile Hooded Plovers survived until at least January 16. Subsequently only one juvenile was seen, which was present with the adults until February 21, when it was in juvenile plumage with a distinct black collar band. Although presumed fledged, at this date it ran off and did not fly when disturbed.

At the runner stage juveniles often freeze and remain crouched, usually initially near an adult, relying on their cryptic plumage as defence against predators. When one broke cover and ran it took a zig-zag path.

The second instance involving nesting association between Hooded Plovers and Pied Oystercatchers occurred at Seven Mile Beach on December 19. One pair of oystercatchers had prepared three scrapes, which they had recently visited. A pair of Hooded Plovers had laid their first egg in a scrape about 20 metres from one of the oystercatcher scrapes. Further along the beach another pair of plovers and oystercatchers had both prepared scrapes, but no eggs had been laid by either species. Our experience suggests that all of these breeding attempts involved repeat clutches, probably as a consequence of nests being washed out by high tides earlier in the season. All of the nests were located in sand two to three metres in front of marram grass growing on the foredune. Such nest sites are extremely vulnerable to high tides.

Interactions between Birds

During the study period at Gorringes Beach a number of observations were made on interactions between the breeding birds and other birds entering their territories.

Pair 2 of the oystercatchers were accompanied by an unbanded female in their territory between July 18 and November 2, including the duration of the incubation of their first clutch. This additional bird was constantly chased by the resident female, but never moved far. One one occasion the extra female assisted the resident pair in defending their territory against a transient oystercatcher.

During incubation, both the oystercatchers and the plovers were quiet when disturbed. However, both species became vocal and aggressive after the young hatched. This change in behaviour usually does not occur until after the young have left the nest. In the case of oystercatchers the alarm calls are usually made on the wing, whereas the plover calls on the ground most of the time. On a subsequent occasion the pair 1 oystercatchers chased an intruding non-breeding oystercatcher up the spit into the area where the two adult Hooded Plovers were loafing with the two runners. Both Hooded Plovers were extremely aggressive to all three oystercatchers. At a later date the Hooded Plovers drove a Silver Gull *Larus novaehollandiae* away from a shell bank, where they were feeding with a juvenile.

On January 5, during the evening visit, the pair 1 oystercatcher female approached the area of mudflat where the plovers were standing, presumably in close proximity to their young, which were hidden. One of the plovers twice made short "ankle height" charges at the oystercatcher, and then flew at it. The oystercatcher reacted by jumping in the air, and then promptly left the area.

A pair of non-breeding adult Kelp Gulls *Larus dominicanus* were regularly present in the area. The oystercatchers are generally tolerant of the presence of these birds during the incubation period. However, on January 5, the female oystercatcher of pair 1 was foraging near one of the loafing gulls, and flew at it several times until it departed from the area.

Discussion

This note describes two instances in which Hooded Plovers and Pied Oystercatchers have nested in close proximity, but in which the Hooded Plover laid first. In an earlier paper such nesting associations were discussed in terms of the advantage to the plover from nesting in proximity to the larger oystercatcher. If this hypothesis is correct it might be expected that the Hooded Plover would select its nest site after the oystercatcher, and hence lay after the oystercatcher. The alternative explanation is that both species have similar optimal requirements in a nest site, in which case either species may lay first. The present evidence suggests that the latter explanation is correct, in that in two instances the plover laid before the oystercatcher. However, an element of caution is necessary in drawing this conclusion in that both species are highly territorial, and were involved in repeat clutches. Hence, the territories would have been established earlier in the season. Following the loss of the previous clutch the key requirements of both species would be to replace the clutch at the earliest possible date. Consequently, assuming that the loss of the previous clutch was synchronised the order of laying would be determined by the rate at which the clutch can be replaced, and the Hooded Plover may be able to achieve this more rapidly.

The prime requirements of both species with respect to nest site selection appear to be excellent visibility for the incubating bird, remoteness from vegetation cover, and an elevation which precludes inundation at high tide. The first two requirements afford protection against predation and we suggest that they are more important that the latter because the survival of long-lived breeding adults is of more value to the species than the successful incubation of an individual clutch.

The present data confirm an interval between the laying of Hooded Plover eggs in excess of 48 hours and add to the sparse information available on the breeding statistics of this species. Based on the information available there are striking similarities between the breeding strategies of Hooded Plovers and Pied Oystercatchers, both species having similar nest site requirements, incubation periods and vulnerability during a long incubation period. Perhaps not surprisingly both species are geared to the rapid replacement of lost clutches.

These results indicate that Hooded Plovers show intense intra-specific aggression in defence of their breeding territory and effective inter-specific aggression to much larger species in defence of their young. There remains considerable scope for further study of their behaviour.

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TWELVE YEARS OF COUNTING THE HOODED PLOVER IN VICTORIA, AUSTRALIA.

Michael Weston, 28 Craig Rd., Donvale, 3111.

"Counting birds is incredibly difficult. They move, they migrate, they hide, they swarm in swirling flocks that defy the expert, or crouch in wild open spaces where it is difficult to go." (Dobinson 1976).

Introduction

Garnett (1992) has recently recommended that the Hooded Plover *Charadrius rubricollis* be classified as rare. Evidence suggests that nest destruction, predation and disturbance while nesting are adversely affecting Hooded Plover populations in South Eastern Australia (see Schulz & Bamford 1987).

Some years ago, interest in the status of the Hooded Plover in Victoria resulted in the AWSG conducting biennial population monitoring counts (Lane 1987). The first count was conducted in 1980 and this paper examines the data obtained from the first 12 years of counting in order to a) determine whether local or general population declines are occurring and b) whether a shift in distribution has occurred (presumably away from disturbed areas). Recommendations concerning the direction of future research are discussed.

Counters also collected information on breeding biology and habitat preference, however, these aspects are not covered in this paper.

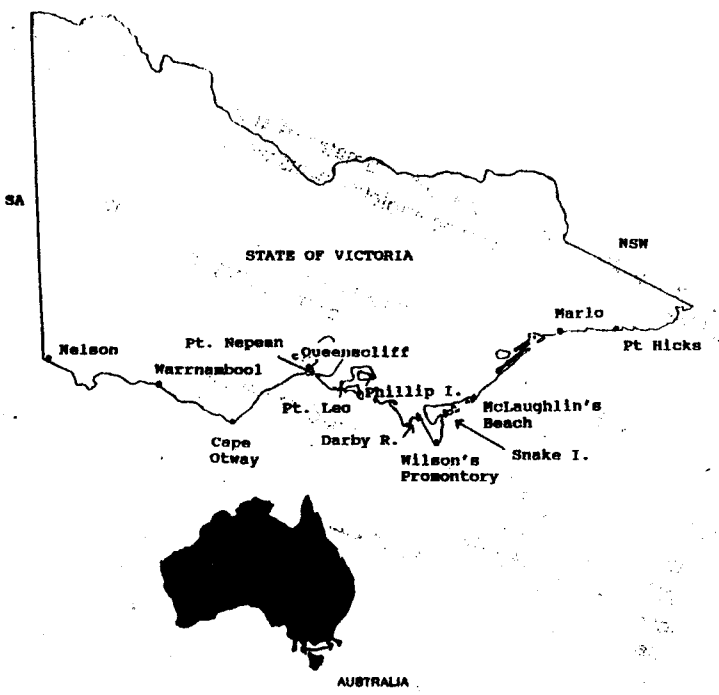
Methods and Study Area.

The results of the counts are presented in Lane (1981), Starks (1987), Murlis (1989), Lane (1991) and Weston (1993), with some other results in Lane (1982) and Hewish (1989). The raw data of the 1982 and 1984 counts were obtained and analysed.

All counts were conducted early in the breeding season and so variation due to the time of year of the counts is not considered significant. The counts recorded very few juveniles. Weather may have affected the count results because Hooded Plovers are probably difficult to detect while sheltering (M. Schulz in Lane 1987) and may even move from the beaches during poor weather. The specific counting methods are detailed in the respective count reports and generally involved counting by foot and from vehicles and sometimes boats.

Lane (1991) used 11 divisions of the Victorian coastline to qualitatively compare the results of the first six counts. These divisions are used in the present analysis (see Figure 1). The regions are not of equal size and almost certainly vary in suitability for Hooded Plovers. Table 2 in Weston (1993) summarises the results of all counts 1980-1992 for these regions. Where appropriate, simple linear regressions have been performed.

Figure 1. Major Localities Defining the Coastal Divisions.



Results

1.1 Coverage Biases

Where a region has been consistently well covered, absolute numbers of Hooded Plovers are analysed. Not all counts were able to achieve a high degree of coverage of the coast due to logistic constraints. In an attempt to control for variation in coverage, the density of birds (birds per kilometre) was analysed but was found to be problematic.

Problems with a Density Measure

Even though density controls for the degree of coverage, comparisons of density between counts may still be affected by coverage related biases. For example, the low coverage counts tend to concentrate on important sites for the Hooded Plover i.e. sites with high densities. Low coverage counts often do not survey marginal habitat and thus report artificially high Hooded Plover densities. Indeed, in the past 12 years, the lowest coverage count (1986) also gives the highest overall density. These potential biases were examined by generating correlation matrices for kilometres covered, density and numbers recorded. The interpretation of the correlation matrices assessed whether coverage had affected the reported densities. However, complicated relationships between the variables were discovered, some of which could be attributed to the spatial distribution of the birds.

There were also additional reasons why density was excluded from the analysis. Due to the unavailability of the 1980 raw count data, only the quoted densities were available and these were only calculated for three broad divisions of the Victorian coastline. Consequently, no great emphasis could be placed on the densities from the 1980 count. In

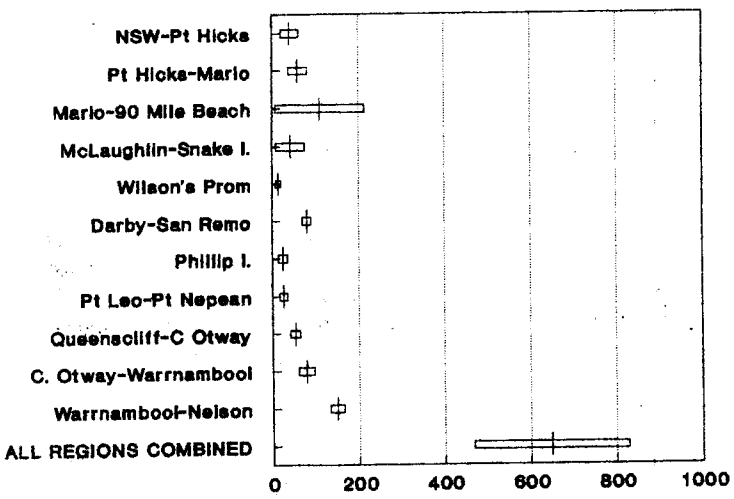
addition, it was apparent that some of the estimates of the number of kilometres covered in the incomplete counts were inaccurate.

In light of the aforementioned considerations, density of Hooded Plovers has not been analysed in the current paper.

1.2 Coverage

Figure 2 shows the mean and standard deviation of the coverage achieved by the counts. Where no coverage was achieved, the result for that particular count in that region was omitted from the analysis, rather than recording a coverage of zero kilometres.

Figure 2. The Number of Kilometres Counted for Each Region, and of all Regions Combined 1980-1992. The Vertical Line is the Mean and one Standard Deviation Above and One Below the Mean are Shown.

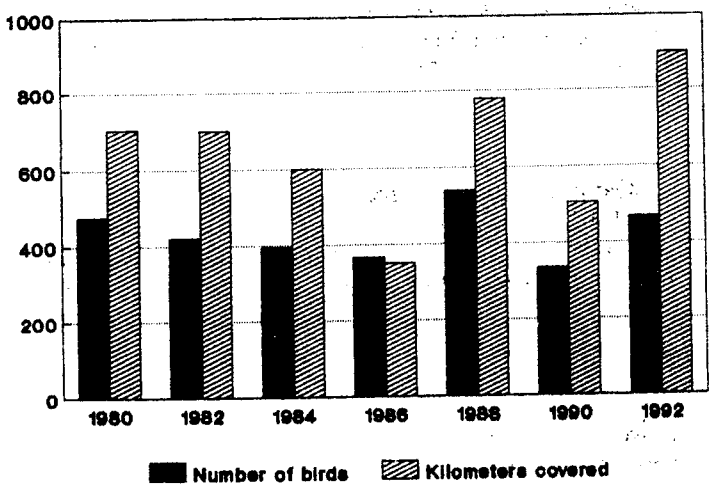


Estimates of the completeness of coverage for each region are based on Lane (1991).

1.3 Population Trends for the Entire Coast.

Variance in the coverage of each region is compounded when considering the coverage of the entire coastline (see Figure 2). An almost complete coverage of the entire coastline has only been achieved in two counts; 1988 and 1992. Figure 3 shows the coverage attained by each of the counts and the total number of Hooded Plovers counted. There is no statistically significant trend in the total number counted across counts ($F_{1,5} = 0.02$, $p = 0.90$) although a decreasing linear trend is apparent if the very high coverage counts (1988 and 1992) are excluded. For the two high coverage counts, the 1992 total is *c.* 13.4% lower than the 1988 total.

Figure 3. The Total Number of Hooded Plovers Counted and the Number of Kilometres Covered 1980-1992.



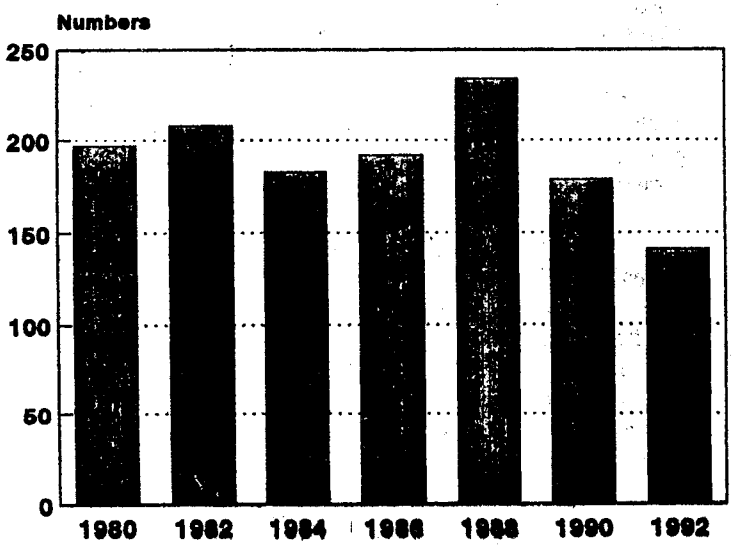
1.4 Population Trends within Coastal Regions

Because disturbance and predation may be localised phenomena, a more detailed analysis of the coastline has been conducted. Statistical analysis has only been carried out where an area has been completely covered in most counts.

