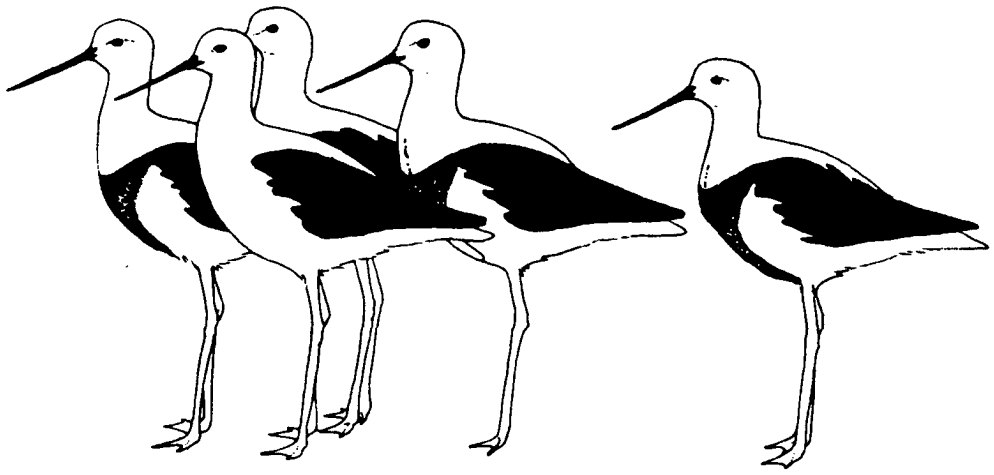
The Stilt



ISSN 0726-1888

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

Number 11 October 1987.

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.

SUBSCRIPTIONS FOR 1988:

AUSTRALASIA	AUS $15
OVERSEAS	AUS $20
LIBRARIES	AUS $25

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

SUBSCRIPTIONS FOR 1988.

The AWSG Committee has decided that 1988 subscriptions should be raised by $5. The new rates will be:

Australasia	-	Aus $15.00
Overseas	-	Aus $20.00
Libraries	-	Aus $25.00

During the last two years our expenditure has risen substantially, mainly because of higher Stilt production costs. Whilst I am sure that members welcome the marked improvement in the quantity and quality of material in Stilt, the consequent result is that 80% of the current subscription income goes towards its production and distribution. That leaves insufficient residue to cover administrative expenses and support worthwhile causes, such as the attendance of Doug Watkins (an AWSG member) at the Asian Wetlands Conference earlier this year. You will find his report elsewhere in this issue.

Income from the new subscriptions will enable the group to run at a modest surplus and the Committee's intention is to retain the new rates for at least three years and hopefully longer.

A statement of the Group's income and expenditure is published annually. The 1987 Statement will be in the April 1988 Stilt.

Brenda Murlis.

AWSG RESEARCH FUND.

The Group's Research Fund is used to pay the running costs of the Regular Count and Population Monitoring Projects. Richard Alcorn gave his annual report on the former project in the last Stilt and Marilyn Hewtsh provides accounts of the Winter 1986 and Summer 1987 counts in this issue.

Expenditure in 1987 on these projects will be about $600.00 and comprises mainly postage, telephone, printing and computing costs.

In 1988 we will have additional costs associated with the recently commenced Conservation Project.

To date, donations to the Research Fund (which are tax deductible for Australian residents) have just kept pace with expenditure and we have not been forced to use subscription income to subsidise our Scientific Programme.

We appeal to all members to directly support our Projects by making a donation when returning their 1988 membership subscriptions. All donors will receive an RAOU receipt for taxation purposes.

Brenda Murlis.

ELECTION OF OFFICE BEARERS.

The term of Office of the present Committee expires on 31st May, 1988.

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 31st in the year of an election. The new committee shall take office on 1st June 1988 and shall have a term of two years.

The positions and names of office bearers are listed below:

Chairperson -	Mark Barter
Research Co-ordinator -	Brett Lane
Administrative Secretary -	Brenda Murlis
Editor -	Eric Woehler
Treasurer -	David Henderson
Liaison Officer -	Peter Howard
(Co-opted to replace Jon Starks)	
Committee Members -	Clive Minton
	Jeff Campbell (Co-opted)
	Mick Murlis (Co-opted)

All committee members, elected and co-opted, are willing to stand for another term. Should an election be necessary, ballot papers will be included with the April 1988 edition of the Stilt.

CONSERVATION ACTIVITY.

The ultimate objective of the AWSG's activities is to conserve waders and their habitats. Now that the scientific programmes - Population Monitoring and Regular Counts - are running smoothly, the Committee has decided that the Group should take a more active role in conservation.

We have been fortunate in obtaining the assistance of Jeff Campbell who has joined the Committee with special responsibilities for conservation matters.

Elsewhere Jeff introduces himself and asks for your help. Our success in this important job will depend greatly on the co-operation that he received from our members.

Mark Barter.

NORTHWARD MIGRATION 1988.

Serious consideration is being given to conducting a study of the northward migration of selected species through Australia and south-east Asia during March-May 1988.

Whilst we have had a number of band returns from the Asian coast-line, ranging from Vietnam to the Shanghai region, there is no direct information available on what intermediate staging sites are used by waders when migrating between southern Australia/New Zealand and continental Asia.

The opportunity for sighting marked birds appears to be reasonable, as the coverage of potential staging posts in south-east Asia is improving steadily with a large number of important sites now being watched regularly, particularly in The Philippines, Taiwan, Malaysia, Hong Kong and the Shanghai area. Additionally, the Asian Wetland Bureau (Interwader) is mounting a major six month expedition to study the extensive intertidal mud-flats on the south coast of Irian Jaya (situated north of the Gulf of Carpentaria) during the forthcoming non-breeding and northward migration seasons. This region is on the great circle route between south-eastern Australia and the breeding grounds and would seem to be a potentially good staging site.

Within northern Australia there will be a major expedition to the north-west in late March/early April and there is the possibility of a smaller expedition to the western side of the Gulf of Carpentaria at the same time. There are also observers on the east coast of the Gulf and within the Gulf country itself.

Our initial thoughts are to mark Red-necked Stints, Curlew Sandpipers and Sharp-tailed Sandpipers in southern Australia, and possibly Red Knot in New Zealand, with coloured leg flags. This method has been used successfully for similar studies in the South-North American Flyway.

We plan to make direct contact with those observers who are best placed to see marked birds. However, we would be pleased to hear from anyone who feels that marked birds may pass through their area and who is willing to keep a frequent watch during the migration period.

Mark Barter.

A NOTE FROM THE AWSG CONSERVATION OFFICER.

As Mark Barter has reported I have recently been appointed to the new position of AWSG Conservation Officer.

Plans are at present being formulated for a survey of the status of wader habitat in Australia but meanwhile I would be pleased to support you with any matters regarding the protection of wader habitat currently under threat in your area or of concern to you. If I may be of assistance to you please contact me at the address below or through your Regional Representative.

Jeff Campbell,
AWSG Conservation Officer
8/5 Wattle Avenue,
GLENHUNTLY, Victoria, 3163.

HOODED PLOVER COLOUR BANDING PROJECT, SOUTH AUSTRALIA.

Immature runners have been banded between October and January in the Coorong National Park and along the south-east coast north of Robe, South Australia.

The colours used are orange, white, blue, green, red, black and yellow. Only one colour banded bird has been recorded back in the area:

White on blue (051-18563) banded 19 Dec 1985 55 km north of Ti-Tree Crossing recorded 13 Nov 1986 74 km north of Ti-Tree Crossing.

The program has been running since January 1985, as yet there have been no conclusions as to the birds life cycle as a result of the program. Reports of any sightings should be forwarded to:

David Farlam, Ranger, Salt Creek, Coorong National Park, South Australia.

XX INTERNATIONAL ORNITHOLOGICAL CONGRESS 1990:

Preliminary Notice No.1

The XX International Ornithological Congress will take place in Christchurch, New Zealand, from 2-9 December 1990. Professor Charles G. Sibley (USA) is President and Dr. Ben D. Bell (NZ) is Secretary-General. The anticipated Congress programme will include plenary lectures, symposia, contributed papers (spoken and posters), workshops, discussion groups and films. There will be a mid-Congress excursion day. Pre- and post-Congress excursions are planned to interesting ornithological sites in New Zealand and adjacent regions. Requests for the First Circular and suggestions regarding Congress organisation should be addressed to:

Dr. Ben D. Bell,
Secretary-General,
XX International Ornithological Congress,
Department of Zoology,
Victoria University of Wellington,
Private Bag, Wellington,
NEW ZEALAND.

REPORT ON THE COORONG WADER SURVEY, FEBRUARY 1987.

Twenty observers from Victoria and nine from South Australia participated in a survey of waders (shorebirds) in the Coorong from 6 to 8 February 1987. Using a light aircraft (6 February), 10 motor vehicles and three power boats, observers surveyed the entire Coorong wetland from Ti-Tree Crossing to the Goolwa Barrage.

In early February 1987, the Coorong wetland was approximately 115 km in length, being dry south of Ti-Tree Crossing. The North and South Lagoons were separated by mudflats south of Magrath Flat. Local residents considered water-levels in the Coorong to be higher than average at this time.

Observers surveyed approximately 96 per cent of the inland (north and east) side of the Coorong, and 83 percent of the sea side (south and west: access by boat only). Conditions varied from hot and calm with clear skies, to cool and breezy with overcast skies during the Survey.

The total number of birds counted was 130 500 of 23 species (Table 1). The most abundant species were the Red-necked Stint, Curlew Sandpiper and Sharp-tailed Sandpiper (which together comprised 79 per cent of the total number of identified waders) and Banded Stilt. Other species for which totals were appreciable (compared with national count data from any one wetland) were the Masked Lapwing (765), Banded Lapwing (130), Red-necked Avocet (3589), Greenshank (596) and Sanderling (308). Rare species recorded in the Survey were the Cox's Sandpiper (1) and Red-necked Phalarope (3).

The distribution of waders in the Coorong was as follows: 48 600 in the hypersaline South Lagoon (15 species), 45 100 in the less saline North Lagoon to just south of Pelican Point (18 species), and 36 800 in the channels (near the barrages) from Pelican Point to the Murray Mouth (15 species). The largest concentration of waders was 55 100 birds in the area of broad shallows extending for six kilometres at the south end of the North Lagoon and six kilometres at the north end of the South Lagoon.

A comparison of results from this survey with data from previous surveys of this and other wetlands will appear in the final report, which is currently being prepared and should be published before the end of 1987.

Thanks are due to the following people for their assistance in the 1987 Coorong Survey: all participants, especially those who travelled long distances and those who provided vehicles for surveys; rangers at the Coorong National Park (Darryl Wancke, David Farlam, Herman Bakker) for use of a boat, participation and information; the managers of Gemini Downs (accommodation); Jenny Harvey (access to barrages); Peter Turner (Meningie Airstrip); Ian Philips (Air Goolwa); Glen Jaensch and John Merry (use of their boats); Don Jeans (piloting the aerial survey); David Paton and Julian Reid (advice); Mark Barter (organisation - Vic); Jamie Matthews (organisation - SA); Stephen Davies (RAOU Director); and the SA Dept of Environment and Planning for providing funds for the Survey.

TABLE 1

COORONG WADER SURVEY

'Ground' Surveys - 7,8 February 1987

SPECIES	TOTALS
Pied Oystercatcher	84
Sooty Oystercatcher	3
Masked Lapwing	765
Banded Lapwing	130
Lesser Golden Plover	144
Hooded Plover	12
Double-banded Plover	1
Red-capped Plover	2533
Black-winged Stilt	291
Banded Stilt	18692
Red-necked Avocet	3589
Eastern Curlew	8
Common Sandpiper	1
Greenshank	596
Marsh Sandpiper	30
Black-tailed Godwit	105
Bar-tailed Godwit	3
Sharp-tailed Sandpiper	22898
Red-necked Stint	54710
Curlew Sandpiper	22512
Cox's Sandpiper	1
Sanderling	308
Red-necked Phalarope	3
TOTAL IDENTIFIED	127419
Unidentified small wader	3064

Roger Jaensch.

NORTHERN AUSTRALIAN EXPEDITIONS, 1986.

In 1986, the Royal Australasian Ornithologists Union organised a series of expeditions to northern Australia to study the migration and distribution of waders. These were very successful and the results have provided new information on how waders migrate into and out of Australia and on the distribution of waders in the north.

The study of wader migration in the Broome-Port Hedland area of Western Australia was advanced considerably with the more intensive use of the Bureau of Meteorology radar during the two expeditions there: 11-26 April and 15 August-14 September 1986 (see abstracts of RAOU Congress wader papers presented in Stilt 10, p.3. Table 1 gives the results of aerial surveys showing that over 165,000 waders arrived in the area during the four weeks of the expedition in August and September.

The expedition to the south-eastern part of the Gulf of Carpentaria from 14 to 27 September 1986 has provided valuable new information on the location of important roosts and feeding grounds (see Figure 1) and on the southward migration into that area. Consistent with previous findings, the most abundant species in this area were Great Knots, Black-tailed Godwits, Red Knots and Red-necked Stints.

The north-central Arnhem Land coast of the Northern Territory (between Maningrida and Buckingham Bay) was the last remaining large concentration of waders that had not been surveyed in detail by the end of the RAOU wader studies programme. The expedition there from 13-24 October 1986, as well as being a fascinating cultural experience, enabled detailed counts to be made of each species in about half of this remote and inaccessible coastline. Table 2 shows that the most abundant species were Great Knot, Black-tailed Godwit, Bar-tailed Godwit and Red-necked Stint. Compared to the Gulf of Carpentaria, Arnhem Land holds many more Ruddy Turnstone, Grey-tailed Tattler and Terek Sandpipers. As well, it holds one of the most important concentrations of Pied Oystercatchers in Australia (more than 400, ground and aerial counts combined). With thorough aerial surveys nearly 45,000 waders were counted (see Table 3) and the locations of important feeding and roosting areas were mapped.

The expedition series, funded by World Wildlife Fund and Earthwatch, has considerably expanded the understanding of how waders migrate into and out of Australia and provided information on the location of important roosts and feeding grounds. This information is of great value for wildlife management in these places and details are being sent to the Queensland, Northern Territory and Western Australian governments.

Brett Lane.

SPECIMENS NEEDED : A REQUEST FOR HELP.

I need to obtain specimens of breeding, migratory and wintering Australasian shorebirds for a study on comparative anatomy and development of the voice apparatus. If you come across dead birds or have casualties from netting, and are willing to help, please contact me:-

Dr. Ted Miller, B.C. Provincial Museum,
Victoria, British Columbia, CANADA V8V 1X4.

DOUBLE-BANDED PLOVER RESULTS.

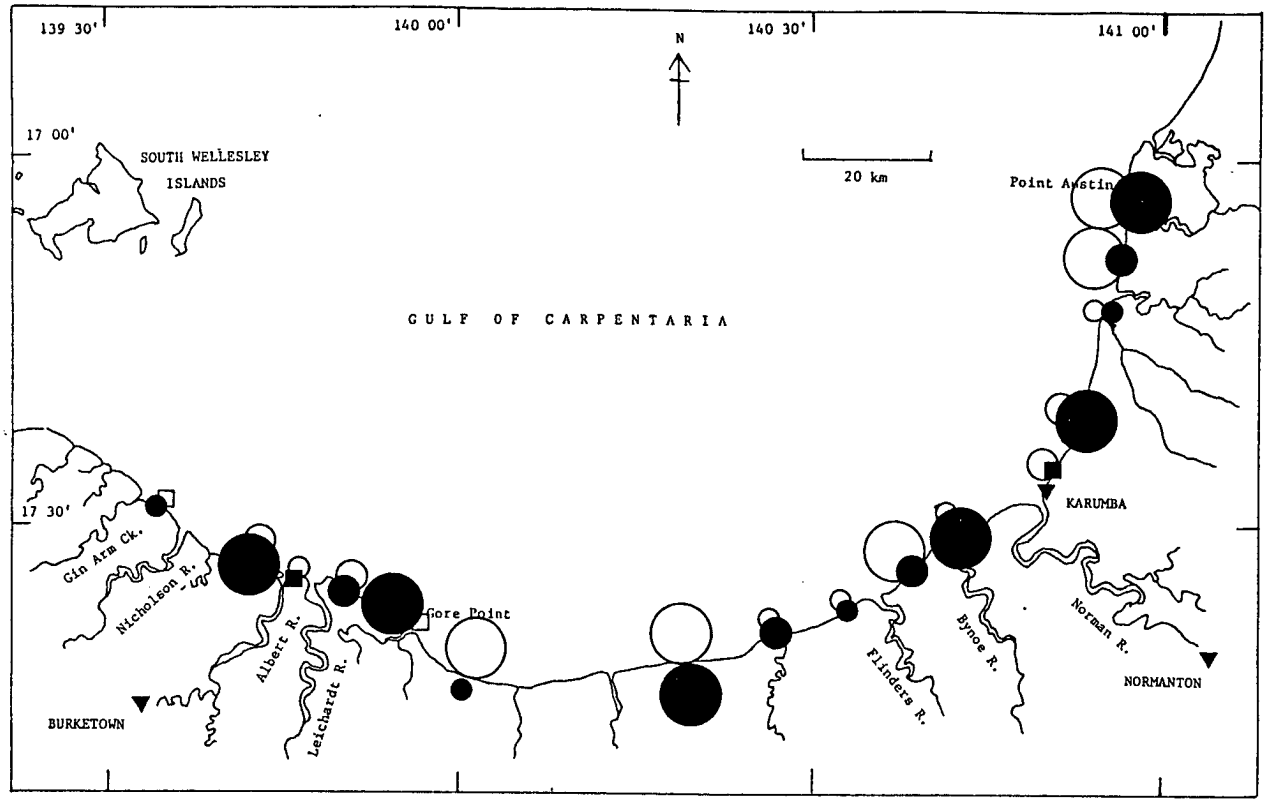
The response to the request for "one-last-effort" to look for New Zealand colour banded Double-banded Plovers in Australia this winter has been fantastic. As I write this (18 July) the total is 90, well exceeding the previous best figure of 54 last winter and almost up to the phenomenal 102 Australian colour banded birds which were sighted or caught in New Zealand last summer.

Perhaps the most exciting report was one seen by Phil Webster at Boonooroo (on the mainland opposite Fraser Island) - our first from Queensland. In spite of its more northerly location it had still come from the same breeding area as all the other birds sighted in Australia - the high central regions of the South Island of New Zealand.

Joy Regler, and others, have put in an enormous effort in New South Wales visiting almost every possible Double-banded Plover wintering site within reach of Sydney. They have been rewarded with 7 different New Zealand birds, some of them valuable multiple sightings, and more than doubling the previous total for the state (4).

In Victoria, Bob Swindley has again made a major contribution, finding 18 birds including 10 in the 'lakes' area of southern Victoria (west of Geelong) where a considerable amount of walking and searching is required to find the scattered flocks. Mark Barter has also thoroughly covered some of the flocks nearer Melbourne, finding 15 New Zealand colour banded birds. Pleasingly, many of the birds found this winter were also present at the same locations last winter.

Pride of place for effort and success must go to Kiwi Ray Pierce - the organiser of the New Zealand end of the co-operative study - who took time off from looking for colour bands in the flocks wintering in New Zealand to have a 'holiday' in Tasmania. He spent 3½ weeks in June walking the coasts, often in conjunction with local ornithologists, and found 3,000 Double-banded Plovers. He was able to examine the legs of 2,100 birds and identified 30 with New Zealand colour bands! He also found a Victorian Wader Study Group



MAP SHOWING THE LOCATION OF IMPORTANT CONCENTRATIONS OF WADERS IN THE SOUTH-EASTERN PART OF THE GULF OF CARPENTARIA (CLOSED CIRCLES ARE ROOSTING SITES, OPEN CIRCLES ARE FEEDING AREAS).

TABLE 1. AERIAL SURVEYS OF WADERS BETWEEN BROOME AND PORT HEDLAND: AUGUST - SEPTEMBER, 1986

DATE	BROOME TO CAPE MISSIESSY	CAPE MISSIESSY TO WALLAL DOWNS	WALLAL DOWNS TO PORT HEDLAND
18/8	30,818*	31,792*	-
23/8	35,000	47,819	-
27/8	-	68,872	34,911*
29/8	37,123	53,451	19,809
3/9	64,762	110,992	-
6/9	73,436*	114,423	-
10/9	-	150,423*	39,460*
LATEST COUNT / EARLIEST COUNT	2.4	4.7	1.1

* An estimated 165,798 birds arrived during the period based on the difference between first and last count for each coastal sector.

TABLE 2. WADER COUNT RESULTS FOR NORTH COAST OF ARNHEM LAND, NORTHERN TERRITORY: OCTOBER, 1986.

SPECIES	BOUCAUT BAY 14-17/10	OPP. MILLINGIMBI 21/10	ELCHO ISLAND 19/10
Beach Thick-knee	3		
Pied Oystercatcher	311		4
Masked Lapwing	8		
Grey Plover	169	127	126
Lesser Golden Plover	44		
Mongolian Plover			1
Large Sand Plover	692	720	214
Oriental Plover	80		
Red-capped Plover	29		108
Ruddy Turnstone	57	6	40
Eastern Curlew	156	25	50
Whimbrel	24	21	3
Little Curlew	610	50	
Grey-tailed Tattler	70	108	91
Tattler sp.	1		
Common Sandpiper	3	1	7
Greenshank	124	48	46
Marsh Sandpiper	1	21	8
Terek Sandpiper	66	46	
Black-tailed Godwit	1,099	60	10
Bar-tailed Godwit	736	1,086	2,302
Red Knot	12		7
Great Knot	4,895	2,750	840
Sharp-tailed Sandpiper	2	10	
Red-necked Stint	722	760	1,500
Curlew Sandpiper	68	16	32
Sanderling	1		
Broad-billed Sandpiper	3		
Asian Dowitcher	15	1	
Redshank	1		
Unidentified Wader	500		
TOTAL	10,502	5,856	5,389

See text for exact locations

TABLE 3. RESULTS OF AERIAL SURVEYS OF THE ARNHEM LAND COAST, OCTOBER, 1986.

COASTLINE	DATE	
	18 OCT	23 OCT
Buckingham Bay	6,915	4,606*
Cadell Strait	11,141	9,902*
Nth Shore Elcho Island	1,968+	3,515
Castlereagh Bay (incl. Crocodile Islands)	7,823+	12,124
Boucaut Bay	5,956+	11,011
TOTAL	33,803	41,158

+ = count done on falling tide, mudflats exposed, therefore likely to be an underestimate.

* = incomplete coverage compared to 18 October.

Given the differences between the tidal conditions and coverage in surveys, the maximum counts for each area are likely to represent the best estimate of the number of waders in the region. The sum of these counts is: c. 44,700.

banded bird - from Inverloch - on the north coast of Tasmania.

With only a month to go before the birds will have departed for New Zealand, we will be hard pressed to reach the century. But we'll be out trying! Thanks to everyone for their efforts.

Clive Minton.

WADER BANDING EXPEDITION TO N.W. AUSTRALIA IN 1988.

As foreshadowed by Mark Barter, a major expedition to N.W. Australia will take place in 1988. Participants will assemble in Port Hedland on Saturday, 19 March and the expeditions will finish at the same location on Sunday, 10 April. This three week period spans Easter (1-4 April).

The objectives will be primarily oriented towards wader (& tern & pratincole) banding and a continuation of the radar studies. The majority of the time will be spent cannon netting at 80 Mile Beach and at Broome, but with some mist netting for Broad-billed Sandpipers and Asiatic Dowitchers at Port Hedland Saltworks for a few days at the beginning and end of the visit. Efforts will be concentrated on those species which can only be banded in significant numbers in northern Australia, i.e. everything except Red-necked Stints, Curlew Sandpipers and Sharp-tailed Sandpipers. Based on previous expeditions, it should be possible to band around 4,000 birds over the three week period.

The radar set in the Meteorology Station at Broome will be manned throughout the period in order to get a continuous record of the migratory departure pattern. This will mean leaving one person in Broome when the team is away at 80 Mile Beach. Furthermore, Brenda and Mick Murlis have offered to go up early and man the radar from 1 March in order to obtain information from the very start of the northward emigration. So we should get a continuous 6 week record of the migratory departure pattern.

It is intended to operate with a team of 18-22 people - preferably with the same individuals staying for the full three week period. Would anyone with experience in wader banding who is interested in participating please contact Clive Minton or Doug Watkins, the joint expedition leaders, as soon as possible (first come, first served!).

We want to get the strongest and most experienced team possible in order to achieve the maximum from the expedition. Three highly experienced wader banders from the U.K. have already indicated their willingness to participate, as well as a number of AWSG members who have been on previous N.W. Australia expeditions. The ANPWS Banding Office is also hoping to sponsor the attendance of 2 or 3 trainee wader banders from Asian countries.

Costs for participants will be the cost of getting to/from Port Hedland plus about $8-10 per day for food, etc. Other costs, principally transport during the expedition, will hopefully be covered by grants (from the Banding Office), donations and via the usual generous assistance of the Department of Conservation & Land Management, Western Australia.

Let's be hearing from you!

Clive Minton, 165 Dalgetty Road, Beaumaris, Vic. 3193.

Doug Watkins, 4 Bracedale Avenue, Duncraig, Perth, W.A.

REPORT ON VISIT TO N.W. AUSTRALIA 21 MARCH TO 5 APRIL 1987.

Participants:

John Dawson, Clive Minton, Brenda Murlis, Mick Murlis & Bob Swindley.

Objectives:

The principal objectives were -

(1) To study the northward departure of migrant waders by

(a) Counts (ground);
(b) estimates of age groups in population (by plumage criteria);
(c) radar (at Broome), together with visual searches at dusk.

These will be particularly valuable to complement the data gathered in 1986 from mid to late April. It will also be an interesting contrast to the 1985 data in view of the late arrivals of birds from the Arctic in August/September 1986.

(2) To carry out a recce for the proposed major wader banding expedition to N.W. Australia in March/April 1988.

(3) To carry out any further appropriate local liaison re the proposed Broome Wader Observatory and to tangibly demonstrate the RAOU's continued commitment to the project.

(4) To see specifically how the distribution, behaviour and departure date of the Little Curlew population may vary from that in 1985 in view of the much better wet season this year in the Broome/80 Mile Beach region.

(5) To obtain further photographs of the waders which visit Australia, especially at a time when they are beginning to assume breeding plumage prior to their northward departure to the breeding grounds.

Itinerary

Sat. 21 - Wed. 25 Mar. - Port Hedland Saltworks (5 days)
Fri. 27 - Sun. 29 Mar. - 80 Mile Beach/Anna Plains (3 days)
Mon. 30 Mar. - Sat. 4 Apr. - Broome (6 days)

Thursday, 26 March and Sunday, 5 April were largely spent travelling between locations.

Weather

The weather was clear, sunny and hot (maximum 33-39°C throughout the visit. Winds were light and variable, though there was usually a pleasant sea breeze during the day. There was no rain, though there were late afternoon thunderstorms visible to the inland of Port Hedland on three days. Night temperatures were ideal (20-25°C) except on a couple of nights at Broome when humidity was high.

Prior to the visit, the area had experienced a good wet in January and February - primarily associated with two cyclones. Broome had received 570mm of rain then, which exceeds its normal total annual rainfall of 530mm. However, no rain at all fell in March - the first time in at least 50 years.

Vegetation was greener and taller than usual throughout the area - metre high grass on the banks of the De Grey River and surrounding some of the remaining pools of water on Roebuck Plains (30 km inland of Broome). However, all pools on Anna

Plains station had already dried up (they only received 200mm rain from the cyclones).

Counts

The full details of ground counts made at Port Hedland saltworks, Port Hedland sewerage works, 15 km of 80 Mile Beach, Broome and Roebuck Plains (including Lake Eda) are given in Appendix 2. The main features of these counts were:

(a) Port Hedland Saltworks

The total count of 30,000 on 24 March was approximately half the maximum population level of 65,000 usually reached in late October/November - but was similar to the count of early April 1985. Only Oriental Plovers (5 compared with 15,000 in October/November) had departed almost completely. However, Don Rush (Maintenance Foreman at the Saltworks) reported that there had been big departures of Oriental Pratincoles during the previous ten days, and only 1,000 remained on 24 March.

The count of 6,000 Broad-billed Sandpipers was the highest ever seen at any location in Australia (and probably throughout the world). This concentration may have resulted from the excellent feeding conditions present in the intake areas and in the mudflats external to the perimeter bank (following flooding in recent very high tides).

Banded Stilt and Red-necked Avocet numbers were low. Good inland rains following cyclones in January and February had probably attracted birds to exploit feeding (and probably breeding) opportunities elsewhere.

The presence of 90 Asiatic Dowitchers indicated that few had departed, as the normal peak population is only 80 to 120. However, there appeared to be fewer males (only the male has the bright orange brown breeding plumage, a sex difference similar to the Bar-tailed Godwit) on the morning of 25 March and it is possible the first major departure took place the previous evening.

Most adult birds of all species were in 75-100 breeding plumage. The exceptions wered Grey Plover (0%) and Red-necked Stint (25-75%).

An unusual feeding behaviour of adult Curlew Sandpipers (first seen in April 1985) was again noted. Several hundred birds were present daily swimming in several metres of water in one of the 1km square salt lagoons (moderate salt concentration). Birds swam around actively, with tails cocked high, in the manner of Red-necked Phalaropes, Banded Stilts or Red-necked Avocets. They seemed to be picking insects or larvae from the surface of the water. Birds had no difficulty in rising from the surface of the water to move location. Feeding in this manner took place in relatively calm as well as breezy conditions. Whilst all waders can swim well, most normally do so over only short distances and only the three previously mentioned species regularly resort to feeding in this way in Australia.

(b) Port Hedland Sewerage Ponds

This small area had its usual good variety of waders - 2 Long-toed Stints and 3 Wood Sandpipers were normal, but the Swinhoe's Snipe was a bonus. The high tide roost of 80 Ruddy Turnstone (on the 23 March count) seemed to be still largely present when a brief return visit was made on 5 April - confirming 1985 data that Ruddy Turnstone do not depart before mid April.

The 15 Oriental Plover feeding (together with 50 Ruddy Turnstone) on the nearby Port Hedland racecourse on 25 March was a pleasant surprise considering their scarcity everywhere - one was an adult in full breeding plumage.

(c) 80 Mile Beach and Anna Plains

A count, at high tide, of the 15 km of beach south from Anna Plains produced the incredible total of almost 140,000 waders on 27 March. This is almost double the normal peak concentration in this area in November (5,000 per km).

Bar-tailed Godwits (70,000), Great Knot (25,000) and Red Knot (20,000) were the most numerous species. Red-necked Stints (1,500) and Curlew Sandpipers (5,000) were conspicuous by their relatively low numbers compared with the southward migration in late August/September. This tends to confirm previous data that this area is used much less by passage migrants (to southern Australia) of these two species on northward migration than on southward migration.

Low numbers of Large Sand Plovers (1,500) and Oriental Plovers (1) were, on the other hand, due to the relatively early departure of these two species on northward migration. In October/November tens of thousands of both species are present.

A concentration of 12,000 Oriental Pratincoles about 15 km south of Anna Plains was much higher than seen on the beach previously. They could well have been on passage (e.g. from Port Hedland Saltworks) and been driven to using the shoreline habitat because the usual shallow muddy pool areas on Anna Plains had all recently dried out.

The usual March/April coastal passage of terns was much in evidence, with 6,000 White-winged Black Terns concentrated in three or four big flocks on the shore at high tide.

In contrast to 1985, no Little Curlew were present on Anna Plains Station (and only 5 on the shore). Food (especially grass-hoppers/small locusts) still appeared to be plentiful and the grasslands were in excellent condition. It may be, however, that the drying up of the pools, around which the Little Curlew gathered in the heat of the day in late March 1985, had contributed to an earlier departure.

Bar-tailed Godwit numbers dropped markedly on 28 and 29 March, and the proportion of adult males (recognised by their full breeding plumage) dropped from an estimated 40% to around 10-20% of the flock composition - presumably due to departure on northward migration.

(d) Broome

The high tide roosts on the beaches on the north side of Roebuck Bay, between Crab Creek and Quarry Beach, were observed daily between 30 March and 4 April. Further huge flocks of waders could also be seen flying to roost behind the mangroves beyond Crab Creek (on the tidal areas at the seaward end of Roebuck Plains) but these could not be counted as this area was not accessible.

Some 56,000 waders were roosting on the beaches at the beginning of the period (30 March), with Bar-tailed Godwits and Great Knot being the dominant species - as at 80 Mile Beach. The pure white (plus pink bill and legs) Bar-tailed Godwit was still present - for the seventh consecutive year. Black-tailed Godwits (530) were more plentiful than usual, and 10 Asiatic Dowitchers was the highest number yet seen at Broome. A Redshank was also present - in full breeding plumage. Red-necked Stint (300) and Curlew Sandpiper (500) numbers were again very low - as at 80 Mile Beach - and Large Sand Plovers had almost all departed. In contrast, few Grey-tailed Tattlers, Terek Sandpiper and Ruddy Turnstone had left.

During the week, huge numbers of waders set off on northward migration (see Radar Observations) - mainly Bar-tailed Godwits and Great Knot - and by 4 April the total population had dropped to nearer 20,000. A parallel reduction in the proportion of adult male Bar-tailed Godwits occurred, as at 80 Mile Beach.

In all species except Bar-tailed Godwits, and possibly Grey-tailed Tattlers, almost the whole population seemed to be adult birds. This appears to support evidence from banding in south eastern Australia that the 1986 breeding season in the Arctic was a poor one for most wader species. For some reason, Bar-tailed Godwits, however, appear to have had an unusually good breeding season in 1986.

(e) Roebuck Plains and Lake Eda

A visit on 1 April revealed the legacy of the good rainfall in January/February - plenty of grass and other vegetation, hordes of grasshoppers/locusts, several pools up to 100 metres in diameter with thin reeds up to 1 metre high, and Lake Eda full to overflowing (and with extensive reed surrounds).

Sharp-tailed Sandpipers, Black-tailed Godwits, Greenshank and especially Black-winged Stilts were presents on all the pools in small numbers. However, only one small flock of Little Curlew (30 flying over) was seen. This contrasted with the 50,000 present in the last week of March 1985. In that year, they departed on migration on 28-30 March and it seems that again this year virtually all had left by 1 April.

The good conditions had resulted in many more water birds being present than in 1985. There were over 600 Glossy Ibis and 15 Magpie Geese. Duck numbers were high - two male Freckled Ducks in full breeding plumage were the highlight. This is over 1,000 km from the nearest 'Atlas' record, but less from Lake Gregory where Roger Jaensch had apparently found several hundred on a recent visit. Several broods of young Plumed Whistling Duck and one brood of Wandering Whistling Duck were seen.

Roebuck Plains was, as usual, an excellent place for birds of prey. Several Black-breasted Buzzards carrying out aerial antics were the highlight. During the whole visit 18 different species were seen (out of the 24 species of birds of prey present in Australia).

Radar Observations

The radar set in the weather station at Broome airport was manned from 5-7 p.m. each evening from 30 March to 4 April in order to look for flocks of waders departing on migration. Photographs were taken of the radar screen at 10 minute intervals (and more frequently during the peak of migration). Operating conditions were generally the same as used by Brett Lane and Angela Jessop in 1985 and 1986, i.e.

1.5° elevation of rotating radar dish
30 nautical miles (55 km) screen radius (maximum magnification)
Radar gain and PPI brilliance at near maximum setting
Swept gain turned off

Photographs were generally of the 1 min on/1 min off/2 min on standard procedure, but a few 4 min continuous exposures were made. The former procedure is necessary to determine in which direction birds are moving, but the latter is better for detecting distant/diffuse flocks. It was noticeable that wader flocks gave the strongest radar response when they were tangential to the radar beam (i.e. in this case when they were to the SW of the radar station) but a weaker response when their direction of flight was radial (in this case to the NW). Presumably this is because a bird presents a larger profile to the radar beam when 'side on' rather than when 'tail on'.

On 30 and 31 March little migration occurred - generally only one flock of birds was visible on each photograph. In contrast massive departures took place on 1 and 2 April. Even as early as 5.00 p.m. one or two migrating flocks were visible on the radar screen. However, the main departures occurred between about 5.20 and 6.05 p.m. (Sunset was c.5.55 p.m. and it was dark by 6.15 p.m.) On these peak days upwards of 20 flocks of birds were visible on some photographs. All birds were moving on a bearing of c.320°, i.e. northwest. After about 6.15 p.m. most flocks were in the northwestern sector of the radar screen, and most had disappeared out of detection range by 6.45 p.m.

A little migration took place on 3 April (approximately 1 flock per photograph) but not a single migrating flock was seen on 4 April.

The pattern of migration corresponded extremely well with wind conditions, as in 1985 and 1986. The meteorology station kindly provided data on wind strength and directions at various heights up to 10,000 ft. taken from the 7 p.m. balloon release each day. The peak departures occurred when the wind was from the south eastern sector at all heights down to ground level. On days when little migration took place favourable tail winds were not present until 3-5,000 ft, while on the day of zero migration, the base level for ESE winds was nearer 10,000 ft.

An interesting event occurred during the period of radar observations on 2 April. A broad band of radar response running east-west across the screen was observed moving slowly southwards down the coast towards Broome. This turned out to mark a clear air wind change and as it reached Broome c.6 p.m., the wind went from light SE to light NNW. A huge hazy response area was apparent on the radar screen just ahead of this wind change and field observations by the rest of the team (based at Cable Beach looking out for migrating wader flocks) revealed that this was a mass of many hundreds of Fork-tailed Swifts. It is not unusual for swifts to be associated with frontal conditions, but this was an exceptional concentration.

Potential for Banding

The potential for further wader banding with cannon nets at this time of year was enormous. Huge numbers of waders were present at accessible high tide roosts all along the shore at 80 Mile Beach and at Broome. The waders were tame and settled

(in contrast to August/September 1986) and with the light winds, tide heights were predictable. High temperatures in the middle of the day would be the main limiting factor on catch size and the usual hessian shade protection over both keeping cages and fired nets would need to be employed.