Nelson-Warrnambool

This section has been covered by all counts although the 1984 count was incomplete. The number of Hooded Plovers counted in this region is shown in Figure 4. No significant change in Hooded Plover numbers was detected in this region ($F_{1,5} = 1.44$, $p = 0.28$). The 1992 count recorded the lowest number to date.

Figure 4. The Change in Hooded Plover Numbers between Nelson and Warrnambool 1980-1992.



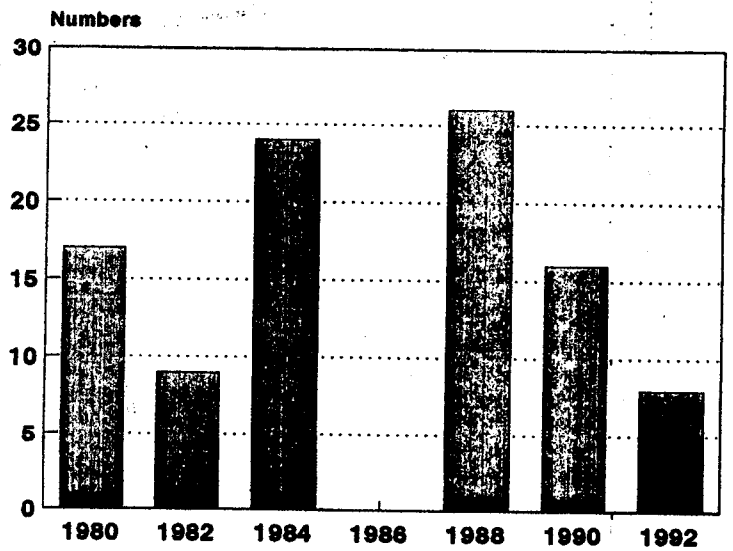
Warrnambool-Cape Otway

This region has only been covered completely in 1980, 1984 and 1992, with an incomplete count in 1988. In other words this region has been covered to some degree every four years. These data are considered insufficient to analyse statistically.

Cape Otway-Queenscliff

This stretch was covered completely in all counts except in 1986 when the area was not counted. The number counted in this region 1980-1992 is shown in Figure 5. There is no evidence of linear decline in the numbers counted in this region ($F_{1,4} = 0.06$, $p = 0.81$). The 1992 count recorded the lowest number to date in this region.

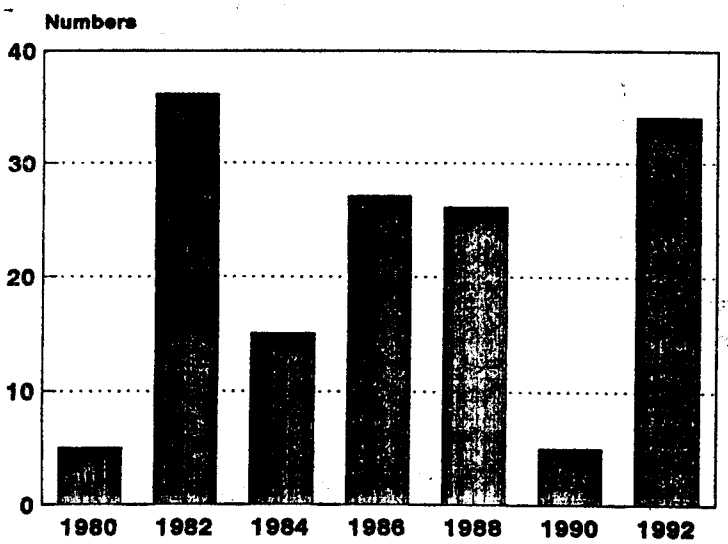
Figure 5. The Change in Hooded Plover Numbers between Cape Otway and Queenscliff 1980-1992.



Point Nepean-Point Leo

This section has been fairly well covered by all counts except in 1990. The number counted 1980-1992 is shown in Figure 6. There is no decline apparent in the number of Hooded Plovers counted ($F_{1,5} = 0.24$, $p = 0.64$). Interestingly, the range of the number of birds counted is high (5-36) i.e. the maximum number counted is over seven times the minimum number counted.

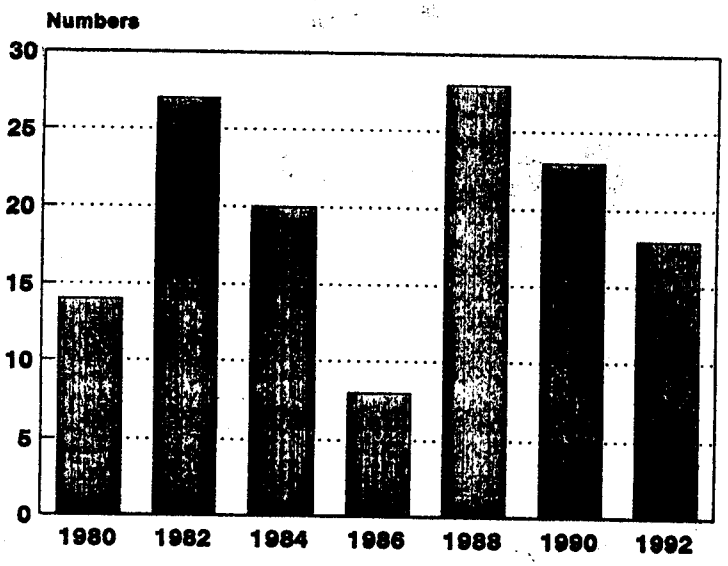
Figure 6. The Change in Hooded Plover Numbers between Point Nepean and Point Leo 1980-1992.



Phillip Island

This island has been completely covered by all counts except in 1986 when it was incompletely covered. The change in numbers is shown in Figure 7. A regression of year on number of birds showed no significant trends ($F_{1,5} = 0.09$, $p = 0.78$), although a slight negative gradient was apparent.

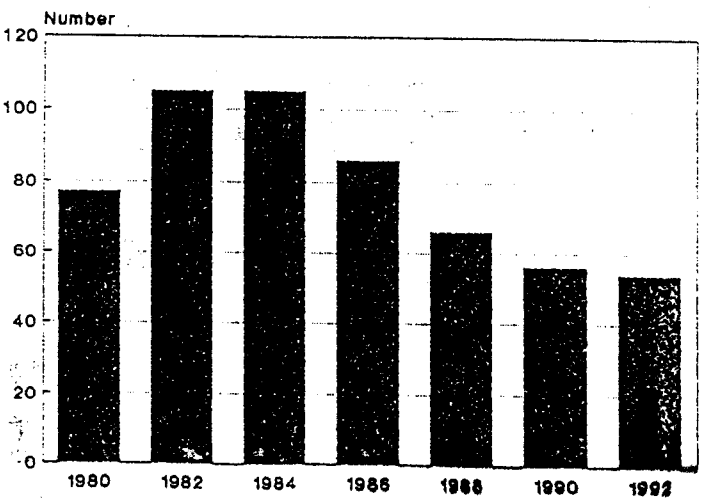
Figure 7. The Change in Hooded Plover Numbers on Phillip I. 1980-1992.



San Remo-Darby Beach

This section has been completely counted in all years (note the low variation for the region in Figure 2) and thus provides a good basis for inter-count comparisons. The change in numbers of *C. rubricollis* 1980-1992 is shown in Figure 8.

Figure 8. The Change in Hooded Plover Numbers between San Remo and Darby Beach 1980-1992.



Hooded Plover numbers showed a significant decline at an alpha level of 0.1 ($F_{1,5} = 6.26$, $p = 0.05$, $R^2 = 0.47$). This constitutes good evidence that Hooded Plover numbers have declined in this area over the past 12 years.

Wilsons Promontory

Complete counts have probably never been attained for Wilson's Promontory due to limited accessibility and lack of counters. The Promontory was not counted in 1982. The data are not considered to warrant further analysis.

McLaughlin's Beach to Snake I., Corner Inlet

This region was counted completely in 1980, 1986, 1988 and 1992. The data are considered insufficient for quantitative analysis.

Ninety Mile Beach to Marlo

This coastline has been counted every year but only covered completely in 1980, 1990 and 1992. Of all regions, Ninety Mile Beach to Marlo has the highest variation in coverage (see Figure 2). The data are not considered to warrant statistical analysis.

Marlo to Point Hicks

This section has only been counted in 1980, 1988 and 1992 with complete coverage being realised in 1980 and 1992. The data are not considered to warrant statistical analysis.

Point Hicks-NSW Border

Although complete coverage of this stretch was only achieved in 1980, 1984 and 1992 it has been covered to some degree by each count. The data do not warrant statistical analysis.

1.5 Distributional Changes

The following analysis will only detect a shift in distribution if the shift is apparent in the breeding season and is within coastal Victoria. Other adjoining or nearby areas where birds may move to or from include south-east South Australia, southern New South Wales and the Bass Strait islands. These areas have been covered by other AWSG counts. The distribution of birds along the Victorian coast is shown in Figures 9 and 10. It should be noted that the divisions are not of equal size. The highest numbers and proportion of total number of birds counted are found west of Warrnambool. Otherwise the numbers are spread fairly uniformly except for a peak between San Remo and Darby Beach (this region is also apparently very important for adults and juveniles in autumn, Heislers & Weston 1993).

The general pattern of Hooded Plover distribution is apparent in all counts, suggesting no large-scale change in distribution.

Figure 9. The Distribution of Hooded Plover Numbers 1980-1992.

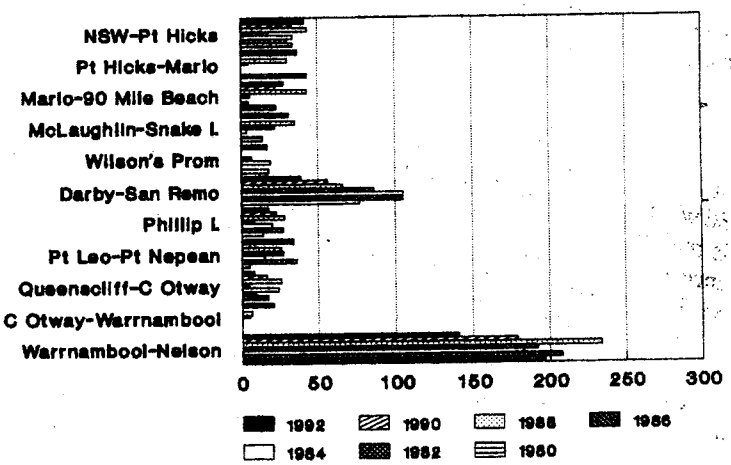
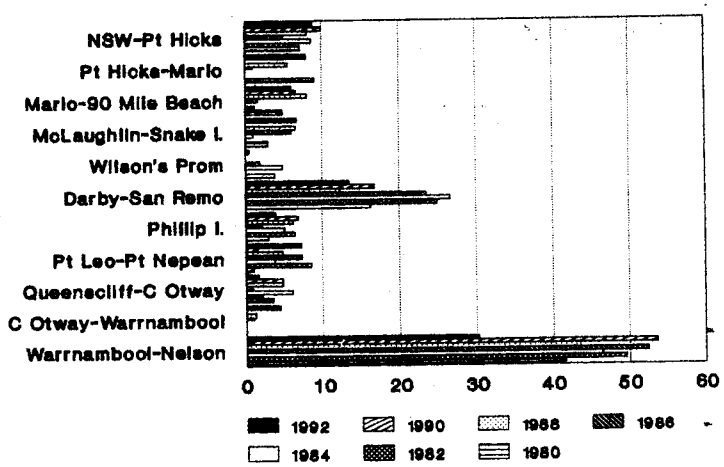


Figure 10. The Proportional Distribution of Hooded Plovers 1980-1992 (i.e. the Percentage of Count Totals in Each Region).



Discussion

2.1 Trends in Victorian Hooded Plover Populations

Despite the limitations of the data, suggestions of decline in the Victorian Hooded Plover population are apparent. Between San Remo and Darby Beach, the second most

important division in terms of proportional and absolute Hooded Plover numbers, a significant decline in numbers was discovered. This region was also the most consistently well covered region. Results from other regions are suggestive of a more widespread decline in Hooded Plover populations. Apart from temporary increases, no region showed any evidence of a sustained increase in numbers. The two high coverage counts suggest an overall decline in numbers. More data is required to explore the rate and extent of any decline.

2.2 Shifts in Distribution

No large-scale shifts in distribution were apparent. This may be due to "social-spacing" influences such as territoriality. Such influences may limit the opportunities for Hooded Plovers to move from undesirable or unsuitable sites. A better understanding of the movements of Hooded Plovers would help in the interpretation of count data. The data presented may constitute a baseline which could be used to determine any future shifts in distribution.

2.3 Problems

There are a number of problems with the sampling techniques used over the past 12 years, and consequently with the current analysis.

Sampling

Problems with coverage related biases stress the need for counts to be replicable and comparable by adopting one of two strategies. Counts should either a) achieve a high degree of coverage thus sampling most of the coast or, if this is impractical, then b) concentrate on a particular portion of the coast and cover all of it on every count. Such methodological controls are preferable to statistical controls.

Study Period

The current analysis is based on only seven counts and the analysis should be repeated in the future when suggestive trends may become statistically significant, or new trends may emerge. Further data will also allow meaningful statistical analysis of regions not analysed by the current paper.

The greatest threat to Hooded Plover populations appears to be low breeding success. Only a small proportion of counted birds are young and thus the counts seem to be measuring the adult population. If these adults are unable to supply young which are recruited into the breeding population, then population decline may only become apparent when mortality of the current cohort of adults becomes significant. Banding and marking studies may be able to shed light on some other basic population parameters such as recruitment, mortality and age of first breeding.

Other Variables

Some variables are difficult, if not impossible, to quantify. One of these is the experience and skill of observers which may, on average, have been increasing with each count (many counters become "regulars").

Other variables that were recorded during the data collection phase were not used in the current analysis because of problems with comparability between counts. For example, weather is likely to influence bird distribution and counting efficiency and, although it was recorded on most counts, there was no standardised scale used. Perhaps development of a standard "Environmental Variables Data Sheet" using scales such as the Beaufort Wind and Sea Scales would be useful.

2.4 Recommendations

The current analysis indicates that Hooded Plover counts should continue, provided acceptable levels of comparability between counts are achieved. Regular counts should be conducted at the same time in adjacent areas such as SA, Tasmania and NSW. The Darby Beach to San Remo stretch of coastline should be monitored yearly.

Additional studies on the causes of decline should be instigated in order to identify better management practices, and these should be acted on.

Acknowledgments

I wish to thank the AWSG for allowing me to analyse its data. I would also like to thank all counters, regional organisers and co-ordinators for their efforts over the past 12 years, I hope it is satisfying to see your hard work and commitment on paper. This manuscript was improved by the comments of Ken Rogers, Mark Barter and Hugo Phillipps.

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AN EXAMINATION OF THE EFFICACY OF COUNTING HOODED PLOVERS IN AUTUMN IN EASTERN VICTORIA, AUSTRALIA.

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"To make things more difficult there is no agreement as to the ideal method of counting." (Conder 1978).

Introduction

This paper describes an autumn survey of Hooded Plovers *Charadrius rubricollis* in the eastern half of Victoria, Australia, in 1993. The survey was a follow-up to the biennial Victorian Hooded Plover Survey last held late in the spring of 1992. Comparison of the results of these counts allows an evaluation of the efficacy of autumn and late spring counts of Hooded Plovers in South-East Australia.

Methods

The autumn 1993 count was made by a team which walked east from the Point Nepean National Park to the Victorian/New South Wales Border. The walk began on 2 April 1993 and was completed, some 7 weeks later, on 19 May 1993. About 750 km of coastline was covered. Hooded Plovers and other shorebirds were counted along the way. Hooded Plovers were aged by plumage, as either adults or juveniles according to the description given in Hayman *et al.* (1986).

Daily movements of birds in a progressive count, such as the autumn count, can lead to double-counting. Although some birds were counted twice, the figures have been adjusted accordingly. Where there was doubt about double-counting, the possibly duplicated figures have been excluded. Consequently the results of the autumn count are considered conservative.

The methodology of the late spring count was somewhat different to the methodology of the autumn count. The late spring count involved an intensive count effort by many counters on one weekend. Details of this count are presented in Weston (1993). Although there were differences in the coverage of the counts, they both almost completely covered the suitable coastline of Eastern Victoria and any differences in coverage are not considered significant.

Results

1.1 Population

The autumn survey recorded 340 Hooded Plovers in the Eastern half of Victoria, 95 more than the 245 counted in late spring. The results are summarised in Table 1.

Table 1. Summary of the Number of Adult and Juvenile Hooded Plovers Counted in Late Spring 1992 and Autumn 1993 (*=incomplete coverage).

Stretch	Adults in Late Spring	Juveniles in Late Spring	Adults in Autumn	Juveniles in Autumn
NSW Border - Point Hicks	41	0	45	5
Point Hicks - Marlo	37	0	40	2
Marlo - Ninety Mile Beach	28	0	22	0
McLoughlin's Beach - Snake I.	31	0	9*	2*
Wilson's Promontory	2*	0*	0	0
Darby Beach - San Remo	53	1	137	18
Phillip I.	17	1	19	2
Point Leo - Point Nepean	33	1	35*	4*
TOTAL	242	3	307	33

Sixty-five (*c.*27%) more adults were recorded in the autumn count, when compared with the late spring count. Excluding coastal stretches that were incompletely covered by the autumn survey, more adults were counted in autumn in all coastal divisions except two. The Marlo to Ninety Mile Beach stretch apparently had six more adults in late spring. It is also apparent that the population counted in late spring at Wilson's Promontory had moved elsewhere by 18-22 April, when the Promontory was comprehensively covered by the autumn survey. The numerical decline in these two coastal stretches accounts for only eight birds and, assuming these birds moved to adjacent regions where they were counted, this still leaves the origins of the additional 57 adults counted in autumn uncertain.

Although Hooded Plover numbers are known to be lower in late spring than in autumn at Venus Bay and Darby Beach (both in eastern Victoria), the origin of the extra birds is unknown (Schulz & Lumsden 1983). The widespread nature of the increased numbers of adults counted in autumn, reported by the present study, suggests a systematic factor is involved across most of the surveyed area. There are several possible explanations.

The first possibility is that there could have been a movement into eastern Victoria from nearby areas such as southern New South Wales, western Victoria and/or the Bass Strait Islands. There is some anecdotal evidence which suggests that the additional birds counted in autumn are unlikely to have originated from immediately west of Port Phillip Bay because a winter survey on 31 July 1993 between Point

Lonsdale and Barwon Heads (*c.* 14 km) counted four adults, two more than were counted in the 1993 late spring count.

An alternative systematic factor which may account for the numerical increase in autumn is nesting behaviour. Some adults would have been engaged in nest-centred activities in late spring, with some nests possibly located in the dunes. Consequently, these adults would have been overlooked. At the cessation of breeding these birds may have returned to the beaches, where they were counted by the autumn survey.

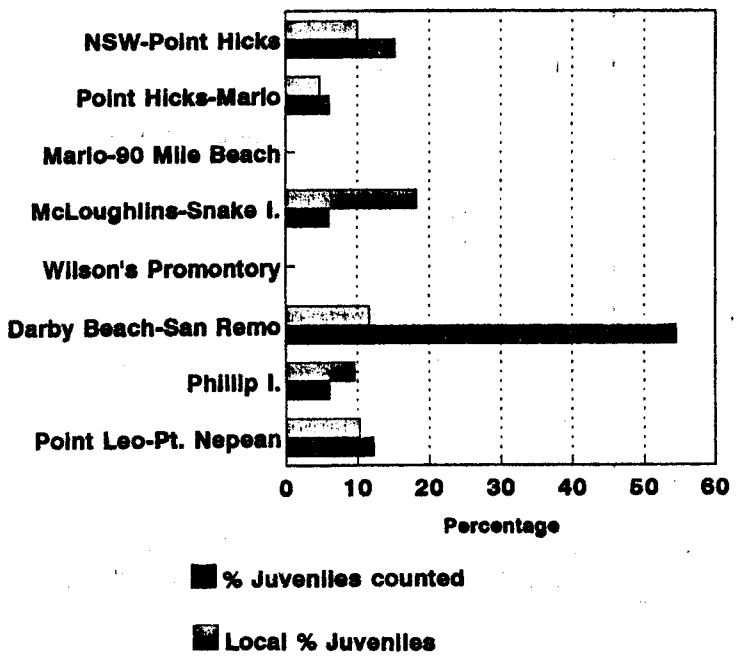
Finally, the methodology of the autumn survey may have resulted in double-counting of the birds. However, although there were several instances of birds moving ahead of the walkers, double-counting was controlled and is not considered to have significantly affected the results.

Banding studies and regular counts (perhaps on a monthly basis) would help solve the mystery of the additional adults.

1.2 Distribution of Juveniles

The distribution of adult Hooded Plovers in Victoria will be the subject of another paper. The proportion of Hooded Plover juveniles in each coastal stretch, as well as the proportion of the total number of Hooded Plover juveniles counted, is presented in Figure 1.

Figure 1. The Proportion of Juveniles in the Local Population of Each Coastal Stretch and the Proportion of the Total Number of Juveniles Counted in Each Coastal Stretch.



It is clear that in eastern Victoria the stretch of coast between Darby Beach and San Remo is the most important area for young Hooded Plovers, with *c.*55% of juveniles counted in eastern Victoria in autumn occurring there. Hooded Plovers are known to favour the Darby beach area for wintering (Schulz 1992).

Figure 1 also indicates that the proportion of juveniles in local populations varies between coastal stretches. The variables affecting the proportion of juveniles in different coastal areas are unknown. They may be related to reproductive success but, before this variation can be explained, a more comprehensive knowledge of the movements of Hooded Plover adults and juveniles is required.

1.3 Reproductive Success

Reproductive success is an important parameter to consider when examining the dynamics of a population. The late spring count recorded seven Hooded Plover nests, all of which were in eastern Victoria. The autumn count located no nests. The number of nests is considered to be a poor measure of reproductive success because of the potential mortality of eggs and young.

It has been suggested that the Hooded Plover population monitoring program should be extended to measure reproductive success, by determining the proportion of juveniles in the population (Garnett 1992). Traditionally, the biennial counts have occurred early in the breeding season, and have thus tended to grossly underestimate the number of juveniles produced each year. Juveniles represented *c.* 10% of the population in autumn, and *c.* 1% of the population in late spring. Only three juveniles were counted in late spring, compared with 33 in autumn. The results suggest that in the 1992/93 season, each adult produced an average of 0.11 juveniles which survived to autumn. The proportion of juveniles in local populations varied between coastal stretches (see Figure 1).

It is apparent that the autumn survey reflects seasonal reproductive success more accurately than the spring survey. Another advantage of counting juveniles in autumn, rather than earlier, is that the juveniles counted then have survived the nesting period, and many have survived long enough to join flocks. Thus a realistic level of natural productivity can be determined.

1.4 Social Organisation

The composition of social groups of Hooded Plovers was also recorded in the autumn survey. Occasionally birds would fly ahead of the counters and form a larger group with other Hooded Plovers further along the beach. In a few instances it was the larger group which was recorded. However, such events were rare and are not considered to have significantly affected the results. The social structure of Hooded Plovers counted by the autumn count is presented in Table 2.

Table 2. The Social Structure in Autumn.

Social Unit	Percentage of birds in various social units	Percentage of social units encountered
Adult Pair	24.11%	42.71%
Pair with one juvenile	5.29%	6.25%
Solitary adults	3.82%	13.54%
Solitary juveniles	0.29%	1.04%
Adult flocks	27.65%	20.83%
Adult flocks with juveniles	37.65%	13.54%
Other	1.18%	2.08%

In autumn, adult flocks ranged from three to 10 birds, with an average of 4.7 birds. Adult flocks with juveniles had 1-28 adults and 1-4 juveniles. In "other" social units there were two instances where the number of adults equalled the number of juveniles (one adult and one juvenile), and another instance where the juveniles outnumbered the adult component of the flock (two adults and three juveniles).

The percentage of birds in pairs across the entire Victorian coastline in late spring was *c.* 80% (Weston 1993), thus it is apparent that in autumn proportionately fewer birds were in pairs (*c.* 24%).

Discussion

The issue as to whether Hooded Plovers should be counted in autumn or late spring is complex. It should be noted that the following remarks are based on the results of only one late spring survey and one autumn survey.

Poor weather has been implicated in low counts of Hooded Plovers (Lane 1991). While the likelihood of poor weather would tend to discount large-scale winter counts, it does not differentiate between autumn and spring counts.

The autumn survey apparently counts more adults than the late spring survey. Until the origin of the extra adults is determined, it will remain unclear as to which survey provides a better estimate of the Victorian adult breeding population.

The main advantage of the autumn count is the more accurate measure of reproductive success for no additional search effort. This assumes, of course, that all volunteer counters can age Hooded Plovers correctly.

There are, however, several disadvantages to counting in autumn. Counting the autumn "flocking" population may be subject to greater error, because missing or double-counting a flock has a substantially larger effect than missing or double-counting a single bird or a pair, the most common social unit in late spring. Although the autumn survey effectively eliminated this problem by having one group of counters cover a large distance, the situation would be more complex when coordinating multiple counters. Investigation of the mobility of flocks may help resolve this potential problem. Another disadvantage of adopting autumn counts would be the disruption of the sequence of late spring/early summer counts which have been made every two years since 1980. There are already problems with the comparability of these counts, but it would be unfortunate to end this sequence.

The main problem Victorian Hooded Plovers seem to face is a low reproductive success rather than adult mortality. If the adults are long-lived, simply counting the adult population may mask a very low, or possibly declining, recruitment rate. By the time a decline in the adult population is recognised, it may be too late to prevent a rapid decrease in population size. Provided very good coverage is achievable, and double-counting can be effectively eliminated, the autumn surveys may provide more useful information on Hooded Plover populations.

Recommendations

1. Conduct autumn counts in order to a) monitor reproductive success, and b) examine the determinants of reproductive success in Hooded Plover populations.

2. Where possible determine the seasonal trends in Hooded Plover numbers.

3. Examine the possibility of banding and colour-marking Hooded Plovers in order to determine the movements of adults, juveniles and flocks.

Acknowledgments

The Hooded Plover autumn count was a major objective of the Eastern Victorian Coastal Trek in April and May 1993. It could not have been achieved without consistency and continuity, for which the efforts of all trekkers are appreciated. The task would not have been possible without support from the major trek sponsors which included Australian Geographic, Westpac, Comalco, Plastics Industry Association and Paddy Pallin. Special thanks to Ian Bell (Sorrento Youth Hostel) for the guided tour through Hooded Plover territory on the Nepean Peninsula. Hugo Phillipps and Mark Barter made constructive comments on a draft of this paper.

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DISTURBANCE OF HOODED PLOVERS BY DOMESTIC DOGS

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The effect of disturbance by introduced predators is considered to be a major threat to nesting shorebirds such as the Hooded Plover, *Charadrius rubricollis* (Schultz and Bamford, 1987; Garnett, 1992). The population dynamics of the Hooded Plover are currently being investigated, and early observations suggest that their numbers may be in decline, perhaps as a result of disturbance at potential nesting sites. Indeed, disturbance and predation by domestic dogs *Canis familiaris* has been suggested as a cause of nesting failure of Hooded Plovers (Schultz and Bamford, 1987), but this appears to be little-documented.

At midday on Sunday 18 July 1993, two very large unleashed dogs were observed to be playing with their owners near a pair of Hooded Plovers on Koonya Ocean Beach near Sorrento, on the Mornington Peninsula in southern Victoria. As the group approached the birds, one of the dogs responded to the movement of a pair of plovers, and bounded ahead of its owners, chasing the birds until they took flight. The birds alighted at least 400 metres from their original position.

Hooded Plovers are thought to breed in the dunes behind this beach and other beaches nearby, although this pair of plovers was probably not breeding in July. Frequently, dogs have been observed on these beaches and in the dunes. Because of the birds' breeding season coincides with Victoria's peak beach-recreation period for humans and their pets (spring and summer), the occurrence of birds disturbed by dogs is likely to become more frequent and more critical to the welfare of the Hooded Plover. It is hoped that observations such as these, which simply confirm previously held suspicions, can help shed light on threatening processes affecting the Hooded Plover.