A commencement date of around 20 March for a banding expedition would enable catches to be made of all species except Oriental Plovers. An earlier date would run the risk of encountering a late cyclone or the tail end of the wet season. It would be necessary to attempt to band Little Curlew as soon as possible after the start of an expedition as evidence so far suggests they depart en masse before the end of March.

At Port Hedland Saltworks it would again have been possible to have cannon netted Red-necked Stint, Curlew Sandpiper and Sharp-tailed Sandpipers on the perimeter of some lagoons. Mist netting would have been the only technique possible for catching Broad-billed Sandpipers (and Asiatic Dowitchers!), and conditions were ideal in the intake areas.

Broome Wader Observatory

Discussions with Peter White, the Manager of the Conservation and Land Management (CALM) office at Broome indicated that matters were proceeding only slowly. Stephen Davies (Director, RAOU) and Grant Pearson (CALM, Perth) have subsequently been advised of the need for further follow-up with the relevant planning and other authorities involved.

The site of the proposed observatory, near Fall Point, was in excellent condition and there were superb large and varied high tide wader roosts on the adjacent beaches every day.

There is considerable local interest and enthusiasm for the observatory to proceed. Hopefully, sufficient funds will be raised by the recently launched 'RAOU Appeal' to enable construction to commence within the next year - the Broome Wader Observatory is one of the three specified appeal targets.

Photography

Some 2,500 photographs - all colour slides - were taken during the 16 day visit! Excellent quality photographs were obtained of -

Pied Oystercatcher	Grey-tailed Tatler
Red-necked Stint	Grey Plover
Greenshank	Curlew Sandpiper
Mongolian Plover	Terek Sandpiper
Broad-billed Sandpiper	Large Sand Plover
Asiatic Dowitcher	Oriental Pratincole
Black-winged Stilt	Bar-tailed Godwit
Ruddy Turnstone	Red Knot
Whimbrel	Great Knot

Lesser Crested Tern & Black Falcon

At Port Hedland Saltworks four hessian "wrap around" hides were erected in various positions in the muddy/shallow water 'intake area'. Hides had to be moved quite frequently as pumping operations and wind conditions caused variations in water level. The hides were usually occupied from 6-10 a.m. and again for an hour or two in the late afternoon. The harsh vertical light in the middle of the day was not suitable for good photography.

The small waders quickly accepted the hides and within 24 hours Broad-billed Sandpipers were feeding to within three metres. Mongolian Plovers were, however, more wary and rarely came closer than about 10 metres. Bar-tailed Godwits and Asiatic Dowitchers were slower to accept the hides but on the last two days would sometimes come as close as 10 metres.

The biggest problem was caused by the continuous energetic feeding behaviour of all birds. Use of 500mm mirror lenses (4 people) and a 600mm straight-through lens (1 person) meant that fast exposure speeds were not possible (film speeds used were 64-200 ASA). A significant proportion of slides show unacceptable levels of movement - but fortunately, enough photographs were taken to ensure a satisfactory series of slides of all the main species.

At 80 Mile Beach hides were made less conspicuous by digging a half metre deep hole in the sand and having only a low (½m.) hessian hide over it. Four such hides were erected at 100 metre intervals at the top of the beach about 10-15 metres above the predicted high tide mark. The two vehicles (Ken Lance had joined the group for this period) then proceeded to 'twinkle' (from opposite directions) the waders towards the hides. On the first day they managed to put some 20,000 waders onto the beach in front of the hides and these gave magnificent opportunities for photography over a 2-3 hour period around high tide.

A dozen different species were present in good numbers and the only problem was in obtaining portrait rather than group photographs. The light was rather harsh due both to the time of day (a midday high tide) and the very white light reflected from the shell beach. However, some reasonable photographs were obtained.

In contrast, photography conditions at Broome were excellent. The red sand beach and the turquoise blue sea gave pleasing lighting conditions and background even in the middle of the day. The tides were so high that hides could be set right at the top of the beach and camouflaged with vegetation. Large flocks of birds would roost (with a bit of help from a roving 'twinkler') within ten metres. Because they were relatively still (compared with the active feeders at Port Hedland Saltworks) there were fewer problems with the movement of birds spoiling photographs. On separate days the white Bar-tailed Godwit and the Redshank appeared in the flocks in front of one hide and some 'record-type' photographs were obtained.

The most successful hide was constructed on 'Tattler rocks' - a repeat of a 1983 experiment. This 30m. diameter flat topped rock complex is surrounded by water at high tide but is never completely submerged. Loose rocks were used to construct two substantial hides around the rock pillar on the centre of the 'island' - a backbreaking three hour task! These hides accommodated three photographers and were so 'natural' that waders actually roosted on the hides themselves at the peak of the tide on the first day (less than ½ metre from the photographer but not photographable!). Excellent photographs, at ranges down to 4 metres were obtained of a wide variety of species.

Acknowledgements

A great many people assisted the visit in a variety of ways and considerable thanks are expressed to all of them. Particular thanks are due to -

(a) Ken Lance - for accommodation on our first 'half night' at Port Hedland, for assisting in the fieldwork at Port Hedland Saltworks and 80 Mile Beach, and for making various local arrangements before our arrival.

(b) Maureen Schock - an RAOU member living in South Hedland - who identified us (by our N.W. Australia Wader Expedition T-shirts) in the local shopping complex and promptly offered to do all our washing while we were in Port

Hedland (unlike Broome, there is no laundrette).

(c) Paul Cook - who loaned us a trailer (as in 1985) for the duration of our visit.

(d) Roger Windsor - the Manager of the Port Hedland Saltworks - for permission to visit the area and for the loan of an entrance key.

(e) Don Rush - the Maintenance Foreman at Port Hedland Saltworks - for much helpful local ornithological knowledge.

(f) Bob and Trish - the Managers of Anna Plains Station - for permission to visit the property, for keeping our food supplies in their cold store, for the provision of water and fuel, and especially for providing daily quantities of ice to enable us to have cold drinks continuously available.

(g) Alistair and Ann Cuthbert - for making various arrangements in Broome prior to our arrival, for assisting with the fieldwork and photography, for showing us their magnificent environment - especially the pair of Beach Stone-Curlews on the creek just below their garden, and for storing various equipment until the next visit in 1988.

(h) Bobby Telford - who was unfortunately away from Broome (in Melbourne!) during the time of our visit this year but who nevertheless, as always, offered every assistance.

(i) The Meteorology Station at Broome - for permission to use their radar facilities, for advice and assistance in adjusting these so that they were suitable for studying wader migration, and for the provision of wind strength/direction data.

(j) Peter White - the Manager of the Conservation and Land Management office at Broome - for offering to us the use of their showers and other facilities.

The following note was left for us when, due to a misunderstanding, a member of our party mistakenly took away the key to the 'gents' after showering.

"You have a bower bird in your midst - yes, a larcenous rogue with a predilection for shiny keys, i.e. the one from this door.

My guano filled staff object to having to crawl through the window and urgently request the key be returned before they are caught short!!"

Conclusion and Recommendations

The visit was successful in substantially achieving its objectives and in being particularly enjoyable for the participants.

It is recommended that a major expedition, oriented towards further extensive banding and continued radar studies, be mounted in 1988.

This proposal has subsequently been discussed with, and received the support of -

The RAOU Director (Stephen Davies)
CALM, Perth (Grant Pearson)
The W.A. Wader Study Group (Doug Watkins)
The Australian Wader Study Group (main committee)

Dates proposed are Saturday, 19 March to Sunday 10 April - a three week expedition. Clive Minton (Victoria) and Doug Watkins (Western Australia) will be the principal organisers.

Clive Minton.

Wader Counts - N.W. Australia - March/April 1987

	Port Hedland Saltworks	Port Hedland Sewerage Ponds	Port Hedland Racecourse	80 Mile Beach - Anna Plains to 15 km S.	Broome - Crab Creek to Quarry Beach	Roebuck Plains	Lake Eda
	24/3	23/3	25/3	27/3	30/3	1/4	1/4
Pied Oystercatcher				3	35		
Sooty Oystercatcher					2		
Masked Lapwing						35	5
Grey Plover	15			35	65		
Lesser Golden Plover	1			10			
Rednneed Dotterel						2	
Mongolian Plover	120			30	1		
Large Sand Plover	2			1,500	500		
Oriental Plover	5		15	1			
Redcapped Plover	25			100		1	
Blackfronted Plover						3	2
Blackwinged Stilt	700	20			40	470	45
Banded Stilt	1						
Rednecked Avocet	120						
Ruddy Turnstone	15	80	50	75	500		
Eastern Curlew	12			10	25		
Whimbrel				2	250		
Little Curlew				5		30	
Wood Sandpiper		3					1
Greytailed Tatler	3			2,500	1,800		
Common Sandpiper	2	3					
Greenshank	70	1		120	10	100	5
Redshank					1		
Marsh Sandpiper	300	5		1		30	
Terek Sandpiper	1			1,500	1,000		
Swinhoe's Snipe		1					
Blacktailed Godwit	5			200	530	95	15
Bartailed Godwit	250			70,000	30,000		
Red Knot	50			20,000	2,000		
Great Knot	70			25,000	20,000		
Sharptailed Sandpiper	2,000	25				90	20
Rednecked Stint	15,000	30		1,500	300		
Longtoed Stint		2					
Curlew Sandpiper	4,500	10	3	5,000	500		
Sanderling	1			2			
Broadbilled Sandpiper	6,000						
Asiatic Dowitcher	90				10		
Oriental Plover	1,000			12,000			
TOTAL	30,358	180	68	139,594	57,569	856	93

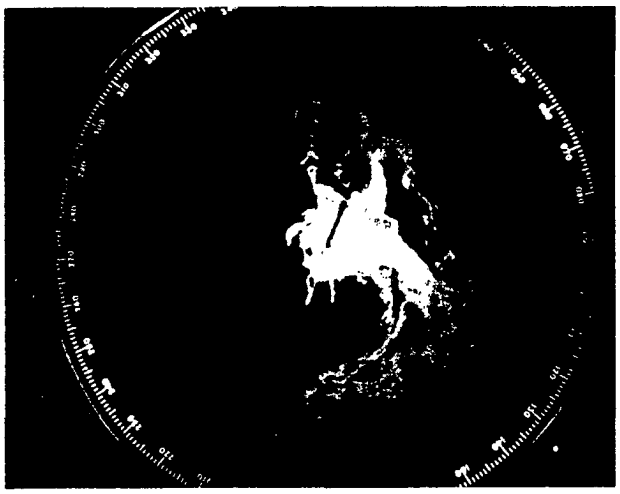
Tern Counts - N.W. Australia - March/April 1987

	80 Mile Beach - Anna Plains to 15 km S.	Broome - Crab Creek to Quarry Beach	Roebuck Plains (including Lake Eda)
	27/3	30/3	1/4
Whiskered Tern	100	60	2,100
Whitewinged Black Tern	6,000		2
Gullbilled Tern	200	20	80
Common Tern		40	
Little Tern	20		
Crested Tern	40		
Lesser Crested Tern	15	60	

Waterbird Counts - Roebuck Plains and Lake Eda 1/4/87

	Roebuck Plains	Lake Eda
Hoary-Headed Grebe	5	75
Little Grebe	6	2
Pacific Heron	3	2
Whitefaced Heron	9	12
Glossy Ibis	600	10
Sacred Ibis		5
Strawnecked Ibis	1,000	50
Magpie Goose		15
Plumed Whistling Duck	11 (+ 5 young)	400 (+ 30 young)
Wandering Whistling Duck	2 (+ 5 young)	100
Freckled Duck		2
Black Duck	2	6
Grey Teal	7	70
Pinkeared Duck		55
Hardhead		110
Coot		250
Brolga		1

Broome 30/3/87 1702 local time



The coastline around Broome showing -

(i) pier and separate pipeline to S.S.W. and S. of Broome (respectively);

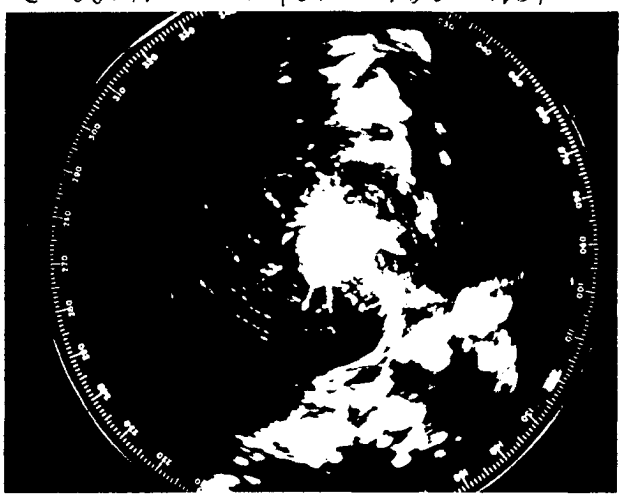
(ii) Roebuck Bay - in arc between E. & S. of Broome (with Bush Point at southern end);

(iii) the coastline running N. from Broome.

Broome Meteorology Station is at centre of picture.

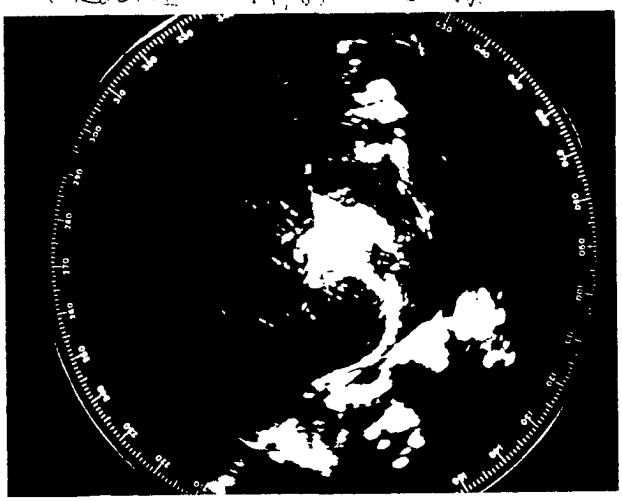
No wader migration visible.

BROOME 1/4/87 1735 WST



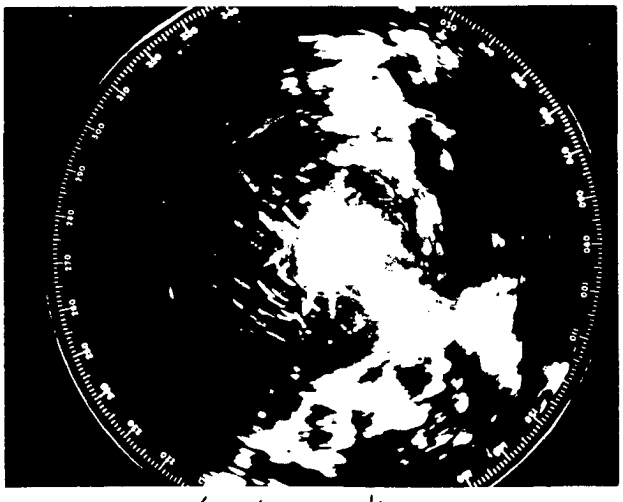
At 1735 hrs. big concentrations of migrating waders to S.W. of Broome which must have emanated from the Bush Point area.

BROOME 1/4/87 1715 WST



Flocks of waders moving N.W. in Roebuck Bay, to S.W. of Broome and to N.W. of Broome - already well on their way by 1715 hrs.

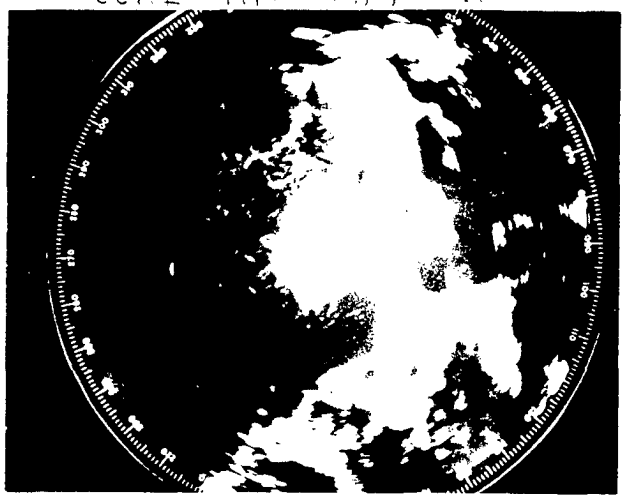
BROOME 1/4/87 1755 WST



4 mins continuous

Peak numbers of migrating wader flocks visible at 1755 hrs.

BROOME 1/4/87 1825 WST



4 mins. continuous

At 1825 hrs the only migrating wader flocks still visible are all to the N.W. of Broome.

Wind Direction/Speed at various altitudes at Broome
30 March to 4 April, 1987

Date	30/3	31/3	1/4	2/4	3/4	4/4
Height (feet)						
0	0/0	0/0	0/0	340/01*	0/0	210/03
1,000	308/06	231/05	106/08	338/05*	300/06	242/07
3,000	018/02	092/08	103/10	102/08	048/05	205/03
5,000	098/05	111/07	118/09	124/08	108/07	095/04
10,000	112/13	144/13	124/13	119/13	111/10	108/04

(a) Figures are:- Wind direction in °/wind speed in metres per second
(b) Data obtained from 7 p.m. balloon release on each day
(c) Figures which are underlined are wind directions between east (90°) and south (180°).
(d) * The NNW sea breeze arrived at c.6 p.m. Before that the wind was light ESE (137/07 at 1,000 ft at 2 p.m.)

RESULTS OF THE VICTORIAN HOODED PLOVER SURVEY 1986.

The 1986 Hooded Ploved Survey was held over the weekend of 18/19 October. Forty-six people participated in the count and over 350 kilometres of beach was covered during the count. The areas between Warrnambool and Cape Otway, and Cape Otway to Queenscliff were not covered during the survey. Table 1 shows the results of the 1986 survey.

Table 1. Results of 1986 Hooded Plover survey.

AREA	HOODED PLOVER	PIED OYSTER CATCHER	KM
SA BORDER TO WARRNAMBOOL			
Nelson - Cape Bridgewater	37	30	69
Cape Bridgewater - Surrey River	2		5
Surrey River - Springfield	6		3
Springfield - Fitzroy River	15		6
Fitzroy River - Yambuc River	25		18
Yambuc River - Port Fairy	63	5	28
Port Fairy - Towerhill	24		15
Towerhill - Warrnambool	20		16
WARRNAMBOOL TO CAPE OTWAY			
CAPE OTWAY TO QUEENSCLIFF			
POINT NEPEAN TO CAPE SHANK			
Portsea - Sorrento	6		3
Sorrento - Rye	9		11
Rye - Gunnamatta	6		5
Gunnamatta - Bushrangers Bay	6		5
PHILLIP ISLAND			
Summerlands Beach - Helens Head	1	1	5
Cowrie Beach	2		2
Cape Woolamai - Forest Caves	5		3
SAN REMO TO WILSONS PROMONTORY			
Kilcunda - Cape Patterson	27		19
Point Smyth - Cape Liptrap	31	4	36
Shallow Inlet	8		10
Darby Beach	20		7
Whisky Bay - Oberon Bay	7		6
CORNER INLET TO NSW BORDER			
Corner Inlet	22	215	27
90 Mile Beach	6	4	24
Point Hicks - Wingan Inlet	14	10	20
Wingan Inlet - Sandpatch Pt.	4	2	8
TOTAL	366	271	351

Table 2 shows the results for the 1986 survey with the results of surveys from previous years. The greatest number of Hooded Plovers was recorded between Nelson and Warrnambool with a total of 192 and a density of 1.2 birds per kilometre. This compares with previous totals for the same area of 183 and a density of 1.7 birds per km. Despite the incomplete coverage in 1984 the density of birds was considerably higher. However, the total number of birds for this stretch of coast is very similar to the totals for the past three counts.