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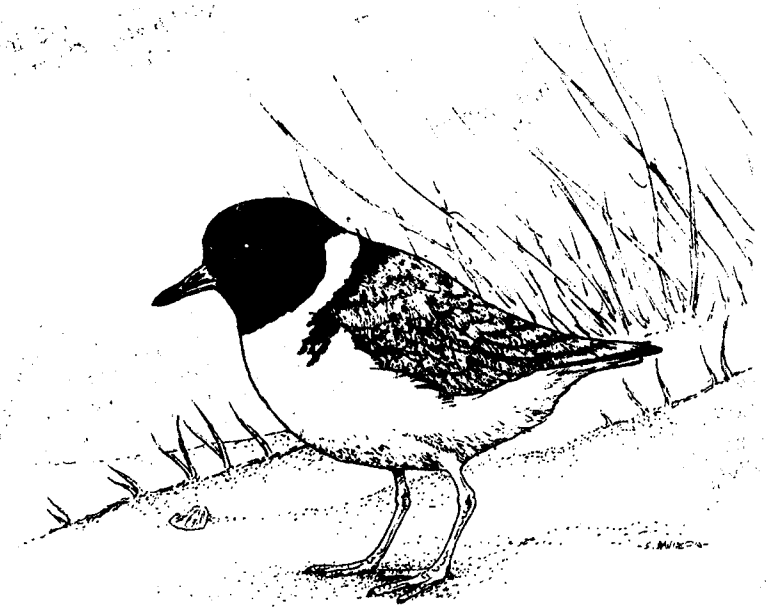

A SURVEY OF SHOREBIRDS OF WESTERN TASMANIA. PART ONE. MACQUARIE HARBOUR TO BLUFF POINT

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Little information is published on the abundance and habitat preferences of shorebirds on the coastline of western Tasmania. Thomas (1973) in a review of waders in Tasmania made scant reference to species occurring on the west coast. Similarly Green (1989) made little reference to species present on this coastline. The Tasmanian Bird Atlas (Thomas 1979) depicted fifteen shorebird species occurring on the west coast of Tasmania north of Macquarie Harbour, while Blakers *et al.* (1984) listed an additional eight species. However, in these references no details are provided other than presence or absence information. Various authors have recorded the abundance of shorebirds along small sections of this coastline, for example, Granville Harbour (Fielding 1976a), Pieman River mouth (Fielding 1976b), and Sandy Cape Beach area (Green 1984).

This paper presents a summary of the shorebirds recorded while systematically traversing the coastline from Macquarie Harbour entrance to Bluff Point in the period from the 13 to 19 April 1991. All beaches on this coastline were surveyed, with the exception of the beach at the Pieman River mouth, Darty's Corner, Nelson Bay, the north side of the Arthur River mouth and Slaves Bay. Rocky sections of coastline were not surveyed.

The census method employed was described in Schulz (1993). It should be noted that as the survey was conducted over a period of seven days it is possible that some waders moved ahead of the observer and were counted on more than one occasion. The grid references for localities where not listed in the text are detailed in Schulz (1993).

Pied Oystercatcher *Haematopus longirostris*

128 individuals were recorded (1.2 birds/km of beach). No large concentrations were observed, the largest flock encountered being eight individuals on Strahan Ocean Beach. This bird was absent from the Strahan Ocean Beach north of the Henty River mouth (a distance of 13 km) and Three Mile Beach (5 km in length). In January 1993 nine birds were recorded on the former stretch of beach, including two runners (Schulz, unpubl. records).

Sooty Oystercatcher *Haematopus fuliginosus*

A total of 81 individuals (0.7 birds/km) is likely to be a significant underestimate of this species on this coastline since no stretches of rocky coastline were included in the survey. As with the Pied Oystercatcher no large aggregations were recorded. Only two individuals were observed on the thirty-six kilometre long Strahan Ocean Beach.

Masked Lapwing *Vanellus miles*

A total of 316 individuals (2.9 birds/km) was recorded, with the largest concentrations at Stingray Bay (93 individuals), north of Gaffney Point (39 individuals), Studland Bay (26 individuals) and Two Mile Beach (23 individuals). A flock of 31 Masked Lapwings was observed in grassland behind rocky coastline at Sandy Cape. Green (1984) recorded thirty birds in the Sandy Cape area, primarily occurring in pairs or small parties on the beaches and dry lagoons in the dunes.

Hooded Plover *Charadrius rubricollis*

For a detailed account of the occurrence of the Hooded Plover on this coastline refer to Schulz (1993). A total of 376 individuals were recorded at an average of 3.5. birds/km of beach. This bird was the only wader species observed on all beaches surveyed.

Double-banded Plover *Charadrius bicinctus*

The most commonly encountered wader during the survey. A total of 673 individuals (6.2 birds/km) was counted with the largest concentrations occurring on the Strahan Ocean Beach between Braddon Point and the Henty River mouth (265 individuals), Four Mile Beach (79 individuals), Templars Creek mouth south of Gaffney Point (41° 11', 144° 42') (48 individuals) and Two Mile Beach (38 individuals). This species was absent from only three beaches: south of Hoyle Creek, three Mile Beach and Calm Bay. Lane (1987) reported a count of 170 individuals on Strahan Ocean Beach.

Red-capped Plover *Charadrius ruficapillus*

The second most common wader with a total of 570 individuals (5.2 birds/km) recorded. This species was present on all beaches except Calm Bay. The largest concentrations were recorded on Four Mile Beach (109 individuals), Arthur Beach (78 individuals) and Two Mile Beach (47 individuals). Green (1984) recorded a concentration of 65 birds in April 1981 between Gannet Point (41° 17', 144° 42') and the Pedder River estuary (41° 24', 144° 46'). In the present survey 51 individuals were recorded on that stretch of coastline at the same time of year.

Black-fronted Plover *Charadrius melanops*

This species is common in Tasmania, where it occurs principally on lagoon edges and shingle beds (Green 1989). Schulz and Kristensen (1990) recorded 27 individuals on beaches on the west coast of King Island, where it principally favoured shingle beaches with freshwater seepage running across or between the rocks and accumulations of decaying beachcast kelp. In the present survey four individuals were recorded: one bird on the edge of Cuffys Creek mouth (40° 07', 144° 37') and three at a small creek outlet on Two Mile Beach. In both cases individuals were observed foraging on the sandy margins of freshwater creek outlets with scattered clumps of beachwashed kelp present.

Ruddy Turnstone *Arenaria interpres*

A total of 258 individuals (2.4 birds/km) were recorded, with the largest concentrations occurring at Templars Creek mouth (72 individuals), Native Well Bay (55 individuals) and Cuffys Creek mouth, Mawson Bay (46 individuals). No birds were recorded on Strahan Ocean Beach, although this species has been located at this site in the past (Thomas 1979, Blakers *et al.* 1984, Schulz unpubl. records). Green (1984)

recorded 100 individuals at Ordnance Point (41° 18', 144° 43') on the 18 April 1981. In the present survey only four individuals were located in this locality on the 17 April 1991. This marked reduction in numbers may suggest that there has been a population decline of this species in Tasmania.

Grey-tailed Tattler *Tringa brevipes*

Seven individuals were recorded on rocks in the intertidal zone midway along Four Mile Beach. Although an uncommon species in Tasmania (Green 1989), it has previously been recorded on this section of coastline (Thomas 1979, Blakers *et al.* 1984).

Terek Sandpiper *Tringa terek*

A single bird was recorded foraging on the edge of a mixed flock of waders at the Henty River mouth on 13 April 1991. This bird is a rare visitor to Tasmania (Green 1989), but has previously been observed on the Strahan Ocean Beach (Blakers *et al.* 1984, Schulz, unpubl. records).

Red Knot *Calidris canutus*

Two individuals in partial breeding plumage were observed amongst a flock of Double-banded Plovers, Red-capped Plovers, Ruddy Turnstone and Red-necked Stints on Four Mile Beach. This uncommon visitors to Tasmania (Green 1989) has previously been recorded on the Strahan Ocean Beach (Blakers *et al.* 1984).

Red-necked Stint *Calidris ruficollis*

A total of 266 individuals (2.4 birds/km) were recorded from five localities: 213 on the Strahan Ocean Beach between Braddon Point and the Henty River mouth, 4 on Four Mile Beach, 6 at Italian River mouth (41° 29', 144° 48'), 1 at Wild Wave River mouth, Sandy Cape Beach (41° 22', 144° 46') and 42 on Two Mile Beach. Green (1984) recorded five birds on the beach at Ordnance Point. Interestingly, although a large number of this species were found on Strahan Ocean Beach south of the Henty River mouth, no individuals were recorded on the thirteen kilometre stretch of beach to the north.

Sanderling *Calidris alba*

A flock of 433 Sanderlings with many individuals in partial breeding plumage, was recorded on the southern side of the Henty River mouth on the Strahan Ocean Beach. This site regularly supports flocks of Sanderling throughout the summer period, for example an average of 330 individuals was recorded in three counts between 1981 and 1985 (Lane 1987), and 258 individuals were present in January 1993 (Schulz, unpubl. records). The concentrations of Sanderling at the Henty River mouth are significant on a national scale (Lane 1987). The only other record of this species during the survey was of two individuals on Two Mile Beach.

Eight additional wader species have been recorded from the coastline between Macquarie Harbour and Bluff Point but were not detected during the present survey. These are the Banded Lapwing *Vanellus tricolor* (Thomas 1979, Blakers *et al.* 1984), Lesser Golden Plover *Pluvialis dominica* (Thomas 1979, Blakers *et al.* 1984), Banded Stilt *Cladorhynchus leucocephalus* (Henderson 1984, Green 1984, Blakers *et al.* 1984), Common Sandpiper *Tringa hypoleucos* (Blakers *et al.* 1984), Latham's Snipe *Gallinago hardwickii* (Fielding 1976b, Thomas 1979, Naarding 1983, Blakers *et al.* 1984). Bar-tailed Godwit *Limosa lapponica* (Thomas 1979), Sharp-tailed Sandpiper *Calidris acuminata* (Blakers *et al.* 1984), and the Curlew Sandpiper *Calidris ferruginea* (Thomas 1979, Blakers *et al.* 1984, Schulz unpubl. records). One of these species, the Banded Lapwing, occurs predominantly in habitats away from the coastline and was unlikely to have been encountered during this survey. Due to the timing of the survey (mid-April) it is likely that a number of migratory species typically present during the summer months had already departed. For example, most Latham's Snipe have departed south-eastern Australia by the end of February (Naarding 1983) and Sharp-tailed Sandpipers have departed from southern Australia in February and March (Lane 1987). Two of the wader species not recorded during the present survey are rare or uncommon visitors to Tasmania; the Banded Stilt and Common Sandpiper (Green 1989).

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A SURVEY OF SHOREBIRDS OF WESTERN TASMANIA. PART TWO. NORTH HEAD, PORT DAVEY ENTRANCE TO CAPE SORELL

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Summary

A total of ten species of shorebirds and 668 individuals were recorded in a survey of waders on the remote west coast of Tasmania between North Head, Port Davey and Cape Sorell. Three resident breeding wader species comprised 76.7% of all shorebirds encountered. these were the Hooded Plover *Charadrius rubricollis*, Sooty Oystercatcher *Haematopus fuliginosus* and the Pied Oystercatcher *H. longirostris*. Migratory waders were present in low numbers with the best represented species being the Ruddy Turnstone *Arenaria interpres*. The most frequently recorded shorebird species overall was the Hooded Plover, with an average population density of 6.6 birds/km of sand beach. A comparison is made with shorebird assemblages on the south and north-west coasts of Tasmania.

Introduction

The south-west Tasmanian coastline between North Head on the north side of Port Davey entrance and Cape Sorell is typified by rocky shorelines, sheer in places, with scattered small sand or rock rubble beaches, numerous creeks and some wide river mouths. The region has no roads, houses or other human habitation and there is little evidence of human presence. Access is difficult, either by helicopter, boat if the weather is calm enough or for the very intrepid few by foot.

A result of the coastline's remoteness is that little information has been published on the shorebirds present in the area. Luckman and Luckman (1972) recorded the Red-capped Plover *Charadrius ruficapillus* at Towterer Beach. Thomas (1973) in a review of waders in Tasmania made no reference to species occurring on this section of coastline. S. Blackall recorded the Ruddy Turnstone *Arenaria interpres* at Alfhild Bight in January 1978 (Thomas 1980). The Tasmanian Bird Atlas depicted three shorebird species occurring on this section of coastline (Thomas 1979). These were the Pied Oystercatcher *Haematopus longirostris* (three site records), Sooty Oystercatcher *H. fuliginosus* (one site record) and the Hooded Plover *Charadrius rubricollis* (one site record). White (1985) in a review of the birds of south-west Tasmania provided no additional information. No systematic shorebird counts have been conducted on this section of coastline.

This paper presents a summary of the shorebirds recorded while systematically traversing the coastline on foot from North Head, Port Davey entrance to Cape Sorell at the entrance to Macquarie Harbour during late summer and early autumn 1993.

Methods

The survey was conducted over a period of thirty-one days (9 February to 11 March 1993) during which the coastline was systematically sampled from south to north. A prime objective of the survey was to census the Hooded Plover population on this shoreline (Schulz and Kristensen, in prep.). Prior to undertaking the survey aerial photographs were examined to identify all sand beaches present in the area. All sand beaches, the majority of cobble beaches and over 75% of the rocky coastline were surveyed. Some sections of rocky coastline could not be traversed due to the difficulty of access. In these sections sheer rock walls, deep gulches with large swells pounding and/or large storm waves smashing high up on the rocky shore forced the authors to retreat through backing coastal scrub, rainforest and button grass plains. Rocky coastline sections not sampled during this survey were North Head to South East Bight, Sandblow Bay to Dennis Gulch, Svenor Gulches, Svenor Point to Brier Holme Head, Mulcahy Bay to Elliot Point, Unmarrah Creek mouth to The Pophole, Low Rocky Point to Sassy Creek Beach, High Rocky Point to 2km south of Hartwell Cove, Hays Reef to Point Hibbs and Cape Sorell to Pilot Bay.

The census method employed is similar to that described in Schulz (1993a) and involved walking at a slow pace in the storm tide zone of the shoreline whilst continually scanning ahead for waders. When birds were detected care was taken to minimise disturbance and individuals were only counted when passed. The shorelines of all estuaries were investigated up to at least one kilometre inland from the river mouth. Any breeding activity or associated behaviour was noted.

Due to the distance, the nature of the terrain and the amount of gear carried it was not possible to complete this section of coastline over a one or two day period as is the case with the biennial Hooded Plover surveys such as conducted in Victoria (Murlis 1989). In order to avoid confusing count results, each beach was surveyed from the beginning to end in the one observation period. It is possible that some waders may have moved ahead of the observers and were counted on more than one occasion.

The grid references for all localities identified in the text are listed in the attached appendix.

Results and Discussion

A total of ten species and six hundred and sixty-eight individuals were recorded in the survey.

1. Annotated Species Account

Pied Oystercatcher *Haematopus longirostris*

108 individuals were recorded primarily from sand beaches, but also from cobble beaches in sheltered situations. The largest concentrations were of 19 individuals on a sheltered cobble beach and adjacent extensive reef platform north of the Trumpeter Islets and 12 individuals at Griffiths Creek mouth, Varna Bay Beach. The only breeding record was a

nest containing a single egg on the upper section of Endeavour Bay Beach on 22 February.

Sooty Oystercatcher *Haematopus fuliginosus*

This was the second most common shorebird (24.3% of all species) recorded along the coastline. A total of 162 individuals were counted, with the largest concentrations occurring on extensive reef platforms north of the Trumpeter Islets (13 individuals, together with 19 Pied Oystercatchers), on reef platforms on the north side of the Mainwaring River mouth (12 individuals) and on a reef on the north side of Nye Bay (9 individuals). No nests were located.

It is likely that some individuals were overlooked since not all sections of rocky coastline were traversed. However, much of the rocky coastline not covered consisted of habitat that was probably not suitable for the Sooty Oystercatcher due to the lack of reef platforms and the presence of gulches and sheer rock faces. For example, a section of this type of coastline was traversed with difficulty between Christmas Cove and Endeavour Bay (a distance of approximately 9km) and revealed no Sooty Oystercatchers.

Masked Lapwing *Vanellus miles*

A total of 61 individuals was recorded scattered along the coastline, primarily in areas of cobble or sand beach with extensive intertidal platforms adjacent and large amounts of beachcast kelp. The largest congregations were of 14 individuals on cobble beaches and extensive reef platforms north of Trumpeter Islets, nine individuals in a similar situation south of Bottom Rocks and five individuals on a reef platform at Stinky Creek.

Hooded Plover *Charadrius rubricollis*

This species was the most frequently encountered shorebird (36.2% of all species), with a total of 242 individuals recorded from a total beach length of 36.9km. The density of Hooded Plovers located (6.6 birds/km) is markedly higher than the state average of 1.7 birds/km (Holdsworth and Park 1993). Schulz and Kristensen (in prep.) attribute this high density to the relatively low amounts of human disturbance on these beaches, particularly from off-road vehicles.

The survey was conducted late in this species' breeding season (Schulz and Bamford 1987). Consequently little nesting activity was observed. Two nests were located high on the beach at Mulcahy Bay on 13 February, a single nest was detected on Sassy Creek beach on 18 February and two runners were located hiding amongst beachcast timber and bracken on the banks of Waller Creek, 0.2km inland from the mouth on 6 March. A number of birds were observed behaving in a manner that strongly suggested that young were present in the area. A total of twenty-seven immature-plumaged birds were recorded, accounting for 11.2% of the total number of Hooded Plovers located.

In the Gorge Point area eight individuals were encountered on short (less than 200m in length) pebble beaches, with no sand present. All other Hooded Plovers encountered were on sand beach or on immediately adjacent reef platforms.

A detailed account of the occurrence of the Hooded Plover on this coastline is provided in Schulz and Kristensen (1993 and in prep.)

Double-banded Plover *Charadrius bicinctus*

Five individuals were recorded on four beaches: two on Towterer Beach, one on Birthday Bay Beach, two on Lagoon Creek Beach and one south of Tiddys Beach. The low densities recorded during this survey was probably a reflection of the time of year.

Red-capped Plover *Charadrius ruficapillus*

Surprisingly uncommon, with only 24 individuals recorded: ome on cobble beach north of Trumpeter Islets, 11 on Lagoon Creek Beach and 12 in a mixed flock of waders south of Tiddys Beach. No nesting activity was recorded.

Ruddy Turnstone *Arenaria interpres*

A total of sixty individuals was recorded during the present survey: one on Birthday Bay Beach and a flock of 59 individuals roosting at high tide south of Tiddys Beach. Both localities were characterised by a sand beach with large piles of beachcast kelp and an extensive offshore intertidal reef platform.

Common Sandpiper *Tringa hypoleucos*

An uncommon species in Tasmania (Green 1989), a single bird was observed in the company of two Hooded Plovers on a small beach and adjacent reef platform south of Gorge Point. On the edge of shallow tidal pools it was observed preying on amphipods, polychaete worms and marine isopods. Higher up on the beach it was seen successfully chasing after sandhoppers (Amphipoda).

Red-necked Stint *Calidris ruficollis*

The only individual recorded was amongst a mixed species flock of waders roosting at high tide south of Tiddys Beach.

Latham's Snipe *Gallinago hardwickii*

Four single individuals were recorded: one south of Bottom Rocks in short bracken on the edge of a cobble beach; one north of Veridian Point on the edge of a clump of *Leptospermum nitidum* in the middle of an extensive swampy marsupial lawn; one circling over Stinky Creek after dusk calling loudly; and one south of Pennerowne Point on the edge of an extensive marsupial lawn. Numerous probe marks were seen on marsupial lawns and in other swampy situations in the Pennerowne Point area.

2. Additional Sites

A number of small lagoons located behind the coastline were visited (refer to TASMAP Sheets 7913, 7912 and 8011). Despite sandy shorelines and/or mudflats present on most of these lagoons, no waders were recorded.

The entrance of Kelly Basin to two kilometres from the mouth and the sandy beaches between Curtis Point and Earles Point on the north side of Port Davey were visited on 9 and 10 February. Three species of shorebird were recorded: the Sooty and Pied Oystercatchers and the Red-capped Plover. A flock of twenty-four Sooty Oystercatchers was observed

roosting at high tide on an exposed sand bar at the entrance to Kelly Basin. This aggregation was larger than any encountered elsewhere during the survey.

Comparison with adjacent shorelines

1. The South Coast

The wader assemblage recorded during the present survey was similar to that observed on the south coast of Tasmania from South East Cape to South West Cape and on the far west coast north of Port Davey entrance (Schulz and Menkhorst 1984, Schulz 1990). In both sections of coastline the Pied Oystercatcher, Sooty Oystercatcher and Hooded Plover accounted for over 75% of the waders recorded. The Masked Lapwing was present in small numbers and migratory shorebird populations only accounted for 10.6% of the wader assemblage in the present survey and 0.9% (Schulz 1990) to 3.8% (Schulz and Menkhorst 1984) on the south and far south-west coast of Tasmania.

Two species, Whimbrel *Numenius phaeopus* and Bar-tailed Godwit *Limosa lapponica*, that were recorded as single individuals on the far south-west coast (Schulz 1990) were not recorded in the present study.

Four species were encountered during the present survey that were not located by Schulz and Menkhorst (1984) and Schulz (1990) on the south coast of Tasmania. These were the Double-banded Plover, Red-capped Plover, Ruddy Turnstone and Common Sandpiper. However, prior to these surveys Luckman and Luckman (1972) recorded the Red-capped Plover as common on Stephens Bay and Ketchem Bay. Although the Double-banded Plover was absent on the south coast during the November to January surveys of Schulz and Menkhorst (1984) and Schulz (1990) this species has been recorded on Louisa Bay Beach and Prion Beach in the autumn months (Schulz, unpubl. records). This bird is generally absent in Australia between September and February (Lane 1987).

2. The North-west Coast

A more diverse shorebird assemblage is present on the north-west Tasmanian Coast north of Macquarie Harbour (eg. Schulz 1993b). Eleven species have been recorded on this coastline that were not observed in the present survey area. These are the Banded Lapwing *Vanellus tricolor*, Lesser Golden Plover *Pluvialis dominica*, Black-fronted Plover *Charadrius melanops*, Banded Stilt *Cladorhynchus leucocephalus*, Grey-tailed Tattler *Tringa brevipes*, Terek Sandpiper *T. terek*, Bar-tailed Godwit, Red Knot *Calidris canutus*, Sharp-tailed Sandpiper *C. acuminata*, Curlew Sandpiper *C. ferruginea* and Sanderling *C. alba*. It should be noted that these shorebirds were recorded over a period of time and not all species were present on the coastline on any single visit (eg. Schulz 1993).

In the present survey the three most commonly encountered waders were the Hooded Plover (36.2% of all waders), Sooty Oystercatcher (24.3% of all waders) and the Pied Oystercatcher (16.2% of all waders). The best represented migratory species was the Ruddy Turnstone (9.0% of all waders). In contrast, a survey conducted in April 1991 by Schulz (1993b) employing identical census methods on the north-west coast of Tasmania between Macquarie Harbour entrance and Bluff Point found that the three most commonly encountered waders were the Double-banded Plover (21.6% of all waders), Red-capped Plover (18.3% of all waders) and the Sanderling 13.9% of all waders). The first two species were uncommon on the coastline south of Macquarie Harbour entrance accounting for only 4.4% of all waders encountered, while the Sanderling was not recorded. Of the three species most frequently encountered south of Macquarie Harbour, on the shoreline north of the Harbour the Hooded Plover was the fourth most frequently encountered species (12.1% of all waders), the Sooty Oystercatcher the ninth most frequently encountered species (2.6% of all waders) and the Pied Oystercatcher the eighth most frequently encountered species (4.1% of all waders encountered).

The difference in shorebird assemblages north and south of Macquarie Harbour entrance may in part be due to the different timings of the surveys especially for the Double-banded Plover, and also that no rocky coastline was included in the survey north of Macquarie Harbour entrance. This may account for the low Sooty Oystercatcher numbers. However, these factors are unlikely to account for the overall differences observed. It is suggested that physical factors such as more extensive sandy beaches with wide sand stretches at river mouths are important in accounting for the observed differences. The low level of human disturbance on beaches south of Macquarie Harbour may also account for higher population numbers of locally breeding species (Schulz and Kristensen in prep).

3. Kelly Basin

Four migratory species of shorebirds have been recorded on the extensive intertidal mudflats of Kelly Basin and on the adjacent protected shorelines of Bond Bay that were not observed in this locality during the present survey. These were the Bar-tailed Godwit (Luckman and Luckman 1972, Jones 1980), Red Knot (White 1985), Greenshank *Tringa nebularia* (Thomas 1979) and Red-necked Stint (Jones 1982). Despite an extensive search of potential high tide roosts on 9 and 10 February, no migratory waders were located during the present survey.

The Red-capped Plover has previously been reported at Bond Bay in 1981 (Jones 1982). In the present survey two individuals were recorded on a sand bar at the entrance of Kelly Basin.

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ing River; and to Melva Truchanas for providing a base in Hobart.

Par Avion provided excellent service in successfully packing and depositing airdrops at Big Beach and Whitehorses Beach, and in flying us to Melaleuca Inlet.

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APPENDIX. GRID REFERENCES OF LOCALITIES IDENTIFIED IN THE TEXT.

Alfhild Bight 43° 13', 145° 48'
Big Beach 42° 58', 145° 35'
Birthday Bay 42° 25', 145° 14'
Bond Bay 43° 15', 145° 54'
Bottom Rocks 43° 04', 145° 40'
Brier Holme Head 43° 08', 145° 43'
Cape Sorell 42° 11', 145° 10'
Christmas Cove 42° 43', 145° 23'
Curtis Point 43° 15', 145° 55'
Dennis Gulch 43° 14', 145° 48'
Earles Point 43° 16', 145° 55'
Elliot Point 43° 05', 145° 40'
Endeavour Bay Beach 42° 39', 145° 22'
Gorge Point 42° 22', 145° 13'
Griffiths Creek mouth 42° 30', 145° 15'
Hartwell Cove 42° 44', 145° 23'
Hays Reef 32° 37', 145° 17'
High Rocky Point 42° 46', 145° 23'
Kelly Basin 43° 16', 145° 54'
Lagoon Creek Beach 42° 23', 145° 13'
Low Rocky Point 42° 59', 145° 29'
Macquarie Heads 42° 12', 145° 25'
Mainwaring River Mouth 42° 52', 145° 25'
Mulcahy Bay 43° 07', 145° 43'
North Head 43° 19', 145° 50'
Nye Bay 43° 03', 145° 41'
Pennerowne Point 42° 31', 145° 14'
Pilot Bay 42° 12', 145° 12'
Point Hibbs 42° 36', 145° 15'
Sandblow Bay 43° 15', 145° 49'
Sassy Creek Beach 42° 55', 145° 29'
South East Bight 43° 18', 145° 50'
Stinky Creek 42° 53', 145° 27'
Svenor Gulches 43° 12', 145° 47'
Svenor Point 43° 11', 145° 45'
The Pophole 42° 59', 145° 36'
Tiddys Beach 42° 12', 145° 11'
Towterer Beach 43° 12', 145° 48'
Trumpeter Islets 43° 12', 145° 48'
Unmarrah Creek Mouth 43° 01', 145° 38'
Varna Bay Beach 42° 30', 145° 15'
Veridian Point 42° 55', 145° 28'
Waller Creek mouth 42° 24', 145° 14'
Whitehorses Beach 42° 37', 145° 18'

PACIFIC SECTION

Waders in New Caledonia

Paul Scofield, 35 McIlwrick St, Windsor, Vic, 3181.

New Caledonia (Grand Térre) and Lifu Island in the Loyalty Group were visited from 13 to 21 September 1993 by myself, Tom Smith, David Andrew and Jerry Klapste. Whilst the bulk of the trip was spent in the mountains looking for the endemic species a few waders were seen at four sites.

These sites were:

1) Noumea Port: waste land around the port installations.

2) RT 2: recent reclamation of mudflats 13 km from central Noumea on RT 2 road to Yáté.

3) St. Gabriel Beach: Beach and shallow coral reef between Yáté and Goro on the south-eastern coast of Grand Térre .

4) Lifu Airport: Rank grass around main airport and adjacent playing fields in northern central Lifu, 13 km north of the main town Wé.

Annotated List.

Pacific Golden Plover *Pluvialis fulva*: Two in mangroves at the RT 2 site on 18th and 25 at Lifu airport on 20th. The Lifu birds were in heavy moult from breeding plumage with speckled black on breast and belly. TS had visited Lifu by himself on 14th and not seen any Golden Plovers. As with many small Pacific Islands there is a lack of suitable roosting places for this species on Lifu and it is likely that TS would have seen this species had it been present. We therefore believe these birds may have arrived from their breeding ground between the 14th and 20th. However those at the RT 2 site appeared to be in full non-breeding plumage and may have overwintered. It was not noticed whether these birds had any traces of juvenile plumage.

Whimbrel *Numenius phaeopus*: One seen at the RT 2 site on 17th and four on 18th. Two observed in flight had the pale rumps and barred underwing coverts of the subspecies *variegatus*.

Wandering Tattler *Tringa incanas*: Two were seen at the RT 2 site on 17th and eight along coast between Yáté and St. Gabriel on 18th. Grey-tailed Tattler *T. brevipes* is also recorded from New Caledonia and both Delacour (1966) and Hannecart and Letocart (1980) state that this is the common species. There are also unpublished reports of Grey-tailed Tattler from other Australian observers. All those seen by us however were undoubtedly Wandering Tattlers, showing dark upperparts and heavily barred underparts and giving rippling calls when flushed. Most appeared to be moulting out of breeding plumage with mostly white hind-bellies and vents and only faint barring on the under-tail coverts.

Common Sandpiper *Tringa hypoleucos*: One was seen on the causeway at the RT 2 site on 17th. Remarkably this appears to be the first record from New Caledonia of this species which is almost ubiquitous in Australia. It was observed closely from the car and was also observed in flight. Though all present were familiar with this species as a first record the following features were noted:

Crown, nape and upperparts were chocolate brown; approximately 10 coverts had dark central streaks though none appeared to have pale fringes. The lores were pale extending to eye. The ear coverts and sides of breast were pale brown though this did not meet in the middle; there was very faint streaking on some feathers on breast. The throat, central breast and rest of underside were white. In flight the distinctive fluttering flight of this species and a prominent white wing bar were seen. The bill was grey and the legs were grey with a hint of yellow; the eye was dark.