Table 2. Results of the 1986 Hooded Plover survey, with previous years' results.

AREA	1986	1984	1982	1980
Nelson - Warrnambool	192	183*	208	197
Warrnambool - Cape Otway	-	0	-	0
Cape Otway - Queenscliff	-	24	9	19
Point Nepean - Cape Shank	27	15	36	5
Phillip Island	8*	20	27	14
San Remo - Darby Beach	86	105	105	77
Wilsons Promontory	7*	19	-	18
Corner Inlet	22*	4*	-	14
Ninety Mile Beach	6*	0*	5*	33
Marlo - Point Hicks	-	-	-	43
Point Hicks - NSW Border	18*	34	30*	34
TOTAL	351	394	420	474

* = incompletely covered
- = not covered

Other areas where coverage has been consistent between years, such as the Mornington Peninsula, also show that the numbers of Hooded Plovers has remained fairly constant indicating that the Victorian population is relatively stable.

Nests of Hooded Plovers were reported from four locations. Two nests were found between Nelson and Warrnambool, both containing 3 eggs. One nest on Phillip Island contained 2 eggs and one on Darby Beach also contained 2 eggs. One juvenile was recorded at Cape Reamur and one at Port Fairy. The 1984 survey found no juvenile Hooded Plovers and no nesting activity. This suggests that either Hooded Plovers bred later in 1984 than in 1986 or breeding productivity was very low in 1984.

Jonathan Starks.

ADDENDUM to Starks and Lane (1987) Northward Migration of Waders, February to April 1985. The Stilt 10, 20-27.

ACKNOWLEDGEMENTS

We are very grateful to the dedicated volunteers who regularly visited the sixty wetland sites and provided their count results to this project of the RAOU Wader Studies Programme.

Jon Starks and Brett Lane.

SHOREBIRDS.

An Identification Guide to the Waders of the World. Peter Hayman, John Marchant and Tony Prater. Croom Helm, 1986.

I wish that this work had been available when I was actively studying waders. It is the first complete guide to the 214 species of waders (the antarctic sheathbills are not included). Furthermore the colour plates are the best that I have seen and capture the essential 'jizz' (general impression and shape) that enables the experienced observer to identify a Large Sand Dotterel at a glance even is he/she has never seen one before. Every experienced observer appreciates the importance of a species' jizz but this volume should enable an observer with little or no experience to identify most waders provided that a good view over a reasonable time is obtained. Identification as to age and sex is more problematical and should not be attempted for birds in non-breeding plumage. Identification as to race may also prove difficult. For banders, the B.T.O. Field Guide 'Guide to the Identification and Ageing of Holarctic Waders' by Prater, Marchant and Vuourinen will remain the standard reference in this respect once identification as to species has been determined.

After an interesting Foreward by the doyen of field guides, Roger Tory Peterson and Introduction and sections on how to use the book, how to identify waders, general notes, etc. are 88 colour plates by Peter Hayman.

The colour plates are on the right hand page with brief identification data and distribution maps on the left hand page. Of the plates 86 are devoted to individual species, one to four per page. The remaining 2 plates are devoted to the very similar small stints including the Red-necked and Little Stints and the Western Sandpiper. The bold use of colour is a feature of the illustrations which are accurate for birds in fresh plumage seen in good light but may give rise to problems in identifying birds in well-worn plumage or moulting from, for example, breeding to non-breeding or juvenile to adult plumage. This is, of course, common to all field guides. If you are uncertain as to the identity of the bird on the dust-cover of 'Shorebirds in Australia' reference to Plate 55 will quickly remove any doubts you may have.

The individual illustrations tend to be small and some plates are somewhat cluttered. Those dealing with the small stints are not easy to follow as the species concerned are not separated from each other to illustrate the differences between them and as such is acceptable. However, the identifying number-letter combination is far too small. Some illustrations lack this identifying combination. On plate 43 the heads of the male (to left) and juvenile (second row) Red-capped Plover, juvenile Double-banded Plover (middle) and Black-fronted Plover (bottom left) are not identified although some are self evident. The cross referencing of Plates 74-80 is incomplete.

The distribution maps are printed in four colours and show the breeding and wintering ranges. The yellow colour denoting the breeding range is difficult to see, particularly in artificial light. Having decided to use colour it is obviously less costly to include the maps with the colour plates. They would have been better placed at the appropriate places in the text as the geographical ranges are seldom quoted explicitly. For example, the wintering grounds of the Grey-tailed Tattler are given as 'mainly on continental coasts and shores of large islands' and 'regular in small numbers in Tasmania .....'. To find out what the first statement means requires referring to Plate 61. To see whether Tasmania is included one requires a magnifying glass. The distribution maps suffer in general from their very small scale. From a parochial point of view the treatment of Tasmania and the Bass Strait islands is uneven. Such criticisms are small when compared to the general level of excellence of the book as a whole.

WANDERING WADERS: MARCH 1987 TO JULY 1987.

The following reports have been received by either myself or the regional representatives. In future, please pass on any records of unusual numbers and/or species or sightings of colour-dyed birds, etc. to either the regional representative or directly to the Editor for inclusion in this section.

Western Australia

1 Broad-billed Sandpiper, south-west W.A., ? 1986/87 summer.
1 Red-necked Stint, Swan River, Perth, ? 1986/87 summer, aged 13+.

Tasmania

600 Double-banded Plovers, Perkins Island, July 1987
865 Double-banded Plovers, Kangaroo Island, June 1987
3 Terek Sandpipers, Kangaroo Island, June 1987
90 Red-necked Stint, Perkins Island, July 1987.

ARE CURLEW SANDPIPERS SEXIST - AND IF SO, WHY?

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SUMMARY

The sex compositions of adult Curlew Sandpipers (*Calidris ferruginea*) at five sites in East Asia and Australia have been determined from bill-length measurements of live birds. The analysis shows that the percentage of males in the population increases as the non-breeding site becomes more southerly. It is postulated that the smaller males are forced by dominant females to fly further south in order to find suitable feeding habitat. Reasons for female domination are probably based on limited food availability which is unlikely to be due to low biomass, but could be caused by such factors as adverse weather conditions, territoriality or disturbance by avian predators, particularly in north-Western Australia. The geographic separation of the sexes and the probable tendency of first year birds to use more southerly sites than adults has important species management implications.

INTRODUCTION AND METHODS

In a previous paper (Barter 1985) it was shown that adult Curlew Sandpipers in Australia can be sexed on the basis of bill-length by using the criteria:

Females $\geq$ 40.8mm, Males $\leq$ 37.3mm

Application of these criteria causes 56.5% of birds to be sexed correctly and 0.7% incorrectly, at the 95% confidence level. The remaining 42.8% cannot be so confidently sexed. The sexing criteria were applied to data obtained from adult Curlew Sandpipers caught during the non-breeding season in Thailand, Tamil Nadu (southern India), north-Western Australia, Victoria and south-eastern Tasmania. These sites provide good coverage of the non-breeding range of the species in the East Asian-Australasian flyway (Lane 1987).

The bill length data employed in this analysis was obtained from birds caught during those months when the site populations would be expected to have attained a stable sex composition. In Victoria and south-eastern Tasmania data from the November to February period has been used, whilst in Thailand and Tamil Nadu March data has been included with these months. This addition is not likely to affect the results as significant migration from, or through, the northernmost sites is unlikely to occur until late March at the earliest. Data for north-Western Australia has been taken from the late October-early November period, as Curlew Sandpiper catches have not been made there during December to February. However, the population should be stable by the end of October as those using the area as a staging post can be expected to have left by the end of October, as the main adult arrival in south-eastern Australia has occurred by November (Lane 1987, pers. obs.).

The recorded movements of banded Curlew Sandpipers between Australia and East Asia, which number 16 to date (ABBBS 1987), indicate that the birds come from the same population and, thus, justifies the use of the sexing criteria for birds caught in Asia.

Dimorphism in Curlew Sandpipers is not restricted to bill-length as other measurements, e.g. wing-length, tarsus, weight, etc., are on average greater for females than males (Cramp 1983, Prater et al. 1977).

This paper records the sexing results from the five different geographical areas and speculates on possible reasons for the variations which occur.

RESULTS

The sexing results for the five sites are given in Table 1 and also in Fig. 1, which is a map showing the geographical relationship of the sites. A statistical comparison of the results is given in Table 2.

It can be seen that the percentage of males in the population increases from 54 to 77% as the sites become more southerly. Whilst the differences between Thailand, Tamil Nadu and north-Western Australia are not significant, the differences are significant between each of these three sites and the two south-east Australian sites, and between Victoria and south-eastern Tasmania, separately.

Birds are obliged, for genetic reasons, to have a primary sex ratio of 1:1 (Fisher 1954). Statistical checks of the results show that the sex ratios in Thailand and Tamil Nadu do not differ significantly from unity ($P>0.05$), but those at the other three sites do (i.e. north-Western Australia $P<0.05$, Victoria and south-eastern Tasmania both $P<0.001$).

DISCUSSION

Why do male adult Curlew Sandpipers tend to spend the non-breeding season at more southerly sites than females?

As a working hypothesis, it is suggested that the larger females are dominant and that they force the males to move further south in order to find suitable habitat in which to survive during the non-breeding season. This process starts with the annual influx of first-year birds into the non-breeding population with this age group adopting a similar geographic segregation as adults.

It has been suggested that birds migrate in order to improve their chances of survival (Lack 1954) and that waders will only migrate as far as is necessary to find suitable non-breeding habitat and then redistribute themselves over the habitat in order to minimise competition, with this competition generally being size based (Pienkowski et al. 1985 Evans 1976).

Hale (1980) argues that non-breeding sites in Europe could hold substantially larger numbers of waders and provides evidence based on the generally small amount of available food which is taken and on the ability of sites to hold larger numbers following a good breeding season. There seems to be no reason why the situation in Asia and Australia should be any different, especially as the climate is considerably warmer than in Europe during the non-breeding season and, thus, food availability is even less likely to be a limiting factor.

However, many waders travel on from Europe to spend the non-breeding season in West Africa and, in Australia, large numbers of birds move on from the extensive, and seemingly bounteous, intertidal flats of north-western Australia to south-eastern Australia and New Zealand.

So, why do male Curlew Sandpipers, more so than females, follow this trend and show a tendence to migrate further than appears to be necessary at first sight? Notwithstanding Hale's comments it may be that food availability is the causative factor. Evans (1984) comments that

> "an individual may not use a site during the non-breeding season at which it might be able to survive, if by moving further its chances of survival are better,"

Table 1. SAMPLING DATES, SAMPLE SIZES AND SEXING RESULTS FOR THE FIVE SITES. (N.W.A. = NORTH-WESTERN AUSTRALIA)

LOCATION AND LATITUDE	SAMPLING	SAMPLE	% MALES
Thailand (13°32'N)	Nov-March	93	56
Tamil Nadu (11°00'N)	Nov-mid March	305	54
N.W.A. (18°00'S)	22 Oct-10 Nov 83	460	60
Victoria (37°50'S)	Nov-Feb	1520	66
S.E. Tasmania (42°50'S)	Mid Nov-Mid Feb	331	77

Table 2. COMPARISON OF RESULTS BETWEEN SITES USING THE CHI-SQUARED TEST, WITH YATES' CORRECTION FOR NON-CONTINUOUS DISTRIBUTION (NWA = NORTH-WESTERN AUSTRALIA).

	Tamil Nadu	N.W.A.	Victoria	S.E. Tasmania
Thailand	NS	NS	0.05	0.001
Tamil Nadu		NS	0.001	0.001
N.W.A.			0.05	0.001
Victoria				0.001

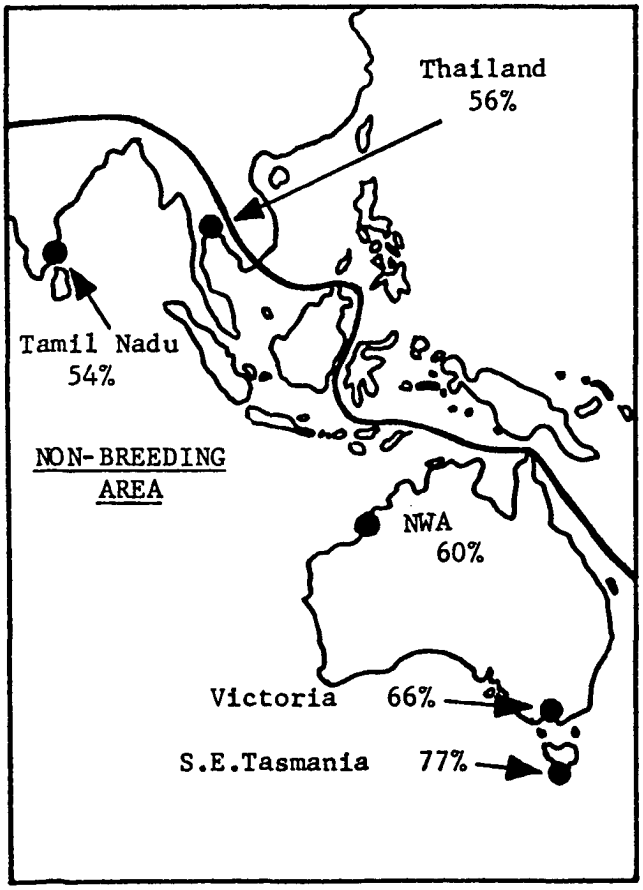

Fig 1. Position and sexing results for the five sites (NWA = north-Western Australia).

even though the migration costs will be higher. This situation appears to be the case with male Curlew Sandpipers in Australia.

Puttick has carried out detailed studies of the feeding strategies of Curlew Sandpipers in an inter-tidal habitat in South Africa. She found that the diet of males and females differed significantly and females were able to out-compete males for food with a higher 'energetic reward' (Puttick 1978). She has also shown that females forage faster and more successfuly than males, and that females and males feed significantly more often in segregated than in mixed flocks (Puttick 1981). Puttick suggests that female Curlew Sandpipers may exclude males from the best areas, thus enabling them to feed faster and more successfully because of higher prey densities. It seems probable that these abilities are derived from the greater body size and bill-length of females.

Therefore, in South Africa female Curlew Sandpipers have been shown to out-compete males and the same situation probably occurs with Australian birds. How, then, can males cope with this problem?

Selander (1966) lists methods by which inter-sexual competition for food can be reduced. These involve (a) differential niche utilisation within a common range, (b) sexual allopatry, either on a macro- or micro geographic scale, or (c) increased territory size. The current study shows that differential niche utilisation, although it probably occurs, is not the complete answer to inter-sexual competition with the result that partial sexual allopatry occurs on a macro-geographic scale. That is, males tend to move further south than females.

Aggression has been stated not to occur to the same degree with probing species, like the Curlew Sandpiper, as with those species which locate their prey visually (Recher and Recher 1969). Certainly plovers, as a group, are far more territorial than sandpipers (pers. obs.). However, as noted previously, female and male Curlew Sandpipers tend to feed in segregated flocks and, therefore, aggression in the form of territoriality may be an additional factor in reducing food availability to males.

Although it seems that food availability should not be a limiting factor in north-Western Australia, there are some weather-related factors which could affect foraging success. The region is subjected to relatively strong winds, with the majority during October to December falling in the 21 - 30 km/h range in the day time (Bureau of Meteorology data). Winds of this strength may reduce the ability of waders to feed successfully (Evans 1976). Additionally, the winds are predominantly on-shore during the whole non-breeding period and this could result in extensive flooding of potential feeding areas, with a consequent reduction in food availability. Maximum temperatures are high with monthly averages varying only from 32° to 34°C during the entire non-breeding season. High temperatures may force prey to greater depths, in order to avoid dessication, and consequently reduce availability. In contrast, the climate in south-eastern Australia is considerably milder, with the mean maximum monthly temperature in Victoria (Melbourne) being less in all months than the mean minimum temperature in the north-west. Daily wind strengths are also lower with the most common being in the 11-20 km/h range. Thus, it appears that food availability in north-Western Australia may be limited by weather conditions causing the out-competed males to be forced further south in the search for adequate food supplies.

Disturbance of waders in north-western Australia by avian predators such as Black Kite (*Milvus migrans*), Brahminy Kite (*Haliastur indus*) and Australian Hobby (*Falco longipennis*) is common (pers. obs.). This disturbance could have the effect of limiting food availability to such an extent that only female Curlew Sandpipers may obtain sufficient food. Males would, therefore, be forced to move elsehwhere.

First-year Curlew Sandpipers, which arrive in Australia some four to six weeks after the adults, appear also to be forced southwards due to competition which is probably based on both sex and lack of foraging experience. In the 1982/3 season, which followed a good breeding year, large numbers of first-year Curlew Sandpipers arrived in south-eastern Tasmania (pers. obs) which is at the end of the migration range. It has been found elsewhere that wader numbers tend to fluctuate more widely at sites further from the breeding areas then nearer ones, presumably because of an influx of first-year birds (Pienkowski and Evans 1985). Banding and count data indicate that first-year Curlew Sandpipers, which as a group do not return to the breeding grounds in their first year, tend to move northwards within Australia, perhaps by 500 to 2000 km, during the breeding season. It is suggested that these birds are forced by competition from returning adults to re-distribute themselves geographically in the same way as the adult sexes and fill gaps caused by adult mortality.

Successful management of Curlew Sandpipers will require the protection of a comparatively large total area because of the tendency of the sexes to be separated geographically. The apparent tendency of first-year birds to spill over into the more southerly sites in a good breeding year further increases the total area that needs protection. These latter areas will probably carry relatively few birds in poor to average breeding seasons and, thus, may appear to be of only marginal importance at first sight. However, the additional influx of first-year birds in a good breeding season must be accommodated for the overall protection of the species and these sites require suitable management.

CONCLUSIONS

It has been shown that:

(i) Adult male Curlew Sandpipers tend to spend the non-breeding season at more southerly sites than females. The male percentages in the northern part of the non-breeding range, i.e. Thailand and Tamil Nadu, are 56 and 54%, respectively, whilst in the more southerly regions the levels increase to 60% in north-western Australia, 66% in Victoria and 77% in south-eastern Tasmania.

(ii) The male percentages in Thailand, Tamil Nadu and north-Western Australia are not significantly different from each other, but the percentages at all three sites are significantly different from those in Victoria and Tasmania. These latter two sites are also significantly different from each other.

(iii) In Thailand and Tamil Nadu the sex ratios are not significantly different from the expected value of unity, whilst the differences from unity are significant at the three Australian sites.

It is postulated that the differential sex distribution is caused by domination of the males by the larger females, and that first-year birds enter the population by tending, initially, to go to the more southerly regions of the migration system and then filter northwards to fill gaps caused by adult mortality.

It is suggested that females need to dominate males in order to obtain adequate food supplies and that food availability may be limited by weather-related factors in north-Western Australia. Territoriality and disturbance by avian predators may be additional factors in reducing food supply.