We therefore aged this bird as an adult with well advanced moult into non-breeding plumage.

Bar-tailed Godwit *Limosa lapponica*: Six were seen in mangrove at the RT 2 site on 17th and two on 18th. None showed any signs of red breeding plumage and may have over-wintered though it was not noticed whether any showed signs of juvenile plumage.

Beach Thick-knee *Esacus magnirostis*: This species was not noted by us nor has it been seen by any Australian 'twitching trips' that we are aware of. Delacour (1966) states that it is rare.

Double-banded Plover *Charadrius bicintus* (Garrett & Garrett 1975); Grey Plover *P. squatarola*; Sanderling *Calidris alba* and Sharp-tailed Sandpiper *C. acuminata* have also been recorded (Delacour 1966) but were not seen by us. Turnstone *Arenaria interpres* was also not seen by us however it was recorded breeding on coral islets in New Caledonia's lagoon in 1978 & 79 (Hannecart & Letocart 1980).

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ASIAN SECTION

ASIAN WETLAND BUREAU ACTIVITIES

SOUTH ASIA PROGRAMME

In order to facilitate AWB activities in the region, it was deemed necessary to establish a Regional Coordinating Centre in New Delhi, India, the most centrally located country in the South Asian region.

The Ministry of Environment and Forests (MOEF) of the Government of India when approached, indicated its support and assistance in setting up such a centre. Details regarding funding, facilities, location etc., are at present being worked out.

Preliminary efforts are underway in collaboration with MOEF, the Government of India, the British High Commission (British Council Division), New Delhi and AWB, to draw up a comprehensive wetland conservation action plan for certain selected wetlands.

In the meantime, AWB has established a registered office: AWB -India will start implementing South Asia programme activities in the region through an interim arrangement.

Range of Activities

The Regional Coordinating Centre will facilitate a wide range of activities which will include:

* Networking
  Providing an effective network of wetland related issues with local NGO's government agencies, universities and individuals in all countries of South Asia.

* Regional Issues
  Providing linkages for action among the countries in the region.

* Training
  Organising training courses for NGOs, government agencies, private institutions, rural and urban communities, as well as managers of parks and reserves.

* NGO Participation
  Providing effective communication links with national and international NGOs.

* Monitoring
  Providing a monitoring base for the status of wetlands and the impact of development activities on them.

* Database
  Establishing a database on biodiversity, productivity and values of wetlands in the region.

* Environmental Impact Assessment
  Identifying expertise for conducting EIAs on development projects affecting wetlands.

* Collaborative Programmes
  Promoting and conducting joint programmes with local agencies by providing expertise, support and obtaining international funding for such projects.

World Bank

AWB's other main activities in the region have so far had a low profile and have been restricted to training workshops, institution building, small grants for project and preparation of project documents - such as for the World Bank Forestry III project in Bangladesh. Some input were made to the components of the Bangladesh's Flood Action Plan.

AWB took part in the World Bank sponsored Biodiversity Consultative meeting in Bangkok, Thailand in February 1993. Wetlands biodiversity issues were highlighted at the meeting. AWB will provide necessary input into the Bank's future projects for wetlands conservations.

EAST ASIA PROGRAMME

The proceedings of the Philippines National Workshop, along with the "National Wetland Action Plan for the Republic of the Philippines - Draft", have been published and distributed to all workshops participants. The Department of Environment and Natural Resources in the Philippines has established a committee to oversee the finalisation and approval of the plan for implementation. Asian Wetland Bureau will assist the Department in implementing the plan.

At the invitation of the Ministry of Agriculture of the State of Cambodia, Asian Wetland bureau has helped in the organisation of a National Wetland Seminar in Phnom Penh at the end of April. The proceedings of this seminar will be published in both Khmer and English in the second half of 1993. With over 20 percent of Cambodia's area being wetland (a percentage exceeded only by Bangladesh), the welfare of Cambodia's people is closely linked to the way in which it develops its wetland resources. The recommendations obtained from this seminar form the basis for the new government to develop appropriate policies for the protection and sustainable use of wetlands, and for Asian Wetland bureau to prioritise its assistance to the Government in this task.

In collaboration with the Chinese government and World Wide Fund for Nature, planning is underway for the development of a National Wetland Action Plan for China. China holds over 20 percent of Asia's internationally significant wetlands. A National Wetland Symposium is scheduled for November 1993, at which an Action Plan will be drafted.

In addition, proposals have been prepared for international agencies covering core activities in Vietnam, Cambodia, Thailand, China and the Philippines.

MALAYSIA PROGRAMME

In collaboration with WWF-Malaysia, the Malaysia Programme helped formulate the National Conservation Strategy Project and in the process, published two background papers on "Freshwater Resources" and "Marine and Freshwater Fishes". similarly, the Programme provided invaluable input on the Sungei Golok Flood Mitigation Project as well as the Northern Trengganu Rural Development Project.

One of the most important projects carried out by the Malaysia Programme during that year was the Sepang Birdstrike Project via the Department of Civil Aviation, Malaysia. This involved an assessment of the potential bird hazard at the proposed Kuala Lumpur International Airport in Sepang.

The Programme also completed two projects by May, 1993. These are "A Preliminary Environmental Impact Assessment of the Proposed Marine Industrial Park at Kapar, Selangor" (Kapar EIA) and "A Preliminary Ecological Study of the Kuala Langat South Peat Swamp Forest". With regard to the Kapar EIA project, the Programme made several recommendations for possible control and mitigation measures to either avoid or reduce imminent impacts on the various components of the ecosystem due to proposed development activities. As part of the Kuala Langat South Peat Swamp Project, the Programme provided input towards the formulation of management plan for the proposed State Park at the Kuala Langat South Peat Swamp Forest.

Listed as on-going projects are the Freshwater Fish Project (Phase 1), the Socio-economic Importance of Wetland Plants Project and various Biodiversity Projects.

The Freshwater Fish Project, funded by WWF-International, is essentially targeted at determining the conservation status of fresh water fish in Malaysia. The Malaysia Programme is in the process of reviewing the effectiveness of legislative enforcement on freshwater fish protection. The Programme is also currently aiding in the assessment of various groups of consumers, the identification of sites of importance and the implementation of an action plan for improved conservation together with appropriate government agencies.

Two reports, namely "Economic Valuation of Wetland Plant, Animal and Fish Species of Tasek Bera and Resident's Perceptions of Development and Conservation", and "Rural Communities' Utilisation of Wetland Species and Perception Towards Development and Conservation of South East Pahang Swamp Forests" have been produced as a result of research carried out during Phase II of the Wetland Plants Project.

The Biodiversity Projects in Key wetlands of Malaysia are being financed by the MacArthur Foundation. Part of the funds are being used for the setting up of the Malaysian Wetland Database.

Lastly, the Programme has also published a case study on "The Assessment of Eco-tourism Potential in the State of Selangor, Malaysia". This report addresses eco-tourism as an alternative sustainable measure of coping with the non-sustainable land use practices in the surrounding area.

INDONESIA PROGRAMME

The Indonesia Programme, in collaboration with PHPA, has undertaken many important joint projects, ranging from surveys of key wetland areas to training, education and awareness activities, information dissemination, institutional strengthening and management policy development. The following provides an overview of some of the current activities:

Danau Sentarum

A major project was initiated in the huge flood plains of the Danau Sentarum Wildlife Sanctuary of West Kalimantan to develop management plans for the reserve. the area is of importance to local fisheries, and sustainable fisheries development is therefore the crux of the project.

A field station with guest and laboratory facilities has been built and a variety of boats were purchased for survey, research, and management activities. AWB-Indonesia counterparts as well as PHPA and Fisheries Department officials have worked closely with the local community and the project has thus far received enthusiastic response.

In 1993, community involvement will be expanded, reserve boundaries redefined, and training provided to the management authorities. At a provincial level, a multi-disciplinary and inter-governmental team will be established to oversee further management implementation in the area.

Indramayu-Cirebon Waterbird Hunting Management

Along the north coast of West Java, many of the villagers in the Indramayu-Cirebon region are involved in the regular hunting of migratory and resident waterbirds. It is estimated that more than 200,000 birds are being caught for consumption annually. For many of the hunted species, the hunting pressure may well be above the carrying capacity of the population. The hunting is poverty driven, and solutions to the problem should therefore be of a socio-economic nature.

AWB's involvement began in 1986 and since then some steps have been taken in the implementation of community-supported management plans for hunting. One of the most important achievements so far has been a total halt of hunting of the endangered (resident) Milky Stork *Mycteria cinerea*. AWB has successfully co-operated with the hunters and local village leaders, both officially as well as informally. In addition, PHPA officers have been trained in waterbird identification, bird banding and hunting monitoring.

Teacher's Wetland Kit

AWB-Indonesia has established linkage with the Indonesian Institute for In-Service Teachers Training (PPPG-IPA). As part of this co-operation, PPPG-IPA will distribute and use awareness and information materials developed under the PHPA-AWB programme.

The AWB Education Unit (part of the Information and Training Section) will work in collaboration with biology teachers and PPPG-IPA on the development and publication of a Teacher's Wetland Kit. This Kit aims to provide an active learning experience for high school students. It will encourage teachers to take their students to nearby wetlands for lessons, which also tie in with the national biology curriculum. PPPG-IPA intends to use the Teacher's Kit in its national programme. The project is financed by the Canada Fund and British Petroleum.

Wetland Data Base (WDB)

The Wetland Data Base is now a fully-fledged wetland data management system which stores comprehensive information on wetland sites, habitats, species, land-uses, land status, values, threats, management, references, etc. Satellite systems have been placed at the National Planning Bureau (BAPPENAS) and offices of PHPA in Bogor and Jakarta.

PHPA-AWB will continue data input and training of the responsible PHPA and BAPPENAS officers in the management of WDB. Furthermore, the WDB Unit of AWB-Indonesia will focus on the improvement of its service role; it will actively search and identify information needs and provide the necessary inputs.

INDONESIANS FINDING ALTERNATIVES TO HUNTING WATERBIRDS

John McCarthy AWB - Indonesia

Each year more than 2 million waders (more than 100 of the world's 200 waterbird species) fly between Australasia and the Arctic Tundra. These birds stop in coastal wetlands rich in foods such as shellfish and worms to obtain the energy reserves needed for their long flight. Some of these wading birds fail to arrive. Apart from natural hazards these birds face human related threats. Many of the key sites waders use for roosting and feeding are under threat from development projects. Moreover, an estimated half to one and a half million waders are hunted each year, including several endangered species.

After a night's work, hunters carrying bundles of trussed up waterbirds return to Singakerta village. At the Cimanis bridge on the Cirebon-Indramayu road, wholesalers meet the hunters; here birds and cash change hands. Later in the evening vendors are seen on the streets of near-by Cirebon selling fried birds.

Singakerta village lies on the north coast of West Java between Cirebon and Indramayu. Like most of the north coast , fishponds, salt pans and rice paddy cover the area. Here, in a stretch 5-10 km wide and 60 km long, villagers catch around 200,000 migratory and resident waterbirds each year. The migratory birds stop over in the area between September and April, hunting, therefore, is only a seasonal activity.

On average, hunters working locally catch 53 birds each week and the birds fetch prices between Rp 200 - 1,800 (US$0.10 - 0.90). This means that the bird hunter makes very little profit; each hunter earns about Rp 150,000 (US$75) a year from the trade, making up forty percent of family incomes.

The hunters have little choice but to hunt birds; the area provides meagre resources. It is dry and the hunters have few other assets or skills. Therefore, hunting techniques are passed on from one generation to the next; children often begin their career at the age of eleven.

As hunting threatens the viability of populations of migratory waterbird species flying across East Asia, the Indonesian Directorate General of Forest Protection and Nature Conservation (PHPA), World Wildlife Fund and Asian Wetland Bureau began studying the bird trade in Indramayu-Cirebon in 1986. The Australian International Development Assistance Bureau later agreed to fund a follow-up project to support development of an alternative livelihood.

In 1990, a joint Australian-Indonesian team carried out a detailed study in Indramayu-Cirebon. The team found that hunting pressure on many species is unsustainable. Naturalists already knew that the hunters caught large numbers of Oriental Pratincoles *Glareola maldivarum* (previous estimates: 45,000 per year). In 1990 the research team found that hunting in Indramayu-Cirebon culled about 20% of the known world population of the Oriental Pratincole. Researchers also discovered that hunters catch large numbers of the Yellow Bittern *Ixobrychus sinesis* , and White-browed Crake, *Porzana cinerea*. Marketplace surveys accounted for 12,000 waterbirds (6%) of 30 species including 90 Milky Stork *Mycteria cinerea*. This is a threatened resident waterbird species with a world population of about 5,000 birds and a Javanese population of only five hundred birds.

In 1991 and 1992, PHPA and AWB started developing a system for managing the hunting. An education campaign that drew attention to the plight of the Milky Stork was backed up by law enforcement. This work scored an early success; villagers no longer hunt this species.

Follow up surveys have found that, compared with four years ago, the total number of birds caught has fallen by one-third. It is unclear whether this is because falling profit margins have driven bird hunters out of Indramayu-Cirebon, or because of the PHPA/AWB activities in the area. It may also be due to decreasing migratory bird populations.

As hunters catch migratory birds for a living, education and law enforcement along will not solve this problem. In the long term, hunters have to find other ways to maintain their families and to do so the community needs support from outside the area. In 1993, a team of Indonesian experts in community development is helping the community identify alternative livelihoods

WADER OBSERVATIONS IN THE SAKHA REPUBLIC, RUSSIAN FEDERATION - SUMMER 1992

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Introduction

A group of seven people visited the Sakha Republic (formerly Yakutia) in late June and early July 1992. The principal aim was to study the breeding waders in this part of the former Soviet Union. The Sakha Republic has 42 species of breeding waders (Labutin & Germogenov 1990) many of which spend part of each year in Australia.

From Moscow we flew to Yakutsk where we had four days of taiga and Lena River islands field trips (Fig 1).

From Yakutsk we flew north eastwards to Cherskiy and using this town as a base we undertook twelve days of field trips in the Kolyma Delta (Fig 1).

We observed 25 species of waders and of these 19 species showed various kinds of evidence of nesting. In addition we recorded other birds and mammals, and made botanical plus geological observations.

Our main leader was Dr Eugeny Sokolov of St. Petersburg with local expertise from Dr. Vladimir Pozdnikov in the Yakutsk area and Stanislav Ivanovich Mochalov in the Kolyma Delta.

Yakutsk - Pokrovsk - Lena River islands and taiga. 29 June to 2 July

The city of Yakutsk (Fig. 1) 62° 13' N, 129° 49'E having a population of around 250,000 lies in the valley of the Lena river. The main vegetation in this area is taiga but also with swamp deciduous forest and farmland in the up to 17km wide river valley. The Lena River around Yakutsk is divided into two or more channels. The western bank is more open and several farming villages lie in the sheltered plains. It is mostly dry cattle and dairy farming, but root crops are also grown.

Beside silt and gravel islands the Lena river is filled with large and small vegetation covered islands well above the spring run off water levels. These islands which look superb for breeding and migrating waders are covered with flat, damp, or wet grassy meadows, ponds, marshy willow thickets full of horsetail, *equisetum spp* and birch-larch-spruce associations. Many of the islands are used as hay meadows and summer pastures by the nearby settlements.

On the East shore of the Lena the land is steep with river banks of pebbles. In one area we saw the famous sandstone formations called Lena Stolbi or "Lena Pillars". The taiga in this area is called light taiga. The dominant trees are Larch *Larix dahurica* and Pine *Pinus sylvestris, P. cembra* with herb-shrub layer or mainly Labrador Tea *Ledum palustre*.

29 June. We went by boat south towards Pokrovsk (Fig 1) and observed the good looking wader habitat on the many islands (Fig 1, site 2). We observed five species of waders.

30 June. We took a 6km walk into the taiga along an old logging road and into a regrowth area with some steppe. The only wader seen was a Common Sandpiper *Actitis hypoleucos* on the shore, but the habitat looked suitable for breeding Wood Sandpipers *Tringa glareola* and Green Sandpipers *Tringa achropus*.

We also visited the Lena pillars. The islands opposite the pillars (Fig 1, site 4) look good for breeding waders.

1 July. We turned north again towards Yakutsk, we went looking for waders for a few hours on large farmed island called Batamaiskii. We saw potential breeding Common and Green Sandpipers.

Later in the day we landed on Rassoloda Island near a folk village for tourists. We searched the nearby heavily

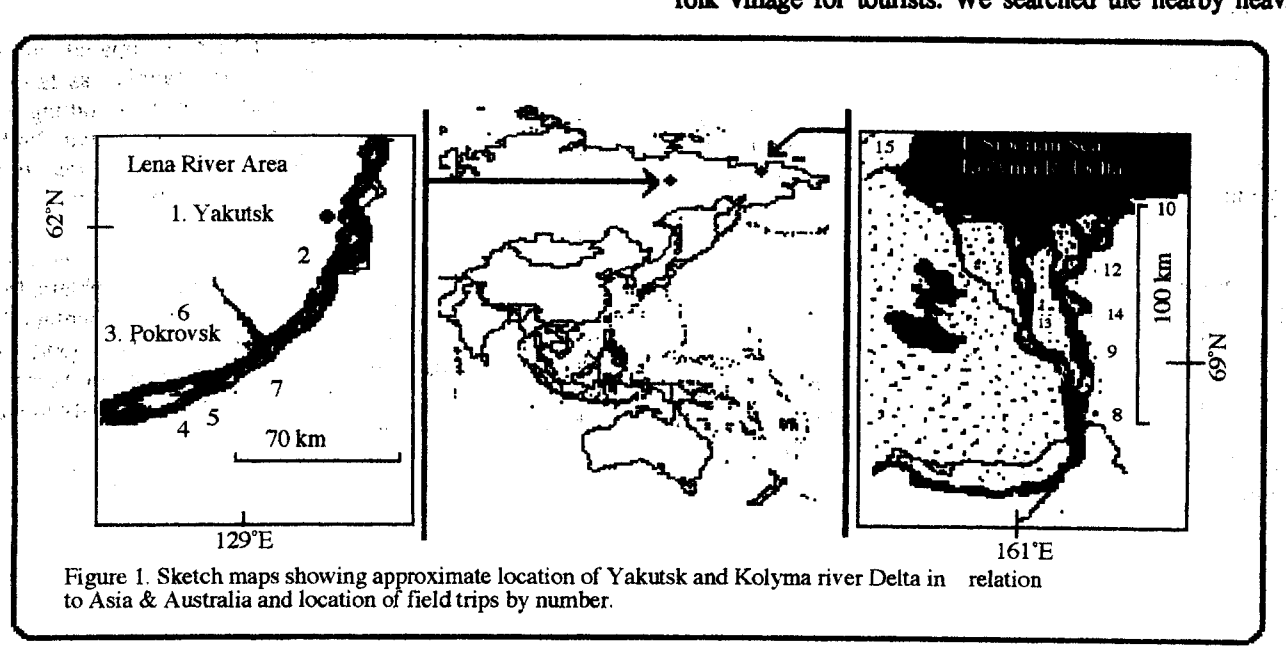

Figure 1. Sketch maps showing approximate location of Yakutsk and Kolyma river Delta in relation to Asia & Australia and location of field trips by number.

grazed farm pastures for waders. We found five species of waders nesting (Table 1), it looked like a good spot to study wader migration. Our local leader Dr. Vladimir Pozdniakov informed us that he catches and bands many waders in the Lena river valley and has had recoveries in Australia (Pook 1992).

2 July. We visited an excellent meadow covered island 50 km south of Yakutsk. It was tree lined on the outside and on these Wood Sandpipers nested judging by their behaviour. In the interior meadows we found displaying and nesting Pintail Snipe *Gallinago stenura*, Common Snipe *G. gallinago*, Green Sandpiper, Wood Sandpiper and Terek Sandpiper *Tringa terek*.

Pintail and Common Snipe are not difficult to separate when they are displaying as their "songs" are completely different. It was very interesting to see Pintail Snipe and Wood Sandpiper displaying from the top of the same tree. Most of the waders on this island had chicks and were very distressed when we approached where the chicks were hiding. We were continually serenaded by Terek Sandpipers calling their chicks.

Cherskiy - Kolyma Delta 2-8 July

2 July. We flew to Cherskiy 68° 65'N, 161° 63'E, the port city for the Kolyma Delta. The city of 8000 is situated on the east side of the Kolyma River (Fig 1, site 8) in hilly forest tundra. The east side of the river is dominated by forest tundra and montane tundra. There are steep slopes up to mountains of 500 metres or more. Near the river a small belt of forest tundra is located dominated by Pine *Pinus pumilla* and Larch *Larix sibirica* with a dense and rich herb-shrub layer of Labrador Tea, Black Crowbery *Empetrum nigrum*, Mossberry *Vaccinium vitis-idaea* and Arctic Bearberry *Arctostaphylos arctica*

Above the tree line the dry alpine or montane tundra begins. Among the dominant plants in this area are low growing Willow *Salix reticulata*, Club-moss *Lycapodium spp*, Poppy *Papaver spp*. Above this the tundra changes into a rock boulder zone with sparse vegetation, Great Knot *Calidris tenuirostris* were found nesting in this zone.

The tundra on the west side of the river is flat, wet and unpenetratable as are many parts of the Kolyma Delta. The area from Cherskiy to the east Siberian Sea at Mys Medyezhiy 69° 40' 30"N, 162° 21'E has many island, some of which can be landed on with difficulty. The water is generally shallow, and the mud very soft.

The ground is generally polygonal tundra with shrub willows and widespread Alder *Alnaster fruticosys* thickets, dense sedge meadows, small ponds, lakes, grassy swamps and moist area of sedge-moss tussocks. The drier hilly tundra at the coast is covered with Cinquefoil *Potentialla emarginata*, Lapland Looseworth *Pedicularis lapponica* Saxifrage *Saxifraga spp*. Whitlow-grass *Draba hirta*, Mountain Avens *Dryas punctata*, etc. In some areas above the sea it was so windswept there was almost no vegetation.

3 July. We sailed 50km north of Cherskiy and anchored below Kamen Egorevitch. We did not see any waders as we had to travel in the middle of the mostly very shallow river. We did see numerous Ross' Gulls *Rhodostethia rosea* which are common (Up to 50,000) nesting birds from the Kolyma westwards (Degtyaryev 1991).

4 July. We sailed to the mouth of the Kolyma river at Mys (Cape) Medyezhiy. Pack ice on the east Siberian Sea was still blocking the river mouth (Fig 1, site 10) so we stayed only six hours as our boat captain wisely decided we would be cut off by ice floes coming in with the tide. This was a great pity as there was a good looking mudflat, and marsh between the Cape and the Chukchi Peninsula a few kilometres to the east.

5 July. We sailed southwards towards Cherkiy and landed at an island called Mikholkino. It is 95% waterlogged with many small ponds, and in the interior some of the high ground has willows one metre high, alders, etc. The high ground appeared to be the main wader nesting area (Table 1).

6 July We landed at the southern end of the Mikholkino-Mikhaylovskly island complex. The area was formerly a barge transhipment port. The island was also water logged and a good area for nesting waders (Fig. 1, site 12).

7 July. We anchored again below Kamen Egoryevitch and headed up the mountain through the riverside taiga. In the open tundra just above the taiga we found Pacific Golden Plover *Pluvialis fulva* and Whimbrel *Numenius phaeopus*. In a clearing in the taiga we put up a Jack Snipe *Gallinago minima*, it surprised us, but they are known to nest in this area.

We walked up hill through the open taiga for 3 km and reached dry north-facing tundra with rocky outcrops. This area of tundra provided the highlight of our Kilyma Delta Trip because at the 350 metre level on a grassy plateau with rock outcrops we found nesting Great Knot (Fig 1, site 14).

We observed and photographed their song flights, "butterfly" flights and ground distraction tactics designed to lead us away from their nests, or more likely their chicks.

The Great Knots song is a mellow whistle, and it is a great pity we did not have tape recorders to capture it.

The Great Knot were found nesting on the sheltered north west side of the mountain where there was plenty of water in the hollows and some patches of snow. One bird, which by its behaviour appeared to be a male, was continually flying around in circles, doing "butterfly" display flights, perching on prominent rocks, alarm calling, and generally trying to make himself as visible as possible. The other bird which we took to be the female was skulking around the ground, and trying to stick to an area in the centre of the plateau. We presumed the nest, or chicks were somewhere nearby.

We spent 90 minutes on the plateau, but we could profitably have spent a lot more time carefully observing these birds. Both Great Knots were photographed and many habitat photos taken.

8 July. We sailed towards Cherskiy and attempted to get into the marshes by the river but this proved impossible, the mud was too soft and the bush too thick.

Chukochiy (Chukoch'ya) river camp 9-14 July

9 July. At 1100 we left Cherskiy by helicopter for the 150km flight over the tundra northwest to the Chukochiy river camp (70° 3'N, 159° 50'E). We made two stops along the way. At one Jukaguy camp we found at least five pairs of nesting Ross' Gulls. There were Red-necked Phalaropes *Phalropus lobatus* nesting within metres of one gulls nest. At another stop a pair of Siberian Cranes *Grus leucogeranus* flew over from their nesting area and circled around us a few times. The weather was clear all the way so we had excellent views of the tundra.

We landed at the camp at 1515. It is a collection of thirteen shacks and reindeer skin tents on a two metre high ridge above the river, and 10 km inland from the East Siberian Sea. The camp is used by its Jukagyr owners for fishing, trapping Arctic Fox *Alopex lagopus* and hunting wild Reindeer *Rangifer tarandus*. It is located in the 1.3 million hectare state reserve Chaigupgina Cordon Big Chukochia. The reserve manager Stanislav Ivanovich Mochalov was our local leader.

The first impressions of the area around the camp was of a vast tundra with a hilly coastal area and flat plains filled with polygonal ponds and plant communities where the barren ground exceeds the vegetated area. Examination from the ground showed that there were no barren areas. This typical polygonal tundra is covered mainly by dwarf shrub-sedgemoss communities and low growing shrubby willows and birches, lichen and dryas heaths are situated on the drier parts of hills and slopes.

The wettest habitats besides the open water of the polygonal ponds, or shallow tundra lakes on the arctic coastal plain are the pools with overgrown margins of Sedges *Carex spp*, Mare's Tail *Hippuris lanceolata*, Knotweed *Polygonum ellipticum*, Marsh-Marigold *Caltha arctica*, Cotton Grass *Eriophorum variegatum*, *E. angustifolium* and Pallas' buttercup *Ranunculus pallassii*. On the small moist ridges between ponds grow Shrub Willows, *Salix puichra*, *S. polaris*, *S. arctica*, and Birches *Betula exilis*, *B. fruticosa*, *B. middendorfii and B. platyphylla*. The ridges above water level are the main bird nesting sites.

We found Little Stint *Calidris minuta*, Temminck's Stint *Calidris temminckii*, Ruff *Philomachus pugnax* and Red-necked Phalarope nesting within 2km of our base camp. Spotted Redshank *Tringa erythropus* and Grey Phalarope *Phalaropus fulicarius* flew by, but were not nesting.

10 July. We crossed the river by boat and walked on the flat tundra for a few kilometres. The water levels in the ponds and on the tundra was below normal (S.I. Mochalov Pers. comm.) due to poor snow cover in winter 91-92. This allowed arctic foxes to reach all potential nest sites, which are usually on small mounds surrounded by water. In addition we saw virtually no Lemmings *lemmus spp*. when there should have been thousands as there were in 1991.

Because of strong cold winds on this field trip most of the local waders were in hiding, but we did locate Little Stints, Temminck's Stints, Pectoral Sandpiper *Calidris melanotos*, Dunlin *Calidris alpina*, Long-billed Dowitcher *Limnodromus scolopaceus*, Red-necked and Grey Phalaropes.

11 July. We did a 25 km round trip over the 100 metre high hills to a still half ice covered lake called Ozero Bolshoye Morskoye. On the hill tops we saw or heard Grey Plover *Pluvialis squatarola* and Pacific Golden Plover while lower down we found Little and Temminck's Stints, Pectoral Sandpipers, Dunlin, Ruff, Red-necked and Grey Phalaropes. However there were very few birds for the amount of ground covered.

12 July. We took a boat trip north to the east Siberian Sea. The low ground on the west side of the river mouth looked an ideal place to find nesting Ringed Plover *Charadrius hiaticula*, Ruddy Turnstone *Arenaria interpres*, Red Knot *Calidris canutus* and Sanderling *Calidris alba* on the beach ridges, but we did not have time to search. Just as we reached the best spots the reserve manager had us turn back for he correctly predicted fog was coming in fast from the sea. It is remarkable how fast fog obscures everything in the Kolyma Delta.

In the afternoon we searched for waders around our base camp.

13 July. Dense fog prevented a boat trip to the high ground above the sea on the east side of the river. We spent the day around the camp carefully searching for waders, but trying not to disturb known nesting birds as the windchill factor was below zero.

14 July. We had planned to take a helicopter trip back to Cherskiy this day, but had out doubts it would happen as the fog was very dense and close to the ground. Eventually the fog lifted and we flew in excellent light conditions along the shore of the East Siberian Sea and up the Kolyma River to Cherskiy.