Management of Curlew Sandpipers requires particular care because of the partial geographic separation of the sexes and the probable tendency of first-year birds to spill over to the more southerly sites in good breeding years.

RECOMMENDATION

Much good work has been done during the last seven years in determining the distribution and abundance of waders in Australia. However, if we are to understand why waders are distributed in the way that they are, studies on foraging behaviour and prey availability need to be carried out on a wide scale. Apart from a limited amount of work in Victoria (Dann 1987), little is known in Australia of this important aspect of wader ecology. Feeding studies need to be carried out at the major sites in Australia used by waders during the non-breeding season. Such work would make a suitable subject for post-graduate studies.

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REPORT ON THE WINTER 1986 POPULATION MONITORING COUNT: A BUMPER YEAR FOR RED KNOTS AND GREY PLOVERS.

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Although winter wader counts are not as productive as those held in summer, in terms of the numbers of birds counted, they nonetheless provide important information on migratory and resident waders. Migratory waders over-wintering in Australia are predominantly first-year birds, which do not return to the northern hemisphere breeding grounds with the adults. Thus winter counts give an indication of the numbers of immatures in the population in each year, and indirectly provide information on breeding success in the northern hemisphere the year before. They are therefore an important component of the Population Monitoring Project, which involves both counts and banding studies. Winter counts are necessary to monitor the population of New Zealand breeding Double-banded Plovers, many of which migrate to spend the winter in southern and eastern Australia. Winter counts also give additional information on the distribution and numbers of Australia's resident waders.

The Population Monitoring Project offers an opportunity for monitoring the populations of over-wintering migratory waders at sites, which are counted consistently from year-to-year. Thus, a significant change in the total numbers of over-wintering waders for any species is likely to indicate a real change in breeding success in the previous year, except for the few species which move north in their first year e.g. Sharp-tailed Sandpipers and Lesser Golden Plovers. The over-wintering percentage (winter count as a percentage of the summer count) is a measure of the proportion of immatures in the total population, and a meaningful indication of breeding success, only if the coverage is identical in the summer and winter of each year.

Monitoring of winter numbers was difficult during the National Wader Counts, as coverage varied from year to year, and between summer and winter. Coverage may be approximately indicated by the number of Count sheets returned, as each represents a count at an individual roost or wetland. From 1981-5, the numbers of count sheets returned in summer ranged from 295 to 685, and in winter from 193 to 454. Thus comparisons from year to year were difficult. During the national counts, count sheet returns in summer and winter for each year were 295:193 in 1981, 515:411 in 1982, 586:454 in 1983, 685:421 in 1984; and 559:405 in 1985. This consistently poorer coverage in winter would have led to an underestimate of the proportions of juveniles in populations of migratory waders.

In contrast, the population monitoring counts have been designed to provide consistent coverage. Summer and winter returns for the first year, 1986, were respectively 117 and 99. The shortfall in winter returns has thus been partly but not completely alleviated. Unfortunately, two important areas (Albany area, W.A., and Clinton Conservation Park, S.A.) could not be counted in winter 1986. Any remaining shortfall has probably arisen because some sites carry waders only in summer, when numbers are high.

The winter 1986 wader count was held on the weekends of 14/15 and 21/22 June, at the sites selected for monitoring in this project. A total of 63,342 birds of 37 species were counted. Wader species and the numbers at each site are listed in Table 1. The winter 1986 count was thus 24%, or approximately one quarter of the summer count and was made up of over-wintering migratory waders from the northern hemisphere (23,032), resident waders (35,817, including 21,526 Banded Stilts), and Double-banded Plovers (3,290). 1,203 birds were unidentified as to species.

A result of particular interest in the winter 1986 count was brought to my attention by Dr. Clive Minton, the count organizer for eastern Corner Inlet, Victoria. He indicated that the Red Knot count for this area was extremely high. In fact, the count was 2,502, in comparison with winter counts obtained during the National Wader Counts of 600 (in 1981), 800 (1982), 296 (1983), 0 (1984), and 700 (1985). The high winter 1986 count at Corner Inlet is consistent with the unusually high proportion of juvenile Red Knots found in a catch obtained by the Victorian Wader Study Group at Queenscliff, Vic., in summer 1985. Thus a catch result and a count result at two important Victorian sites for Red Knot gave independent indication that the number of juveniles in Victoria in 1986 was unusually high. Several other observers also noticed high numbers of Red Knots that winter.

In National Wader Counts from 1981 to 1985, winter count totals for Red Knots were 818, 1,700, 1,572, 3,271 and 941. In winter 1986, the total Red Knot count was 3,356, from only 23 sites. Thus, although coverage had markedly decreased, the count was the highest ever, indicating that high 1986 winter numbers were an Australia-wide phenomenon, and that the 1985 breeding season in the northern hemisphere was excellent.

Red Knots breed in the high arctic in localised populations. The population, which visits Australia and New Zealand during the southern spring and summer, breeds in north-central and north-eastern Siberia (Cramp & Simmons 1982). A British wader count (for the Birds of Estuaries Enquiry) in December 1985 similarly revealed record totals of Red Knots (Kirby 1986). As the majority of Red Knots wintering in Britain breed in arctic Canada and Greenland, this indicates that excellent breeding conditions for Red Knots were not restricted to the Siberian population, but were widespread across the high arctic.

An interesting feature of the British count was that record totals were obtained for some other artic-breeding species, which also visit Australia; notably, Grey Plover and Ruddy Turnstone. Was this finding also reflected in the Australian winter counts for these species in 1986?

The 1982-5 summer and winter count totals for these three species were obtained from the 23 sites, which are presently being monitored, so that the over-wintering percentages could be calculated and compared with the values in 1986. Although some information is available from 1981, it has not been used. There is the possibility that coverage at some sites was poor for the first National Wader Count in summer 1981, as some major roosts had not been discovered. This may have led to an under-estimate of the total population, and thus an over-estimate of the proportion of juveniles in that year (Brett Lane, pers. comm.). In each year, any site that was not counted consistently in summer and winter has been excluded.

The results are shown in Table 2. For Grey Plovers and Red Knots, the over-wintering percentage was much higher in 1986 than in any other year from 1982 to 1985. For these two species, 1985 was an exceptionally good breeding year. Ruddy Turnstones seem to have had a year of average breeding success in 1985: the over-wintering percentage has not varied greatly over 5 years, except in 1983, when it was very high.

There is therefore agreement between the Australian and British results for Grey Plovers and Red Knots, indicating that conditions were good at the breeding sites of both the Australian and the

British-wintering populations. Grey Plovers breed across the northern U.S.S.R., and it is not known whether there is any division between the breeding ranges of birds which winter in Europe and Australia. Certainly, favourable breeding conditions have affected both populations similarly. The similarity in the Australian and British results for Red Knot is even more interesting. The breeding areas for the two populations are localized and widely separated, and the excellent breeding conditions must have occurred in both north-central Siberia, and in arctic Canada and Greenland. The very high British count of Ruddy Turnstones was not mirrored in the Australian results. Thus the conditions favourably affecting breeding for this species must have acted in the north-eastern Canada and Greenland region, but not in eastern Siberia and western Alaska, where the Australian-wintering population breeds.

It is interesting to compare the overall picture of breeding success for these species, with the trends indicated by winter counts at some individual sites. Sites were chosen for analysis, which had held 10 or more Grey Plovers, Ruddy Turnstones, or Red Knots in any winter count from 1982-6. As coverage in the Gulf St. Vincent area of S.A. varied from year to year, results from the two most important sites, I.C.I. and Price saltfields, have been listed separately.

Table 3 shows the winter count results for Grey Plovers, Ruddy Turnstones and Red Knots at several sites. The 1982-5 count averages and ranges have been shown for comparison with the 1986 count. The marked improvement in breeding success for Grey Plovers and Red Knots in 1985 can be deduced from the individual site results.

For Grey Plovers, every site listed held record numbers in winter 1986. Thus the extremely high winter numbers led to increased usage of the usual wintering sites. Birds were found at four sites (I.C.I. saltworks, S.A., Swan estuary and Wilson's Inlet, W.A., Mackay area, Qld.), in which they had never or rarely been found in winter counts from 1982 to 1985. This spill-over into areas that are not normally used may have resulted from overcrowding at more favoured sites.

For Red Knots, the Mackay area, Qld., and south-eastern S.A. are listed because of a single winter count above 10 at some time between 1982 and 1986. They are not generally used by over-wintering Red Knots. Of the other ten sites listed, seven held record winter numbers in 1986. Most of these could be classed as normal over-wintering areas, in that they had held birds in at least two of the four previous years, and had at least one previous count of 10 or more birds.

At I.C.I. saltfields, the Red Knot count was above average, but still within the range found in winter counts from 1982-5. An unusually low count of Red Knots at Price Saltfields was noted in summer 1986 by Jamie Matthew, South Australian count organizer. He believed that it was due to the high water levels compared with other years. Close and McCrie (1986) reported that flooding of Whyalla saltfields in 1979 caused a reduction in wader numbers. They have also shown that Red Knot populations in this area are highly mobile. Thus it seems likely that the birds have deserted Price for more suitable areas, perhaps nearby Clinton Conservation Park (which held 150 Red Knots in winter 1983), or possibly sites on Spencer Gulf, which was shown to hold large numbers during the National Wader Counts (Lane 1987). The apparently low count at Moreton Bay may be misleading; some of the 900 medium to large unidentified waders counted there may have been Red Knots.

Total winter 1986 numbers of Ruddy Turnstones were close to average values. However, three sites held record high numbers; Corner Inlet and Port Phillip Bay, Vic., and the Mackay area, Qld.. Three others held above-average numbers (above the average 1982-5 value, but still within the range); Westernport, Vic., I.C.I. saltfields, S.A., and Botany Bay, N.S.W. At the remaining six sites, the winter 1986 count was below average.

For Grey Plovers, the sites with record high numbers were in Qld., Vic., S.A. and W.A.: for Red Knots, they were in N.S.W., Vic., S.A., N.T., and W.A. Thus the high winter numbers were a feature of many widely-separated sites; an Australia-wide, rather than a local phenomenon. One above-average and two exceptional sites for Ruddy Turnstones were in Victoria; perhaps an indication of a localized increase that was counter-balanced by a corresponding decrease at some other sites (in S.A., Tas., Qld. and N.T.).

It can be seen that counts at individual sites do not always give an indication of trends in the wider Australian population. For Red Knots and Grey Plovers, a glance at the results from a suite of individual sites gives a clear indication that winter 1986 numbers were exceptionally high. However, the low Red Knot counts from Price saltfields, S.A., and Moreton Bay, Qld. could be quite misleading without knowledge of changes in local conditions or of problems encountered in particular counts. For Ruddy Turnstones, remarkable increases in winter 1986 at some sites seem to have been counter-balanced elsewhere. This all emphasizes the value of looking at the national picture, which is less influenced by local factors.

Therefore, trends in overall wader numbers and estimates of breeding success cannot be reliably detected by counts at individual sites. There are problems even in estimates of proportions of immatures obtained from netted birds. Immatures may not be uniformly distributed through wader flocks in summer, and populations at different sites in Victoria often contain different proportions of immature birds (Victorian Wader Study Group, pers. comm.). The results must be interpreted in the light of knowledge of local conditions and wader populations.

In an ideal world, the Population Monitoring Project, with its consistent coverage at many Australian sites, would compensate for these problems of variation between individual sites, and provide a more accurate picture of changes in total wader numbers and breeding success from year to year. But are we counting enough sites to be confident of this? The more sites we count, the closer we approach the true picture for Australia. However, in designing this project, we were guided by what we felt was the level of regular effort that could be sustained by volunteers. Therefore, the coverage is unavoidably limited, and we should be conscious of the possibility that, for some species, the 23 sites may not cover enough of the population or the important sites, to compensate for departures from overall trends in particular places.

It is not posible to estimate the total populations of Australia's migratory wader species from National Wader Count results, as counts in northern and southern Australia were done up to five months apart (Lane, 1987). However, Lane (1984) has given us estimates for the minimum Australian populations for each species. By comparing these with the count in summer 1986 we can roughly estimate the population coverage over the 23 sites. For Red Knots, we detected 8% of the total minimum population given by Lane, for Grey Plovers 31%, and for Ruddy Turnstones 37%. It seems that we can be reasonably confident of the results for Grey Plovers and Ruddy Turnstones. For Red Knots, we must be more cautious. Count totals indicated that there were enormous numbers of immatures present in

TABLE 1. RESULTS OF THE WINTER 1986 WADER COUNT AT 23 SELECTED SITES.

	N.S.W.					VIC.						QLD.			S.A.			W.A.		TAS.			N.T.	TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Beach Thick-knee													1											1
Pied Oystercatcher	18			2	14	707	291		26	35	87		158	8	14	2	12	13		451	83	25		1946
Sooty Oystercatcher	7			1	5	237	4				2				13			4		54	2	41		370
Masked Lapwing		11	11		50	26	157	18	60	126	516	25	16	15	2	127	71			98	4	21	165	1519
Banded Lapwing		10							5		1													16
Grey Plover						70				5	49		18		134		83	11	32					402
Lesser Golden Plover	7			3						1	7		21	42								2		83
Red-kneed Dotterel			8					1	22	169	36		6	20			75	1						338
Hooded Plover						29					21					6					35	47		138
Mongolian Plover						5					2		82		8							1		98
Double-banded Plover	74			123	104	868	308		233	500	482			44	1	44	46			396	32	35		3290
Large Sand Plover						2					1		30		1									34
Red-capped Plover		106			144	93	145		302	252	530	2	110	205	98	109	160	207		111	60	86	5	2725
Black-fronted Plover			4	2				50	4	20	17		33	7				3		2			2	144
Black-winged Stilt	22	943	214					71	126	264	177	23	13	506			163	254	46				150	2972
Banded Stilt									3650	161	3183				11		14447	74						21526
Red-necked Avocet		1600					35	16	424	457	411			150			767	205	42					4107
Ruddy Turnstone	3	3		12		94	44		1	1	69	4	23	16	16	11	26					16	1	340
Eastern Curlew	36	220		43	21	62	193				15	7	69	97			14			4	3			784
Whimbrel	23	37		13	3		1		1			21	34	138		3	11			3			23	311
Little Curlew													22											22
Wood Sandpiper													35											35
Grey-tailed Tattler	52	1		11	5	6	4				1	56	7	14			4			1			5	167
Tattler sp.											5		30	14										49
Common Sandpiper													1											1
Greenshank	4	25		2	4	39	12	1	13	52	138		5	10	51		102	13	1	20			1	493
Marsh Sandpiper														1			4							5
Terek Sandpiper	16			2			6			1		4	25										31	89
Black-tailed Godwit		30								15				2										47
Bar-tailed Godwit	151	460	267	225	338	1022	134			4	159	45	135	347	18		82	11	3	15				3416
Red Knot		50				2502	245			121	46			10	217		129	15				1	20	3356
Great Knot						100							205	276									600	1181
Sharp-tailed Sandpiper							6										8							14
Red-necked Stint	35		1	16	35	1275	910		979	1284	1229	45	129	34	588	39	1526	467		158	25	49	40	8864
Long-toed Stint									1															1
Curlew Sandpiper	2	387	71		4	93	24	9	343	1125	100	2		65	7	168	451	313	1	63		7		3235
Sanderling						5																		5
Australian Pratincole																							15	15
Unidentified small Wader						24					25			250										299
Unidentified medium Wader											4			900										904
TOTAL	450	3883	576	455	727	7259	2519	166	6190	4593	7313	234	1212	3171	1179	509	18181	1591	125	1376	244	331	1058	63342

INDEX TO TABLE 1.

NEW SOUTH WALES

1	Clarence/Richmond
2	Hunter Estuary
3	Paramatta River
4	Botany Bay
5	Shoalhaven Estuary

VICTORIA

6	Corner/Shallow Inlets
7	Westernport
8	East Port Phillip Bay
9	Altona
10	Werribee/Avalon
11	Bellarine Peninsula

QUEENSLAND

12	Cairns Area
13	Mackay Area
14	Moreton Bay

SOUTH AUSTRALIA

15	Western Eyre Peninsula
16	South East Coast
17	Gulf St Vincent

WESTERN AUSTRALIA

18	Wilson's Inlet
19	Swan Coastal Plain

TASMANIA

20	East Derwent/Pittwater
21	Marion Bay
22	Cape Portland

NORTHERN TERRITORY

23	Darwin Area

Table 2. OVER-WINTERING PERCENTAGES OF GREY PLOVERS, RUDDY TURNSTONES AND RED KNOTS, 1982-1986.

	1982	1983	1984	1985	1986
Grey Plover	7	1	12	1	21
Ruddy Turnstone	13	57	20	9	16
Red Knot	25	30	7	13	44

Table 3. WINTER COUNTS OF GREY PLOVERS, RUDDY TURNSTONES AND RED KNOTS AT SELECTED SITES, 1982-6.

Species	Area	Counts 1982-5 No of Counts	Average count	Range	Count 1986
Grey Plover	Corner Inlet, Vic	4	9	0-28	70
	Pt Phillip Bay, Vic	4	9	2-22	54
	W. Eyre Pen., SA	2	53	35-70	134
	Gulf St. Vincent, SA				
	ICI	2	0	0	23
	Price	3	22	8-40	60
	Swan estuary, WA	3	1	0- 3	32
	Wilson's Inlet, WA	4	0	0	11
	Mackey area, Qld	4	0	0	18
Ruddy Turnstone	Corner Inlet, Vic	4	41	7-70	94
	Pt Phillip Bay, Vic	4	11	0-26	71
	Westernport, Vic	4	29	0-72	44
	Gulf St. Vincent, SA				
	ICI	2	7	0-14	12
	Price	3	45	0-91	14
	Sth-eastern SA	4	162	6-495	11
	W Eyre Pen, SA	2	32	6-57	16
	Cape Portland, Tas	4	29	16-35	16
	Mackay area, Qld	4	4	2- 9	23
	Moreton Bay, Qld	4	36	9-68	16
	Darwin area, NT	4	21	0-38	1
	Botany Bay, NSW	4	6	0-12	12
Red Knot	Corner Inlet, Vic	4	449	0-800	2502
	Westernport, Vic	4	31	0-55	245
	Pt Phillip Bay Vic	4	27	0-70	167
	Gulf St. Vincent, SA				
	ICI	2	70	0-140	120
	Price	3	363	94-575	9
	W Eyre Pen SA	2	19	0-38	217
	Darwin area, NT	4	4	0-10	20
	Hunter est., NSW	4	6	0-16	50
	Moreton Bay, Qld	4	11	0-30	10
	Wilson's Inlet, WA	4	1	0- 2	15
	Mackay area, Qld	4	16	0-65	0
	Sth-eastern SA	4	4	0-12	0

winter 1986. Since record high counts were obtained in so many of the individual sites, at locations scattered widely around Australia, it is not likely that our high count total is reflecting a large and unrepresentative increase at just a few sites. Therefore, it is probable that what we detected was a real and widespread increase, and that 1985 was indeed a year of spectacular breeding success for Red Knots. If the increase had been less dramatic, interpretation of the results may have been more difficult.