Results

The wader results are found in table 1.

Discussion

Trips in such a narrow time frame and covering but a small fraction of the vast Sakha land mass (3.1 million km^2) allow observers only brief impressions of the Republic's wader potential. The timing of our trip was two weeks late for the most satisfactory results as many waders had finished their displays. However the timing did offer the chance of warmer weather, but a major disadvantage was the massive numbers of mosquitoes especially in wooded areas.

For the Australian wader specialist Sakha provides wonderful opportunities to observe waders on their nesting grounds. Many Russian ornithologists regard the Kolyma-Indigirka tundra as the most unspoilt in their federation. Sakha (formerly Yakutia) waders have been studied for many years

(Labutin & Germogenov 1990, Vorobiev 1963) and banding recoveries from the area have been made in Australia (Pook 1992). Our guide in Yakutsk Dr. Valdimir Pozdniakov stated he considered the Lena River as the "normal" western limit for birds which migrate southeast towards North America, or down the Pacific Coast.

Most of the 42 breeding species of waders in Sakha also occur in Australia and North America, though some only as very rare vagrants. The exact localities of where the many wader populations go in the non-breeding season are not known at present. Large scale colour banding, leg-flagging and colour dying in future could produce enlightening results.

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Pook, J. 1992. Banding round-up, complete list. Stilt 20, 51-76.

Vorobiev K.A. 1963 [Birds of Yakutia] Moscow (in Russian)

Table 1. Species, dates, numbers and map locations

Locality	Yakutsk area: Lena river									Chersky Area: Kolyma Delta									Chukoch'ya River Camp								
Month-1992	June				July																						
Date	29	29	30	30	1	1	2	15	N	2	4	5	6	6	7	8	15	N	9	10	11	12	13	14	15	N
Time	0700-1600	1630-2345	0345-0845	1145-1430	0430-0915	1200-1500	0300-0630	1300-1500		0700-2245	1330-1930	0800-1600	0800-1300	1900-2030	0915-1545	0900-1100			0315-2300	0500-1900	0300-2200	1000-1400	0600-2100	0600-1530	0930-1150	
Temperature-C	18 to 20	20	17 to 20	20	10 to 15	20	10			17	9 to 14	14 to 16	12	20	17 to 26	25			7 to 11	5 to 6	4 to 11	9	3 to 4	3		
Fig. 1-Map location	1	2	3	4	5	6	7	1		8	9 to 10	11	12	13	14	13 to 8	8		8 to 15	15	15	15 to 16	15	15 to 8	8 to 1	
Ringed Plover											1							N								
Pacific Golden Plover												1			2			N			2					N
Grey Plover																					1					N
Northern Lapwing	2					8			N																	
Great Knot															2			N								
Little Stint											2								1	4	1	2				N
Temminck's Stint	1											1	15				1	N	7	25	20	20	10	2		N
Pectoral Sandpiper												6	1					N		6	4	1				
Sharp-tailed Sandpiper												4						N								
Dunlin																				25	1					N
Broad-billed Sandpiper												2						?								
Ruff												16	5					N	1	2	2					N
Jack Snipe															1			?								
Common Snipe	1						5		N	2			4					N								
Pintail Snipe							20		N																	
Long-billed Dowitcher										1		7	2					N		1		2				N
Whimbrel													1	1	1			N								
Spotted Redshank																			1	1	1	1				
Greenshank						7																				
Green Sandpiper					1	4	10		N																	
Wood Sandpiper						12	50	2	N			1	1	1		1		N								
Terek Sandpiper	2	1				7	2		N																	
Common Sandpiper	2	1	1	2	2	4			N																	
Red-necked Phalarope											2	20	30					N	20	40	30	25	5			N
Grey Phalarope											4							N	1	1	2	12				

WSG REPRINTS

ATTACHMENT OF RADIO-TRANSMITTERS TO SANDPIPERS: Review and Methods

Nils Warnock & Sarah Warnock

Radio transmitters were attached to 33 Dunlin *Calidris alpina* and 63 Western Sandpiper *Calidris mauri* over a period of three years. Methods for attachment are described, and other studies of radio transmitter use with shorebirds are presented in a brief bibliography.

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Introduction

Remote sensing techniques such as radiotelemetry have been utilized in the study of animal movements for the past three decades (Kenward 1987), yet these techniques have only recently become widely used in studies of shorebirds. Over the past several years a reduction in the dimensions of radio transmitters and improved attachment techniques (Sykes *et al.* 1990; Williams 1990; Rappole & Tipton 1991) have made the use of this technology practicable for the collection of data on even the smallest shorebirds. In this paper we present a brief bibliography of studies in which radio transmitters (hereafter referred to as radios) were placed on shorebirds. Next we describe a method of radio attachment we have used successfully on two species of calidrine sandpipers, the Dunlin *Calidris alpina* and Western Sandpiper *Calidris maurii*.

The first shorebird studies to utilize radiotelemetry techniques for data collection were published in the 1980s. In 1981 Dugan published accounts of nocturnal foraging by two Grey plovers *Pluvialis squatarola* fitted with radios. In 1986 Redmond and Jenni published results of their investigation of chick movements and mortality in radio-tagged Long-billed Curlew *Numenius americanus*, and Wood published results of a study of diurnal and nocturnal territoriality by radio-tagged Grey Plover. Other studies have since followed (Table 1). As the size of radios decreased it became feasible to place radios on small shorebird species and chicks. Iverson *et al.* (1991) used radio telemetry to trace the spring migration of 31 Western Sandpiper. Yalden (1991) tracked the movements of four Golden Plover chicks *Pluvialis apricaria* with 1g radios.

Over the past three years we placed radios on 33 Dunlin and 63 Western Sandpiper caught on their wintering grounds in California. The radios used (Holohil Systems Ltd., R.R. #2, Woodlawn, Ontario, Canada KOA 3M0) weighed from 1.1 - 1.4g, and were found to have a battery life of 28-37 days. We were able to receive radio signals at maximum distances of 2.5 km on flat ground and 9 km from a 30 m hill under optimal conditions. The radios were colored dark brown to blend with the back feathers of the bird, and the antenna was colored a flat black.

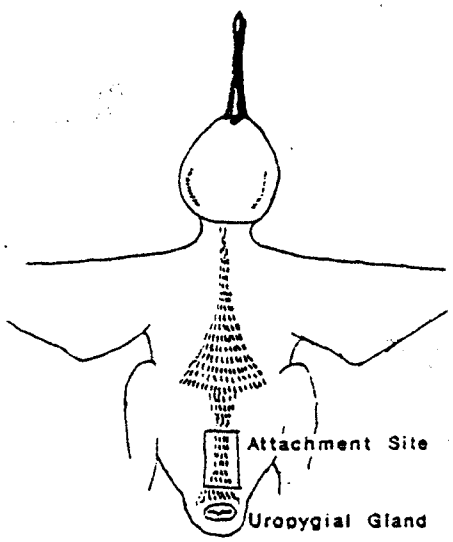

Figure 1. Dorsal view of Calidrid sandpiper showing attachment site for radio-transmitters.

Initially we glued radios to the feathers of the interscapular region of the bird using cyanoacrylate glue (Superglue ®) (following Raim 1978). However, we felt this placement interfered with the natural stroke of the birds' wings (as noted by Hill and Talent 1990). Also, retention time was short; in some cases radios fell off within days.

After experimenting with several techniques we derived an effective method for attaching the radios using an epoxy developed for use on seabirds (Tital Corporation, 5629 208th St. S.W., Lynnwood, Washington, USA 98036). The radio was glued to an area of clipped feathers on the lower back of the sandpipers. Movement of the wings was unrestricted and retention time was at least 7 weeks. The birds preened the radio in among the back feathers, and the antenna into the tail feathers. The radio was not visible to observers using spotting scopes. Radio-tagged birds were regularly observed roosting and foraging normally among flocks of untagged birds. Subsequent to the study at least two of the birds have been resighted behaving normally and without their radios.

To attach the radio, one person held the bird in the left hand, with the head between the second and third fingers, and the wings between the first and second finders and the third and fourth fingers, leaving the right hand free for clipping. Using penknife scissors, a 10mm length of the posterior element of the dorsal feather tract was clipped, about 5mm

Table 1. Published accounts of radiotelemetry studies of shorebirds (American Woodcock *Scolopax minor* excluded).

Species	N	Radio weight (g)	Method	Source
Grey Plover *Pluvialis squatarola*	2	3.5	harness	Dugan 1981
Long-billed Curlew *Numenius americanus*	39	?	?	Redmond & Jenni 1986
Grey Plover *Pluvialis squatarola*	15	?	harness	Wood 1986
Green Sandpiper *Tringa ochropus*	?	?	?	Smith 1987
Wilson's Phalarope *Phalaropus tricolor*	26	3.5	glue	Colwell & Oring 1988
Purple Sandpiper *Calidris maritima*	3	2.0	glue	Cresswell/Summers 1988
Snowy Plover *Charadrius alexandrinus*	18	2.0–2.6	glue	Hill & Talent 1990
Bristle-thighed Curlew *Numenius tahitiensis*	7	?	harness	Gill *et al.* 1991
Western Sandpiper *Calidris mauri*	31	0.9	glue	Iverson *et al.* 1991
Dunlin *Calidris alpina*	14	1.1	glue	Warnock 1991
Golden Plover *Charadrius apricaria*	4	1.0	glue	Yalden 1991

above the uropygial gland (Figure 1). Blowing gently under the feathers helped to locate the tract, and a few drops of water helped to keep surrounding feathers clear of the attachment site. While the feathers were being clipped, a second person mixed the epoxy for 1.5 minutes, and then spread a thin layer of epoxy on the clipped area, working the glue up around the feather stubs with a flat toothpick. A layer of epoxy was also spread on the radio, which had first been scored with sandpaper. The radio was then pressed into place over the clipped feathers and held firmly until the bond was set, about one minute.

After practice, we were able to attach a radio in four minutes. Because the entire process could be completed at the banding site, under the best circumstances a bird could be caught, radio-tagged, and released within 15 minutes.

Potential Problems

Infrequently (6% of Western Sandpiper, 9% of Dunlin) birds were not able to fly with the radio. This occurred especially with low-weight birds and birds kept too long in captivity (i.e. 3-4 hours). We found that radios could be removed from problems birds by carefully cutting the radio from the feather stubs with a sharp razor and applying a few drops of liquid band-aid (Nexiband®). Following removal of the radio these birds flew well.

Clipping of feathers at the site of radio attachment may create a thermal window at the attachment site through which heat could be rapidly conducted in hot weather or lost during cold weather creating extra physiological stress for radio-tagged birds. This did not appear to be a problem in California.

Birds appeared to acclimate to the radio after the first three days, but it was during this period that most predation events occurred. In 1991 and 1992, 29 Dunlin were radio-tagged, and six of the seven Dunlin known to have been predated were taken within three days of release. Of the 60 Western Sandpipers radio-tagged, five were predated within the first two days, and none during the remainder of the study.

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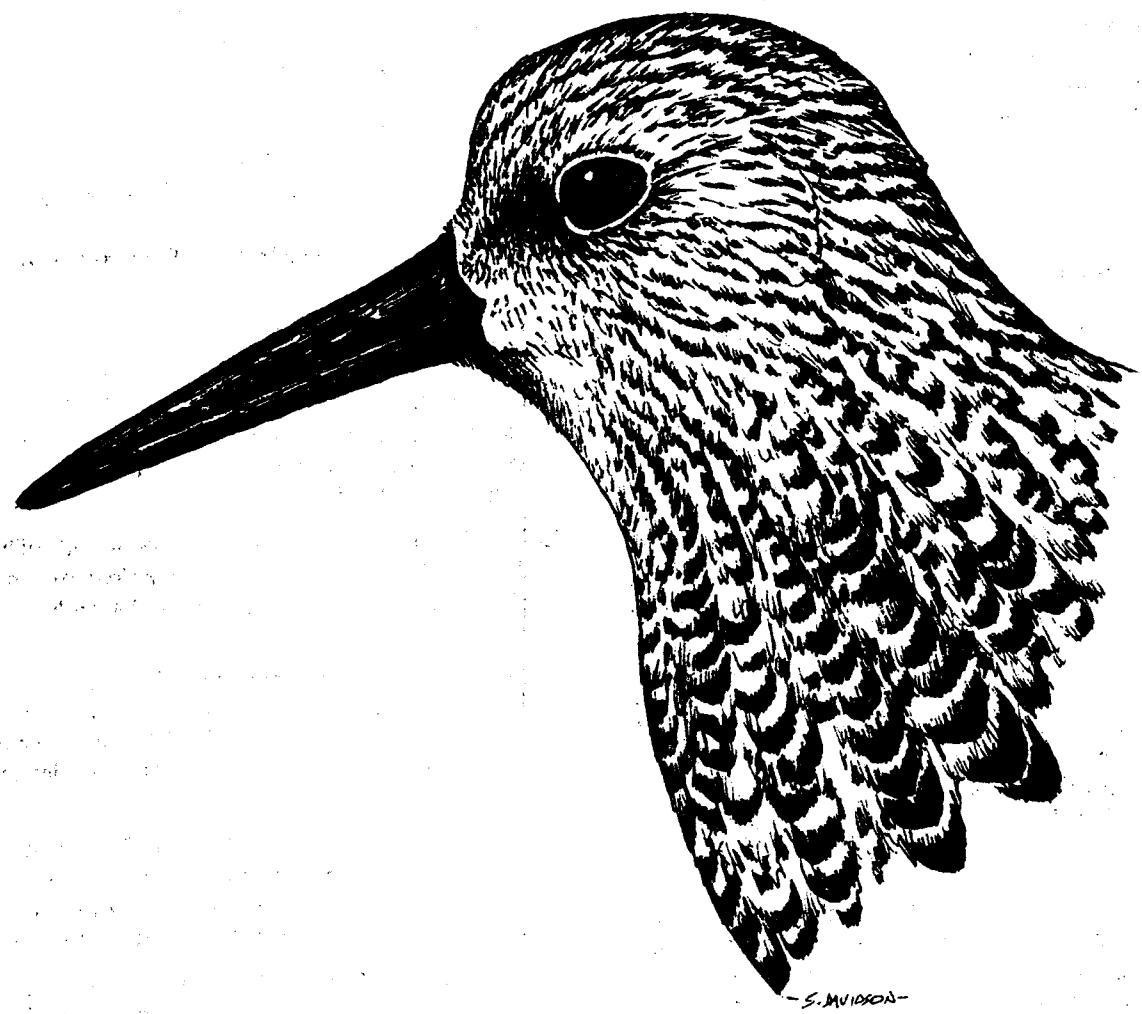

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