In conclusion, although wider coverage is preferable, even single wader catch or count results can be very valuable. I began this small exploration of wader breeding success because Clive Minton, in his twin roles as count organizer and premier wader bander, brought to my attention the high Red Knot count at Corner Inlet, and the high proportion of juveniles at Queenscliff. Information from these two Victorian sites has prompted me to examine the Australia-wide situation for this and for other species, and to find connections with British experience. From all of this, a picture of recent events in the high arctic has emerged. It is one of the joys of wader study, that one counter at one site can see a reflection of conditions at the top of the world, and imagine counters across Australia and in other continents seeing the same picture and drawing the same conclusions.

ACKNOWLEDGEMENTS

I would like to thank the wader counters around Australia, for their hard work in this and in previous counts.

Special thanks are due to the regional organizers: Bob Patterson (Tas.), Mike Bamford (W.A.), Jamie Matthew (S.A.), Margaret Cameron (Bellarine Peninsula, Vic.), Peter Menkhorst (Mud Island, Vic.), Mark Barter (Altona, Vic.), Richard Loyn (Werribee/Avalon, Vic.), Mike Carter (eastern Port Phillip Bay, Vic.), Ken Harris (Westernport, Vic.), Clive Minton and Brett Lane (Corner Inlet, Vic.), Alan Morris (Botany Bay, Paramatta River, Shoalhaven, N.S.W.), Jim Perry (Hunter estuary, N.S.W.), John Martindale (Clarence/Richmond estuaries, N.S.W.), Denis Watson (Moreton Bay, Qld.), Lindsay Bone (Mackay, Qld.), Dawn Magarry (Cairns, Qld.), and Niven McCrie (N.T.).

Members of the A.S.W.G. committee and the scientific committee have been very helpful. I would like to thank Richard Loyn and Brett Lane for constructive criticism of this report, as well as for many of the ideas which went into it. I am also grateful to Clive Minton and Mark Barter for information and helpful discussion. It is mainly because of these four people that I have enjoyed learning as I go.

The R.A.O.U. has supported the project by setting up the Research Fund, and by allowing the use of its computers for storage and analysis of data. The undeniably tedious task of entering the data into the computer has been made bearable by the friendly atmosphere at R.A.O.U. headquarters in Moonee Ponds. Thank you to all R.A.O.U. employees, helpers, and visitors for their pleasant company at lunch.

I would like to acknowledge the continuing assistance of the Department of Conservation, Forests and Lands at Yarram, and, in particular, Ian Carroll, in providing and manning a boat for the Corner Inlet count.

While I was writing this report, I spent many hours extracting results from the National Wader count sheets from 1981 to 1985. As I became familiar with the names of counters, I realised that some names recurred year after year.

In fact, of 161 counters listed on count sheets in 1986, 55 have been counting waders since 1981. Some of these are, or have been, regional organizers, and thus have carried an extra workload. These 55 people have been the backbone of the R.A.O.U. and the A.W.S.G. projects, using their experience to further our understanding of waders, and sharing their knowledge and enthusiasm with others. I would like to thank them personally by listing their names below. The A.W.S.G. is also grateful for the loyal support of those who have counted in previous years, but have been unable to continue: it was unfortunate but inevitable that, when sites were selected for population monitoring, some of our keenest counters would be disappointed that their areas were not included. Many others have joined the count projects since their inception. Some, like myself, gained their first experience in waders during National Wader Counts. If our count projects can continue to earn the loyalty of experienced wader watchers, and also to inspire newcomers to join and learn, their future is assured.

R. Alcorn, Vic.
C. & G. Appleby, Vic.
M. Bamford, W.A.
N. Billing, Vic.
P. Bingham, Vic.
M. Cameron, Vic.
M. Carter, Vic.
D. Close, S.A.
L. Conole, Vic.
R. Cooper, Tas.
A. Corrick, Vic.
V. Curtis, Vic.
P. Dann, Vic.
V. Dedman, Vic.
I. Evans, Vic.
K. Fisher, N.T.
A. Fletcher, Tas.
D. King, Vic.
J. Kirton, Vic.
B. Lane, Vic.
A. Lees, S.A.
R. Loyn, Vic.
H. & B. Mannes, N.S.W.
J. Martindale, N.S.W.
G. McCarthy, Vic.
P. Menkhorst, Vic.
R. Millsom, Vic.
C. Minton, Vic.
C. Morley, Vic.
B. & M. Murlis, Vic.
J. Needle, S.A.
M. Newman, Tas.
J. Ozols, Vic.
P. Park, Tas.
R. Patterson, Tas.
C.K. Pawsey, S.A.
J. Pegler, N.S.W.
T. Pescott, Vic.
J. Pratt, Vic.
J. Russill, N.S.W.
K. Shurcliff, N.T.
T. Simpson, Vic.
V. Smith, W.A.
A. Swann, Vic.
R. Swindley, Vic.
G. Tribe, Vic.
I. Venables, Qld.
W. Wakefield, Tas.
L. Wall, Tas.
J. Ward, Vic.
D. Watson, Qld.
J. Wheeler, Qld.

(I apologise if there are any counters not listed, who deserve a mention. the writing on some count sheets is difficult to decipher, and sometimes not all helpers are listed).

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THE SUMMER 1987 POPULATION MONITORING COUNT: RARITIES AND THE WADER COUNTS.

Marilyn Hewish, 74 Wellington St., Bacchus Marsh, Vic. 3340.

The summer 1987 wader count took place on the weekends of 31 Jan/1 Feb and 7/8 Feb. One hundred and sixteen count sheets were submitted from 22 of our population monitoring sites: Marion Bay, Tas., was unable to be covered in this count.

A total of 224,684 birds of 42 species were counted, and the results are given in Table 1. This is considerably lower than the summer 1986 count total of 260,489, even after taking into account the fact that Marion Bay was not counted in 1987. The decrease at our monitored sites was particularly noticeable for Banded Stilts (45,667 in 1986: 22,071 in 1987). The Banded Stilt count for Gulf St. Vincent, S.A., had decreased from 35,632 (1986) to 12,041 (1987). A marked decrease had also occurred in the Altona area, Vic., from 2,166 to 50. Several other resident waders showed a decrease in numbers from 1986 to 1987. Pied Oystercatcher (2,289 to 1,880); Sooty Oystercatcher (295 to 183); Masked Lapwing (2,317 to 1,990); Red-kneed Dotterel (148 to 29); Red-capped Plover 94,553 to 3,018); and Black-winged Stilt (2,404 to 1,532). Of the migratory waders, the count of Ruddy Turnstones decreased considerably from 1986 to 1987 (2,130 to 1,104). The largest decrease occurred in the south-east of S.A. (744 to 98). The Black-tailed Godwit count increased from 985 to 2,950, with the most striking increase occurring in the Darwin area, N.T. (195 to 2,000): Great Knot increased considerably from 4,344 to 10,850, also with the greatest increase in Darwin (983 to 6,500): and Red-necked Stints decreased from 82,482 to 63,684, with S.A. and Vic., the Red-necked Stint strongholds, showing the greatest decreases.

I am always interested (and sometimes envious) when rare waders are listed on count sheets. This count was particularly productive in this way. Brett Lane saw a Ruff at Avalon Saltworks, Vic., ('very big...yellow-orange legs'). There was a Red-necked Phalarope at Palmerston Sewage Ponds in Darwin. But the most extraordinary count for rarities occurred at the I.C.I. Saltfields/Buckland Lake area of South Australia, where Ruff (1), Reeve (1), Red-necked Phalarope (1), and Hudsonian Godwit (1) were seen. This one day count was, however, just the tip of the iceberg. The 'Twitchers Corner' columns of the last three R.A.O.U. Newsletters (Dec 1986, Mar and Jun 1987) show us that during this last season exciting finds have occurred so regularly in this area as to seem almost routine.

The best of these was perhaps the Hudsonian Godwit, (20 Sep 1986-28 Mar 1987), which was found with a flock of Black-tailed Godwits by John Cox. This is only the second record for Australia of this species. I think that most of us in southern Australia would be happy enough to see such a good-sized flock of Black-tailed Godwits (there was 152 on the count day), let alone their unusual companion. Other exciting finds were Red-necked Phalarope (3 Dec - 28 Mar), up to three Ruffs (6 Nov - 29 Jan), Little Curlew (14 Dec), two Little Stints (one on 13 Dec, another 6 Dec and 29 Jan), Little Ringed Plover (2-10 Jan), Baird's Sandpiper (19 Dec - 4 Feb), and four Cox's Sandpipers (between 6 Dec and 28 Mar). I have very pleasant personal memories of this last season at I.C.I. I was shown my first Long-toed Stint and Cox's Sandpiper there by John Cox on 13 Dec. All of these rare birds were scattered among 23,752 of our more regular wader visitors and residents (count day total). I think we must pay tribute to the incredible I.C.I./Buckland Lake area, and the expertise of Adelaide's wader watchers, who found the rarities among so many other birds.

It perhaps adds some spice to wader-watching that there is always the possibility that this will be your day to find a rare and exciting bird. This is no less true for the wader counts. Possibly some people see the serious scientific goals of the counts as incompatible with the trivial pursuit of looking for rarities. However, I think that the activities can complement each other, and none of us should be ashamed to feel a sense of excitement as we see something 'different'.

Before the wader counts were instituted, our knowledge of rare waders in Australia was generally provided by a limited number of very expert wader-watchers, working intensively in a few areas (generally near the capital cities). It does not diminish in any way the contributions of these pioneers, that the regular, Australia-wide wader counts have extended this work by providing information on the status and distribution of these birds on a national basis.

I would like to give here some of the wader count and expedition results for rare waders. I have concentrated on the 1981-5 national counts, as the limited coverage of the Population Monitoring project makes it unsuitable for studying birds which occur only in small numbers. Where the counts have led to a re-appraisal of a species' status, or where previous results have been extended, I have discussed the results in the light of previous knowledge. I will admit that my selection of the species for discussion has been directed by personal interest and involvement. References for particular sightings have not been given, unless they have added substantially to our understanding of that species in Australia. Readers are referred to Lane (1987) for the original sources.

Asian Dowitcher

In 1981, Asian Dowitchers were listed among the endangered birds of the world (King 1981), on the basis that they were not numerous on their breeding grounds, and very rare in their non-breeding range in south-east Asia. No country within the winter range had more than a very few records, most observations being of one to two birds only. The largest number seen outside the breeding grounds was given as 27, found on the Malay Peninsula in 1965. A report that this species was not uncommon in winter on Chilka Lake, Orisso, India (Ali & Ripley 1980) gave no count figures. On 5 May 1979, the greatest single count was raised to 39, with the discovery of a flock of this size on the Deep Bay Marshes in Hong Kong (Chalmers 1986).

After the first Australian record of an Asian Dowitcher in Darwin in 1971 (Crawford 1972b), there were sightings in Port Phillip Bay, Vic. (1973, 1974, 1975), Moreton Bay, Qld. (1976, 1977), Shoalhaven, N.S.W. (1977), Cairns, Qld. (1977), and Darwin (1977, 1978). All but one of these sightings were of single birds; two birds were seen in a flock of Black-tailed Godwits at Leanyer Swamp, Darwin, 15 Oct 77. Before the wader counts began, there was only one clue that Asian Dowitchers were anything other than accidental and sporadic visitors to this country. Serventy and Whittell (1976) concluded from recent reports of parties of up to six birds at Port Hedland salt intake works, that Asian Dowitchers were fairly common migrants to north-western Australia.

This was the state of knowledge of the wintering range and numbers of the Asian Dowitcher at the beginning of the R.A.O.U. Wader Studies Programme. The situation changed dramatically during the second Australian Wader Study Group's expedition to north-western Australia in March-April 1982, when 130 Asian Dowitchers were counted at Leslie Saltworks, Port Hedland on 4 April. On 29-31 August, 1982, there were 35-40 birds in this same

locality, and on 19 Nov there were 20. At least 57 were found at Bush Point, Roebuck Bay on 6 Sept, and six on the Eighty Mile Beach on 17 Nov (Jaensch 1983). In addition, 16 birds were found at Leslie Saltworks during the summer wader count, 13 Feb 85. As a result of these findings, Asian Dowitchers are now known to be more regular and common in Australia than previously supposed, with their stronghold in the north-west. Jaensch (1983) has suggested that even greater numbers of Asian Dowitchers may be found in this region by careful scrutiny of large flocks of Bar-tailed Godwits, with which they often associate and which they closely resemble.

For a time, it seemed possible that north-western Australia was the main wintering area for Asian Dowitchers, as numbers found there in 1982 exceeded those found anywhere else in the species non-breeding range up to then. However, Interwader surveys in south-east Asia in 1984 (Parish & Wells 1985) demonstrated that greater numbers could be found on migration in the Inner Gulf of Thailand (400+ birds, Apr 8-10), Hong Kong (339, Apr 29), and Ko Libong, Thailand (75, Oct 24). An amazing total of 1460 was counted in south-eastern Sumatra between Oct. 31 and Nov. 24. Thus, during 1984 a maximum of 2300 Asian Dowitchers was counted in south-east Asia. Further interwader surveys along the east coast of Sumatra in 1986 gave a minimum total count of 3800-4000 Asian Dowitchers, the largest number ever recorded (Silvius 1987). Asian Dowitchers in fact proved to be one of the commonest waders along Sumatra's east coast, and Sumatra was confirmed as one of the main staging, and probably wintering areas, for the species, possibly holding as much as 90% of the world population.

Thus, there has been a dramatic increase in our knowledge of this species since 1981. The Australian surveys provided one piece of the puzzle, by increasing our understanding of the Asian Dowitcher's status and distribution in this country. North-western Australia is still one of the few places in the world where the birds occur regularly in some numbers. We can feel considerable satisfaction that the south-east Asian pieces of the puzzle also came from regular and comprehensive surveys, which were pioneered by the RAOU and the AWSG in this region of the world. We can also feel a little relieved, although not complacent, that Asian Dowitcher world population levels are not as low as once thought.

Long-toed Stint

The Long-toed Stint was thought to be a rare vagrant to Australia until F.T.H. Smith's intensive study of the species around Port Phillip Bay in the 1960s. His conclusion that Long-toed Stints are annual but rare migrants to southern Australia (Smith 1969) was extended to other states during the collection of records for the Atlas of Australian Birds (Blakers et al. 1984). Published sightings in Victoria, Queensland, and the Northern Territory have generally been of 1-3 birds.

A sighting of 12 birds at a swamp near Lake Alexandrina in S.A. was the first indication that there were localized areas where larger numbers could be found (Eckert 1965). A hint was given that attention should be directed to W.A. in Serventy and Whittell (1976), who, while describing Long-toed Stints as rare migrants to the state, indicated that sight observations had been made on freshwater swamps near Perth. In Jan 1978, a maximum of 10 birds was seen at Lake Violet in central W.A. (Curry 1979). This was regarded as an exceptional number for the state, in which the species had previously been regarded as rare. This series of sightings also provided a clue to the way Long-toed Stints use transient inland waters, moving on as lakes dry in the summer. During the RAOU Atlas period, there were reports of from 4-13 birds in W.A.

However, it is only since 1981, when the national wader counts and separate Western Australian studies began, that we have the detailed information to confirm the hints given us in previously published reports. The summer counts for each state from 1981-5 are given in Table 2. Although there were records from four states, the overwhelming majority of birds were found in WA and SA (277 out of a national total of 283 for the five summer counts, or 98%). Long-toed Stints were found in all five summer counts in S.A. and W.A., with W.A. carrying by far the largest number of birds (244/283). There was no evidence for a decline in numbers, at least during the five years of the counts, with national count totals ranging from 40 to 80.

Long-toed Stints were recorded at 17 sites during the wader counts. Sites where there were five or more birds during any summer count, or where birds were seen on more than one occasion, were considered to be the most important ones, and are listed in Table 3. The majority of these important sites were in W.A., with freshwater lakes in the south-west of the state featuring strongly. Lake Forrestdale and McLarty Lake regularly held Long-toed Stints, in numbers that would have seemed incredible before 1981. The 1981 summer count of 67 at Lake Forrestdale was in fact exceeded later in the same season, when 80 birds were present (Curry 1984). In addition, 92 birds were reported from Carnarvon in Feb 1981 (G.J. Roberts in Blakers et al. 1984) and 24+ from Herdsman Lake on 1 Jan 1981 (Curry 1981).

Two South Australian sites were important for Long-toed Stints, with the Lake Alexandrina area (Tolderol etc.) regularly holding birds, occasionally in good numbers. Thus, Eckert's suggestion (1965) that Long-toed Stints are rare but regular visitors to this area has proven to be correct. In the other Australian states, there were only two sites where birds were seen on more than one summer count (Werribee Farm, Vic., and Leanyer Swamp in the Darwin area), but numbers were low. Werribee Farm was the site of the only winter count record in 1982. There were only six records away from the 11 sites listed in Table 3: Laverton Saltworks, Vic. (1 bird in 1981); Bool Lagoon, SE S.A. (1 in 1981); Lake Coongoongup, S.W. W.A. (1 in 1981); Jakes Bay, central W. coast, W.A. (1 in 1983); Murray's Lagoon, Kangaroo Is., S.A. (1 in 1984); Gap Ridge Sewage Ponds, N.W. W.A. (2 in 1985). Thus, there were realtively few sightings outside the more important and regularly used sites.

Using this and other information, Curry (1984) has summarised our knowledge of Long-toed Stints' movements within Australia. After they arrive in north-western Australia, they inhabit freshwater lakes in the West Kimberleys and the Pilbara. They then disperse, and may be found anywhere between the Pilbara and coastal S.A., with only a few moving further east. Later in the summer, birds concentrate once again around drying lakes in south-western W.A., where they were counted regularly in summer counts. Thus, in W.A., the birds move between transient lakes which dry as the summer progresses, and there appears to be no permanent suitable habitat. There may be a similar late season concentration in the Lake Alexandrina area, S.A. Eckert's series of records (1965) were from March-April, and the wader counts took place in late Jan-early Feb. Eckert's counts were variable, sometimes from day to day, and ranged from 1-12 birds, indicating some movement of birds. However, it is possible that movements here may be only local in nature. The shores of Lake Alexandrina provide a permanent resource, and could support birds for much of the season.

Thus, far from being accidental and rare vagrants, Long-toed Stints are regular visitors to Australia. Many of the sites which are important for them at the time of summer count are now known, and there are few recorded occurrences outside these areas. Their movements are predictable, at least on the large scale, and allow them to optimally exploit transient freshwater wetlands in the western part of the country.

Pectoral Sandpiper

The store of the Pectoral Sandpiper in Australia illustrates the increasing knowledge of the finer points of wader identification among this country's wader enthusiasts. The first specimen was in fact collected in Albany, W.A., in 1910, but was not recognised as this species until 1936 (Brooks 1936). If a museum specimen could be mistakenly identified as a Sharp-tailed Sandpiper, it was not surprising that even greater difficulties were found in separating the two species in the field. It was perhaps because of this that the next record did not occur until 1952, when one bird was seen at Geelong, Vic. (Hitchcock 1952). The author could not regard the species as anything other than an accidental visitor to Australia on the basis of only two records. However, in urging wader watchers to carefully examine flocks of Sharp-tailed Sandpipers, he may have had some presentiment of the future.

With increased awareness and greater knowledge of the species in the late 1950s, the trickle of published records became a flood (in rare wader terms at least). Birds were seen with increasing frequency in Qld., W.A., Vic., N.S.W., S.A., and N.T., and by the 1970s, published sightings of Pectoral Sandpipers began to decline, probably because they were no longer considered remrkable. During the RAOU Field Atlas, there were records from all Australian states, leading to the conclusion that the birds are, and probably always have been, regular visitors to this country in small numbers.

Table 4 shows the summer counts of Pectoral Sandpipers in each Australian state from 1981 to 1985. Birds were seen in all states. Numbers were greatest in the south-eastern mainland states and declined with increasing distance north and west, Vic., and S.A. held 74 out of a national total of 123 for the five years, or 60%. The national summer counts from 1981 to 1985 generally ranged from 15-21 birds, the exception being a count of 49 in 1983.

Pectoral Sandpipers were seen at 33 sites during the national counts. The ten most important are listed in Table 5, and, not surprisingly, the majority were in Vic. and S.A. Werribee Sewage Farm, Vic., was exceptional, in that birds were counted there on all five summer counts.

Several of these sites were also important for Long-toed Stints, as the two species share similar habitat preferences for freshwater or brackish swamps. In fact, a comparison of Pectoral Sandpiper and Long-toed Stint count results is quite enlightening. The Pectoral Sandpiper national count total over five years was lower (123 vs. 283) and yet more sites were used 33 vs. 17). The maximum Pectoral Sandpiper count at any site in any count was 12 (vs. 67 for Long-toed Stint). At the majority (23/33) of the Pectoral Sandpiper sites, there were only single records, all of those fewer than five birds, during the summer counts (vs. 6/17 for Long-toed Stints).

What does this tell us about the national distribution of Pectoral Sandpipers? They are widely distributed, occurring in all states. Although the greatest numbers are found in Vic. and S.A. (60%), they are more evenly distributed nationally than Long-toed Stints. They are not concentrated at a relatively few sites at the time of the summer count, as are Long-toed Stints, but are more dispersed, with smaller numbers at each site. Their occurrence throughout their range is less regular and predictable than for Long-toed Stints, with the majority of sites holding birds on only one count.

Why do two species, which use similar habitats, have different 'lifestyles'? Is it because Pectoral Sandpipers have a predominantly eastern distribution, while Long-toed Stints are concentrated in the west? Are there critical east-west differences in rainfall patterns, or the number, density, or permanence of suitable wetlands? How do the Pectoral Sandpipers in W.A. behave? Can anyone answer this whole paragraph of questions?

Ruff/Reeve

The first record of a Reeve in Australia was made at Buckland Park, S.A., on 13 April 1962 (McEvey 1963). Already increased observer awareness and expertise were paying dividends in clarifying the status of the Pectoral Sandpiper, so that the time was ripe for McEvey to suggest that wader watchers search flocks carefully for Ruffs/Reeves. It was perhaps inevitable that the first Ruff/Reeve record should soon lead into others, so that over the next several years there were sightings in Tas., Vic., N.S.W., W.A., and N.T. By the end of the R.A.O.U. Field Atlas, it was recognised that the species was an almost annual visitor to Australia, with records in most summers, although it was still considered to be rare.

The 1981-5 summer counts for each Australian State, given in Table 6, confirm this view. In five summer counts, only 25 birds in total were seen nation-wide. This makes the species one of our rarest, regularly occurring migratory waders. There were records from all states except Tasmania. It is difficult to tell whether any state is particularly favoured, when dealing with such low numbers.

Ruffs/Reeves were seen at 17 sites during the five counts. Table 7 shows that they were seen on more than one occasion at only two sites; Werribee Sewage Farm, Vic., and McLarty Lake, S.W., W.A. All records were of five or fewer birds. Thus, the birds are not numerous, widely dispersed, and their occurrence at one one site is sporadic. No wonder I haven't seen one!

Lesser Yellowlegs

The Lesser Yellowlegs is an American bird, breeding in Alaska and Canada, and wintering in the southern U.S.A., Mexico, West Indies, and South America (Cramp & Simmons 1982). Although there have been several New Zealand records, Australia had to wait for its first until 9 Jan 1983, when one bird was discovered at Reedy Lake, Geelong, Vic. (Smith 1983b). After 16 Jan the bird could not be found at this locality, much to the disappointment of wader watchers. It was, however, rediscovered a few kilometres away at the Moolap Saltworks, by Margaret Cameron, and Harry and Kyra Kroger, during the summer 1983 wader count. It was indeed fortunate that the bird had remained in this area, in which count coverage has been regular and comprehensive, and that a count was scheduled for that time. The bird stayed at the saltworks from 13 Feb until at least 20 March, and was seen and appreciated by many local and visiting bird-watchers (including me).

Redshank

The first Australian records of the Redshank in the Darwin area (Crawford 1972a), were followed by several others from the N.T. and north-western W.A. The wader counts and expeditions have produced further records from this region: four birds at Dampier Saltfields, W.A., on 15 Feb 1985; and five at Broome, one at Eighty-mile Beach, one at Pt. Hedland Saltworks, and one at Dampier Saltworks, in March-April 1985 (Lane & Jessop 1985). It thus seems likely that small numbers of Redshanks reach the northern Australian coast each year, as suggested by McKean et al. (1975): this is a slight extension of their normal non-breeding range in south-east Asia, which extends south to Indonesia.

There were two further records of Redshanks during the wader counts. One bird was seen at Cheary Is. in south-west W.A. on 12 July 1985. However, the most remarkable record was made at the I.C.I. Saltfields in S.A. (Day 1984). It was noteworthy as the first Australian sighting away from the north coast, as a winter record, and because the bird remained in a very limited area for over three months (26 May to 7 Sep 1983). It was seen on the winter wader count for that year on 10 July.

Red-necked Phalarope

Red-necked Phalaropes normally spend the non-breeding season at sea in the East Indies, and are common north of New Guinea (Cramp & Simmons (1982), so that it is not surprising that there have been sporadic sightings in Australia. The first Australian sighting of a Red-necked Phalarope occurred at Werribee Sewage Farm, Vic., on 22 Dec 1962 (Smith 1963a). Additional sightings have resulted in published records for S.A., N.S.W. and W.A. Generally birds were seen singly or in pairs.

It is therefore remarkable that 12 birds were seen at Leslie Saltfields, Pt. Hedland, W.A., during the summer 1985 wader count, and it is possible that the birds occur more regularly in this area (Lane 1987). A second wader count record of this species was missed by a small margin, as one bird was seen the day before the 1983 summer count at Lake Victoria, Point Lonsdale, Vic. This bird had been seen intermittently at this locality from 31 Dec 1982 (Smith 1983a), but vanished a few hours before it could be counted.

Hudsonian Godwit

Until the bird seen during this last summer count was found at I.C.I. Saltfields in 1986, there had been only a single record for Australia. This bird was found in the Hunter Estuary, central N.S.W. coast, from which the species was recorded during the 1983 summer and winter counts. Like the Lesser Yellowlegs, this is an American species.

Some thoughts on rare waders

If I have learned anything from my searches in the literature on rare waders, it is that they are not found without effort and study on the part of the observer: effort to find them (they are not called 'rare' lightly) and study to recognize them.

Past experience has shown that regular observations by one dedicated person in a little-studied area can produce a spate of new observations. F.T.H. Smith's record for finding rare waders is legendary: he could not have achieved it without spending countless hours in the field over many years, regularly visiting wader haunts around Melbourne. Similarly, D.N. Crawford was responsible for numerous first records for the Darwin area, after he began routine censuses in 1967 (Thompson 1978). Crawford himself (1972a) predicted the results of his activities, when he wrote of north-western Australia that 'it is an area where a regular watch will probably add several species to the Australian list'.

It is certainly true that, in the pursuit of rare waders, 'fortune favours the prepared mind'. In order to recognize a wader that has not previously been seen in Australia, a thorough knowledge of overseas wader literature is needed. How many of us would be willing to prepare as thoroughly as Smith (1968): 'Fortunately ... it was only the previous evening that I had studied the literature and checked the identification points of the phalaropes; as I had done many times during the past years' (on his first Australian record of the Wilson's Phalarope).

A first Australian record generates increased awareness and interest in the species, leading to a surer knowledge of field characters, behaviour, and the favoured habitat. This priming effect has often meant that further sightings of the same species follow closely, and assessment of a species' status can change quite rapidly under these circumstances. After the first record of a Pectoral Sandpiper in Albany in 1910, it was not seen again for over forty years. For almost 50 years, it was considered to be a very rare vagrant to Australia. The late 1950s, however, saw a series of records, and within the space of a decade, Pectoral Sandpipers were recognised as uncommon, regular visitors. Several authors have described their increasing awareness of this species over that period, their determination to make a thorough search, and their eventual success. It is appropriate to quote them directly.

J.N. Hobbs (1959) discovered a Pectoral Sandpiper in Dareton, N.S.W., only after he had 'examined about 4,000 sandpipers in this part of New South Wales'. In Melbourne, F.T.H. Smith (1963b) wrote,

> 'I decided that in future I would scrutinize all flocks and individuals of *acuminata* thoroughly in the hope that I might see a Pectoral Sandpiper'.

J. Eckert (1967) wrote,

> 'Excellent references to the species by J.N. Hobbs and later by F.T.H. Smith developed the personal feeling that this bird may visit us'.

He discovered the first Pectoral Sandpiper for S.A. in 1966 after 'much scanning of Sharptail flocks in the years from 1962 onwards'.

This priming effect does not work only for experts. An observer renowned for his wader knowledge and dedication first recognized the Lesser Yellowlegs in Australia (Smith 1983b). However, its re-discovery only a little more than a month later was accomplished by people who would not consider themselves experts. Their interest had been aroused in that short time by the first record, so that they were ready for it.

I have become aware during my search of the literature on rarities, that there has been a gradual change in the approach to identifying rare waders over the past 20 years or more. Most reports prior to the 1960s refer to specimens collected (i.e. shot) for close examination and future reference. The impression is that it was common practice in those days to shoot first and ask questions later: 'it was decided to shoot it to make certain of its identification' (Hitchcock 1952); 'a bird which had been collected as an "unusual looking wader", at first thought to be a Knot' (McEvey 1963) (it was in fact a Reeve).

Even as late as 1968, identification based on observation in the field was viewed with some suspicion: 'I am well aware of the problems

attendant on sight records of unusual birds, and that many ornithologists will not accept them' (Smith 1968). A sight record of a Pectoral Sandpiper at Reid, W.A. (McCrum & Slater 1955) earned an unnecessarily stinging rejection, on no other stated grounds than that

> 'There are only three satisfactory records of the Pectoral Sandpiper, all of which are based on specimens'. (Boehm & Condon 1958).

It is true that the original description given is rather rudimentary, and the bill colour is a puzzle (all black). However, the rejection does not seem to be based on any inadequacy or discrepancy here, and the account is described as fairly convincing. With the benefit of hindsight, we can discount the statement that 'the chances that they actually saw a Pectoral Sandpiper are almost nil'. Even at that time, however, this blunt assertion did not stand without some discussion of evidence either way.

Those of us who have begun wader-watching within the last few years may be a little surprised at this vehement attitude. After all, sight records are now widely accepted. What has changed? I believe that the change has been partly effected by the greater detail and accuracy in the descriptions in published sight records. As an example I offer F.T.H. Smith's excellent article (1968) on the first Australian sighting of a Wilson's Phalarope. He has given a comprehensive description of the bird, feather by feather, with notes on behaviour and habitat, backed by a discussion of the species world-wide. No-one who has read this account could remain unconvinced. Not only is an account like this one scientifically useful, but the vivid description of the bird active in its habitat brings it to life for other observers, as no description of a dead bird can do.

This trend would please the many bird-watchers who have been drawn into the world of waders since the beginning of the wader counts. Certainly few bird-watchers today would countenance killing a bird just because it looked unusual, especially since Mr. Smith and others have demonstrated by example that it is unnecessary.

In addition to their scientific value, the wader counts have been very successful in promoting wader awareness, increasing knowledge and identification skills (banishing wader cringe!), drawing people into the wader fold, and getting them out looking. All of our waders, rare or otherwise, must benefit.

Acknowledgements

As always, I would like to thank the many people who did the counting, in fair weather and foul (40°C). For those of you who have spent the last 7 years counting without seeing a rare wader, take heart! (Your co-ordinator would appreciate some assistance in seeing a Ruff or Reeve please).

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Table 1. RESULTS OF THE SUMMER 1987 WADER COUNT AT 22 SELECTED SITES.

	N.S.W.					VIC.						QLD.			S.A.			W.A.		TAS.		N.T.	TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Bush Thick-knee													4										4
Beach Thick-knee	1																						1
Pied Oystercatcher	31	6		26	17	827	189		9	53	63		102	17	25	7	8	15	15	439	31		1880
Sooty Oystercatcher	4			3	11	110	2				1		12		9						31		183
Masked Lapwing	21	11	8	4	37	35	261	228	55	221	556	14	26	14	2	80	215			112	70	20	1990
Banded Lapwing										7											4		11
Grey Plover	2					900					75		107		252	1	362	138	83			23	1943
Lesser Golden Plover	330	510		131	224	71	89		178	71	112		33	187		11		12		168	103	28	2258
Red-kneed Dotterel			2					3		10	8						6						29
Hooded Plover						5	2				1					10				4			22
Mongolian Plover	334	3		19	2	32	1			4	22	65	684	27	31		3			1	4	47	1289
Double-banded Plover			1			1								4									6
Large Sand Plover	91					14	2				1	27	33	18	2		12	175				348	723
Oriental Plover													2										2
Red-capped Plover	61	70	10	30	120	38	59	5	34	63	208		101	38	372	129	1155	144	104	88	121	68	3018
Black-fronted Plover			7	3				18		34	5		3	7		2	2			2	2		85
Black-winged Stilt	47	1	116	6				79	94	220	668		11	64			142	59	21			4	1532
Banded Stilt									50	2243	2509					5000	12041	228					22071
Red-necked Avocet		550	1					18	42	457	817					35	697	620	12				3249
Ruddy Turnstone	48	7		57		131	83			10	46	1	65	103	79	98	174	8			19	175	1104
Eastern Curlew	156	436		151	105	1573	1294			17	108	9	230	351	15		112			133	2	20	4712
Whimbrel	144	55				90	32				1	7	107	422		3	15	1		2		266	1145
Little Curlew													4										4
Wood Sandpiper								7									8						15
Grey-tailed Tattler	257	38		81		15	22			1	29	25	23	128	2	11	3				1	88	724
Tattler sp.													152					21				2	175
Common Sandpiper	3							6		6							10	3				52	80
Greenshank	64	45		5	9	87	306	1	40	99	613	3	66	122	17	7	565	238	6	43		45	2381
Marsh Sandpiper	7	65							39	80	62			5			111	1				10	380
Terek Sandpiper	64	70		14		3						16	44	6			1			1		64	283
Latham's Snipe					2			64		1	31			3									101
Snipe sp														1									1
Black-tailed Godwit	21	618				1				38	1		60	53			158					2000	2950
Bar-tailed Godwit	1158	1212	525	520	204	13139	419			3	219	130	1608	1306	94	7	671	70	5	76		2002	23368
Red Knot	109	2		1	3	7110	87			41	142			106	302		617	260		3		650	9433
Great Knot	7					950	2			2	74	26	2797	250	81		90	33	38			6500	10850
Sharp-tailed Sandpiper	216	2	80	84	40	39	439	3006	2350	5207	5755	5	212	244	375	4582	6975	112	73	50	18		29864
Pectoral Sandpiper								1		2	1												4
Red-necked Stint	505	178	30	60	546	13177	3319		2684	4463	6642	250	954	100	1900	4651	15833	1656	3430	2679	570	57	63684
Curlew Sandpiper	270	1506	498	10	2	5000	4362	40	4245	2891	3029	32	20	405	12	2216	4734	483	206	1425	45	1	31432
Sanderling	25					48										13						72	158
Ruff or Reeve										1							2						3
Hudsonian Godwit																	1						1
Red-necked Phalarope																	1					1	2
Unidentified small wader						1500																	1500
Unidentified medium wader										10			25										35
TOTAL	3986	5385	1278	1205	1322	44896	10970	3476	9820	16255	21799	610	7485	3981	3570	16863	44723	4277	3993	5226	1021	12543	224684

INDEX TO TABLE 1.

NEW SOUTH WALES

1 Clarence/Richmond
2 Hunter Estuary
3 Paramatta River
4 Botany Bay
5 Shoalhaven Estuary

VICTORIA

6 Corner/Shallow Inlets
7 Westernport
8 East Port Phillip Bay
9 Altona
10 Werribee/Avalon
11 Bellarine Pen./Mud Is.

QUEENSLAND

12 Cairns Area
13 Mackay Area
14 Moreton Bay

SOUTH AUSTRALIA

15 Western Eyre Peninsula
16 South East Coast
17 Gulf St Vincent

WESTERN AUSTRALIA

18 Albany Area
19 Swan Coastal Plain

TASMANIA

20 East Derwent/Pittwater
21 Cape Portland

NORTHERN TERRITORY

22 Darwin Area

Table 2. SUMMER COUNTS OF LONG-TOED STINTS IN EACH AUSTRALIAN STATE, 1981-5.

	NSW	VIC	QLD	SA	WA	TAS	NT	TOTAL
1981	-	1	-	1	70	-	-	72
1982	-	-	-	4	36	-	-	40
1983	-	2	-	11	26	-	1	40
1984	-	1	-	3	75	-	1	80
1985	-	-	-	14	37	-	-	51
TOTAL	0	4	0	33	244	0	2	283

Table 4. SUMMER COUNTS OF PECTORAL SANDPIPERS IN EACH AUSTRALIAN STATE, 1981-5.

	NSW	VIC	QLD	SA	WA	TAS	NT	TOTAL
1981	-	7	-	11	1	-	-	19
1982	6	4	1	2	5	2	1	21
1983	4	16	7	14	2	5	1	49
1984	1	10	-	5	3	-	-	19
1985	4	5	1	-	5	-	-	15
TOTAL	15	42	9	32	16	7	2	123

Table 3. IMPORTANT SITES FOR LONG-TOED STINTS IN SUMMER COUNTS, 1981-5.

Location	Count (Year)
Lake Forrestdale, SW WA	67(1981):5(1984):3(1985)
McLarty Lake, SW WA	9(1983):60(1984):27(1985)
Lake Jandabup, SW WA	3(1982):1(1983):10(1984)
Thompson's Lake, SW WA	2(1981):11(1983)
Lake Yangebup, SW WA	25(1982)
Peel Inlet, Albany area, WA	8(1982)
Port Hedland, NW WA	4(1983):5(1985)
Lake Alexandrina area, SA	4(1982):11(1983):2(1984)
Horse Peninsula, W Eyre Pen., SA	12(1985)
Werribee Farm, Vic	2(1983):1(1984)
Leanyer swamp, Darwin area, NT	1(1983):1(1984)

Table 5. IMPORTANT SITES FOR PECTORAL SANDPIPERS IN SUMMER COUNTS 1981-5.

Location	Count (year)
Werribee Farm, Vic	1(1981):2(1982):11(1983):5(1984):4(1985)
MMBW Plant, E Pt. Phillip Bay, Vic	5(1981):1(1985)
Seaford swamp, E Pt. Phillip Bay, Vic	2(1983):3(1984)
Lake Alexandrina area, SA	1(1982):1(1983):2(1984)
Mullins swamp, SE SA	1(1981):12(1983):1(1984)
Bool Lagoon, SE SA	10(1981)
Peel Inlet, Albany area, WA	5(1982):2(1983)
McLarty Lake, SW WA	1(1984):5(1985)
Leanyer swamp, Darwin area, NT	1(1982):1(1983)
Tullakool saltworks, Riverina, NSW	1(1983):1(1985)

Table 6. SUMMER COUNTS OF RUFFS/REEVES IN EACH AUSTRALIAN STATE 1981-5 .

	NSW	VIC	QLD	SA	WA	TAS	NT	TOTAL
1981	2	5	-	1	-	-	-	8
1982	-	1	-	1	1	-	1	4
1983	-	3	-	-	5	-	-	8
1984	-	-	-	1	-	-	-	1
1985	2	-	1	-	1	-	-	4
TOTAL	4	9	1	3	7	0	1	25

Table 7. IMPORTANT SITES FOR RUFFS/REEVES IN SUMMER COUNTS, 1981-5.

Location	Count (year)
Werribee Farm, Vic	1(1982):1(1983)
McLarty Lake, WA	5(1983):1(1985)

OBSERVATIONS ON DISTRIBUTION AND NUMBERS OF DOUBLE-BANDED PLOVERS IN TASMANIA.

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INTRODUCTION

Double-banded Plovers (*Charadrius bicinctus*) breed only in New Zealand, but a large part of the population migrates to Australia for the non-breeding season. Winter counts in New Zealand and Australia in the early 1980's produced totals of up to 14000 birds. The Australian subtotal was up to 5600, of which the Tasmanian total never exceeded 1440 (Lane 1987). These wintering ground counts are considerably less than other estimates of the total population based on banding returns and observations on the breeding grounds (unpub data). During 1-26 June 1987 I visited Tasmanian with two objectives in mind. Firstly, to attempt to improve our knowledge of the distribution and numbers of Double-banded Plovers wintering in Tasmania, and secondly to search for colour-banded birds from New Zealand as part of a continuing migration study.

COVERAGE

Early winter was chosen as the time for this survey, because local numbers of Double-banded Plovers appear to be relatively stable at that time of year (Lane 1987). Initially I planned to cover most of the coastline of Tasmania, but a shortage of time precluded visits to many areas. Instead, I concentrated on the north coast of Tasmania, and made brief visits to four other areas - Hobart area, Ocean Beach (west coast), Flinders Island and King Island. Within these search areas, nearly all known roosts were visited once only. Much additional coastline was searched on foot in attempts to find other feeding and roosting areas. No east coast localities north of Blackman Bay were visited, and, except for the northern parts of King Island, no inland searches were conducted.

RESULTS

About 3000 Double-banded Plovers were counted, with largest roosting flocks occurring at Kangaroo Island in Robbins Passage (865 birds), followed by King Island (c.400) and Cape Portland (307).

Robbins Passage: Kangaroo Island is one of at least seven roosting sites for Double-banded Plovers in the Robbins Passage area, while Bird Point is also a likely site (R. Ashby pers. comm.). I visited four of these eight areas, finding Double-banded Plovers roosting at all of them. One colour-banded bird was found to travel up to 11 km between roosting and feeding areas. There appeared to be much flexibility in selection of roost sites. Thus, R. Ashby found flocks of up to 80 at each of Kangaroo Island, Wallaby Islands, Harcus Island and Five Islets in mid May 1987. During my first visit to Kangaroo Island (on 16 June), 865 birds were roosting by 1645 h (at dusk) when high tide was at about 1730 h. On my second visit (on 22 June) only 3 birds roosted there during high tide (at about 1015 h). (A visit by R. Ashby (pers. comm.) to Shipwreck Point on Perkins Island on 11 July 1987 revealed 600+ birds at high tide.) This interchange among sites precluded an accurate assessment of numbers wintering in Robbins Passage, but the subtotals suggest a total in excess of 1000. During low tide on several days, I counted 315 birds in an area of about 23 km giving a density of about 14 birds per km. It was not clear whether these densities were typical of the whole area, but if they were, this would give a total of about 1400 birds in Robbins Passage (over 100 km. of mudflats are exposed during low tide). Further work is needed in this region, but in the meantime a total of 1000+ birds would seem to be a reasonable estimate.

King Island: A search of farmland in north-central King Island on the afternoon of 25 June revealed a loose flock of about 300 feeding in low-lying, saturated rough pasture between Reekar and Yambacoona about 5 km from the sea. These birds flew in two separate flocks to the WNW before dusk. The following morning about 400 were present in the same paddocks. From 1959 to 1970 flocks of 200-1000 birds were recorded in pasture and on the airfield in the northern half of King Island (Green & McGarvie 1971). Clearly, this pattern of pasture feeding on King Island continues. A check of several beaches in the Whitemark area on the morning of 25 June revealed only three birds.

Cape Portland: This area contains up to 600 Double-banded Plovers and is regularly checked by R. Cooper who took me to the Cape on 5 June. Fewer than ten birds were seen along the seashore of the Cape. Over 300 birds were foraging in pasture and ploughed land for most of that day. Before dusk, all of these birds flew to roost at the edge of a sand-dune pond about one kilometre away.

Numbers of birds found in the remaining areas of Tasmania are summarised in Table 1. As in New Zealand, Double-banded Plovers utilise a variety of feeding habitats, ranging from several types of intertidal zones (bare sand, mud, seaweed and especially *Zostera* flats), to pasture, ploughed land and lagoon edges. The most favoured intertidal sites were those *Zostera* flats which remained heavily saturated at low tide and/or contained numerous small pools during low tide. Shrimps, crabs and polychaete worms were seen being eaten, but most mudflat prey appeared to be very small. Locally high densities of birds occurred in kelp beds, and elsewhere flocks of birds were found foraging on three exposed sandy ocean beaches, particularly Ocean Beach. Throughout Tasmania there was a tendency for birds to forage in loose flocks of up to 100 birds, even at low tide, although flock feeding was most pronounced during flood and ebb tides. Territoriality was prevalent at low tide in the Robbins Passage area and in parts of East Inlet.

Except on King Island late in the survey, few birds were in full breeding plumage. Males in full breeding plumage comprised 6% of Hobart samples on 3 June (n = 36), 0% of Cape Portland birds on 5 June (n = 307), 7% of Robbins Passage samples on 15-16 June (n = 180), and 22% of King Island samples on 25 June (n = 120). These proportions indicate a later timing of prenuptial moult than in those birds which spend the non-breeding season in New Zealand (unpub. data).

Of the 2020 birds checked for colour-bands, 41 were colour-banded. These included 30 with New Zealand colour bands, 10 with Tasmanian colour bands and one bird banded by the Victoria Wader Study Group. The latter bird (a female) was found at Lades Beach, Bridport on 13 June 1987. It had been banded in winter 1986 at Inverloch in Victoria about 300km to the NNW and represents the fathest shift in wintering sites recorded thus far (Barter & Minton 1987). All 30 New Zealand birds were from the southern half of the South Island. Two of these 30 birds had originally been metal-banded in Tasmania and later recaptured and colour-banded on the breeding grounds in New Zealand.

DISCUSSION

Double-banded Plovers have proved elusive during winter wader counts in both New Zealand and Australia. The total of approximately 3000 birds seen during this study is considerably more than previously recorded in Tasmania. Previous counts were relatively low due in part to the lack of coverage in the northwest, especially the Robbins Passage area. Overall, my coverage was also rather

fragmentary, with no visits to east coast and inland localities being made. In recent years flocks of 100 or more birds have been seen at Moulting Lagoon and near Tunbridge (P. Duckworth, K. Hughey, pers. comms.). Flinders Island was the only island in the Furneaux Group which I visited. Elsewhere in that group, a flock of 300 birds has been recorded (on Badger Island, N. Brothers, pers. comm.), while aerial views suggest that there is suitable habitat on Cape Barren Island (pers. obs.) and possibly others of that group. Many more beaches and islands in the north and west of Tasmania would have been visited if I had had more time available. No west coast beaches north of Henty River were visited. The additional colour-banded birds seen by Ralph Cooper before and after my visit is further confirmation of my incomplete coverage. Between March and June 1987, Ralph found four colour-banded individuals in the Cape Portland area, and four in the Tamar Estuary area. Of these eight birds, I recorded only four during the June survey, three at Cape Portland and one at Tamar Estuary.

A second potential means of missing birds is a tendency for roosts to be on offshore islets. This was particularly noticeable in the Robbins Passage area, where all roosts seen were on island (including the rocky Shell Islets), and no plovers were seen at mainland peninsulas there. A third possibility arises from the generalist behaviour of the birds themselves, feeding in a variety of habitats including far-inland pasture and lakeshores. After my survey, Ralph Cooper found a large feeding flock at Longford, containing 200+ birds on 21 Jun and 298 birds on 26 July. It is possible that I missed seeing farmland flocks in other parts of Tasmania, including elsewhere on King Island. On King Island, most plovers were foraging in an area with high concentrations of other insectivorous species, especially Starlings (*Sturnus vulgaris*), Silver Gulls (*Larus novaehllandiae*) and Cattle Egrets (*Ardeola ibis*). Future workers may find these conspicuous species to be useful in locating concentrations of Double-banded Plovers.

Wintering Double-banded Plovers have a high site fidelity between years in both New Zealand and Australia (e.g. Barter & Minton 1987), so that with good feeding conditions, individual sites should attract fairly similar numbers of birds from year to year. This prediction is supported by observations over many years at localities in New Zealand (pers. obs.) and in Australia (e.g., Cape Portland, Hobart area). Flocks reported in previous years at many other sites, should continue to occur at or near those sites. Over 1000 birds have been recorded at those "known" plover sites which I did not visit. Bearing in mind the incompleteness of my survey, I believe that a conservative estimate of the Tasmanian wintering population would be 4000+ birds. It is hoped that this survey will encourage further searches for Double-banded Plovers in Tasmania, particularly in the more remote regions and offshore islands.

ACKNOWLEDGEMENTS

Details of roost sites were provided by R. Ashby, N. Brothers, R. Cooper, P. Duckworth, D. Henderson, K. Hughey, P. Park, and R. Patterson. Tasmanian hospitality lived up to its fine reputation: particularly I thank R. and S. Ashby (Heymouth), R. and B. Cooper (Legana), R. Gales (Hobart), D. and B. Henderson (Legana), P. Park (Campania), D. Smith (Flinders), D. and J. Whitchurch (King Island), all of whom contributed much to the speed and comfort of this survey, and often at short notice. I am also grateful to the many landowners who permitted me to cross their properties in search of plovers, and to R. Williamson for criticising a draft of this manuscript.

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TABLE 1. NUMBERS AND PREFERRED HABITAT OF DOUBLE-BANDED PLOVERS SEEN IN TASMANIA, JUNE 1986

LOCALITY	DATE	NO. SEEN	NO. CHECKED FOR BANDS	NO. NZ-BANDED	PREFERRED FEEDING HABITAT
Hobart area	2-3	297	261	4	Zostera, mud
Little Musselroe Bay	5	2	2	0	Zostera
Cape Portland	5	307+	280	3	Paddocks
Port Sorell	6	90	64	0	Zostera
Tamar Estuary	7	70	68	1	Zostera, Kelp
Flinders I: Long Pt	8-11	110	85	2	Seaweed
Patriarch Inlet	9	19	19	0	Saltmarsh
Cameron Inlet	10	4	4	0	Mud
Adelaide Bay	11	4	4	0	Bare sand
Lades Beach, Bridport	13	82	82	0	(Roosting)
Waterhouse Rivermouth	13	170+	150	5	(Roosting)
Seabrook	14	33	33	1	Bare sand
Robbins Passage	16-21	1000+	c.450	8	Zostera
East Inlet	18	121	121	2	Zostera, sand
Black River	18	2	2	0	Beach sand
Ocean Beach: Strahan	24	60	60	0	Beach sand
Henty River	24	160	36	1	Beach sand
King Island	26	c.400	c.300	3	Wet pasture
TOTAL		c.2930	c.1940	30	

LIST OF COLOUR-BANDED BIRDS IN TASMANIA JUNE 1987.

DAY	LOCALITY	BANDS (L/R)	BANDING DETAILS AND SUBSEQUENT RECORDS
2	Lauderdale	MW/RWG	Lauderdale 030483 (BOAT); recap NZ (fem), Lake Tekapo (Region 18) 081085 & colour-banded. Seen Lauderdale 1986 and 310387 and Cass River Lake Tekapo 301286.
2	Clear Lagoon	MG/Y	Tasman River (R 17) Juv 1985. Also Lauderdale 310387 (P. Park).
3	Barilla Bay	MG/YWR	Barilla Bay 310581 (BOAT); recap NZ (fem), Ashburton River (R 28) 161186 and colour-banded (K. Hughey).
3	Barilla Bay	GM/-	Upper Rangitata River (R 24) fem 1985.
5	Cape Portland	M/WBY	South Canty coast (R 22) 1985 or 1986 (fem). CP since 050487 (R. Cooper).
5	Cape Portland	RB/GM	Cass River (R 19) juv 271284. Cape Portland 1986 and since 290387 (RC).
5	Cape Portland	MY/RYR	Upper Waimakariri River fem 1985. Cape Portland 270486 and 170487 (RC).
7	Tamar Estuary	WRG/M	Cass River (R 19) fem 1984. Tamar Est 1986 and 170587 (D Henderson, RC).
8	Flinders I	G/YM	South Westland (R 54) juv 1986.
11	Flinders I	WYB/Y	Ashley River (R 36) fem 101083. Flinders Is 230485 (K Hughey).
13	Waterhouse R	MR/RWR	Cass River fem 141086.
13	Waterhouse R	Y/M	Cass River juv 1985.
13	Waterhouse R	M/YM	Mayfield (R 27) fem 1984 1985 or 1986.
13	Waterhouse R	MG/WB	Tasman River (R 17) male 1985.
13	Waterhouse R	M/WRY	Matukituki River (R 12) fem 1985.
14	Seabrook	MR/RBW	Cass River male 311086.
15	Robbins Is	M/WBY	S Canterbury coast (R 22) fem 1985 or 1986.
16	Kangaroo Is	-/YM	Cass River fem 1985 or 1986.
16	Kangaroo Is	W/GYR	Tekapo River (R 18) fem 151086.
16	Kangaroo Is	M/GY	Oreti River (R 4) fem 1985 or 1986.
16	Kangaroo Is	GBY/M	South Westland (R 54) male 1986.
17	Robbins	M/YWR	Ashburton River (R 28) fem 1985 or 1986.
18	East Inlet	-/MR	Cass River juv 1986.
18	East Inlet	WM/YRB!	Tekapo River (R 18) fem 1986.
21	Robbins Is	Y/YM	Tekapo River (R 18) fem 1985 or 1986.
21	Robbins Is	GG/M	Rees River (R 8) fem 1985.
24	Ocean Beach	R/R	Cass River juv 1984 (fem).
26	King Is	BM/Y	Tekapo River juv 1986.
26	King Is	M/YR	Tiwai (R 6) fem 1985 or 1986.
26	King Is	Y/M	Cass River juv 1985.

SIGHTINGS BY OTHER OBSERVERS IN TASMANIA MARCH - JUNE 1987

170487	Cape Portland	BR/GM	Cass River juv 1984, R. Cooper.
210487	Legana	WM/RG	Cass River male 1983, RC.
170587	Tamar Est	MR/WB	Cass River juv 1984 (male), RC.
100687	Tamar Est	M/GW	Oreti River male (R 4), RC.

APPENDIX 1. MINIMUM COUNTS OF SOME OTHER WADER SPECIES IN TASMANIA IN JUNE 1987.

	LOCALITY												
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13
Red-capped Plover	P	50	P	30	P	P	P	P	P	20	P	80	P
Hooded Plover	P	2	P			83	6	25			15	33	P
Black-fronted Plover													3
Mongolian Plover			2										
Grey Plover										2			
Golden Plover					1					1			
Red-necked Stint	P			1		60	8	10		45	12	3	
Curlew Sandpiper	P					46				26	3		
Bar-tailed Godwit					2	24			c.40	2			
Knot sp.									c.20	1			
Eastern Curlew	P			3		13				23			
Whimbrel										1			
Ruddy Turnstone		3	8							35	15		15
Tattler sp.			2		1								1
Terek Sandpiper					1	1				1			
Greenshank						1							

Locality code: 1 Hobart area; 2 Little Musselroe Bay; 3 Cape Portland; 4 Port Sorell; 5 Tamar Estuary; 6 Flinders Island; 7 Lades Beach; 8 Waterhouse River; 9 Shell Islets, Robbins Passage; 10 Kangaroo Island; 11 East inlet; 12 Ocean Beach, 13 King Island.

Notes 1: P = present.

2. The 83 Hooded Plovers seen on Flinders Island included 77 seen along 18 km of beach between Patriarch and Cameron Inlets, 9 June 1987.

THE WEIGHTS OF RED-NECKED AND LITTLE STINTS.

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INTRODUCTION

The Red-necked Stint *Calidris ruficollis* breeds in eastern Siberia and winters from south-eastern China, Taiwan, the Philippines and on the mainland and islands southward to Tasmania occasionally reaching New Zealand (Palmer 1967). The morphologically similar Little Stint *C. minuta* is the western Palaearctic equivalent of the Red-necked Stint. It generally winters further west than the Red-necked Stint on the southern Caspian coast and south-west to Assam, Madras and Bengal, along the coast of India, Ceylon, on the shores of the Persian Gulf, in Arabia and in Africa (Dement'ev et al. 1969). In recent years a few Little Stints have been identified in Australia, including Tasmania (Newman 1982).

The weights of 97 Red-necked Stints collected in Tasmania between Sep 1967 and Apr 1968 have been analysed previously (Thomas and Dartnall 1970a, 1971b). Unfortunately, the results included a systematic error, as pointed out by Paton and Wykes (1978). This error was not made in reporting the weights of Curlew Sandpipers *C. ferruginea* collected during the same period (Thomas and Dartnall 1970b, 1971c).

Recently I found my original laboratory book with the correct weights. In this paper the original data, which include the determination of fat contents of five males and five females, have been re-evaluated. Mean monthly weights are compared with those for Red-necked Stints caught in Tasmania between 1979 and 1983 and comprehensively analysed by Barter (1984b). Comparison is also made between the weights of Tasmanian Red-necked Stints and those of South African Little Stints reported by Middlemiss (1961) because this raises an interesting question regarding the weight of the third Tasmanian Little Stint (Newman 1982).

METHODS

Ninety-seven Red-necked Stints were collected, under licence, from early September 1967 to late April 1968. These were subsequently weighed, stage of moult determined, sexed by dissection, the gonads examined and the gut contents determined (Thomas and Dartnall 1971a,b). After removal of the guts the carcasses of five males and five females were ground, the fact extracted with ether which was evaporated, and the oily residue heated until no emulsion products were visible when it was weighed. This was the only method available and its accuracy and reproducibility are not known. However, it should give comparative results.

Weight data for Red-necked Stints for 1979/83 were taken from Barter (1984b) and for South African Little Stints from Middlemiss (1961). Additional weight data for both species were taken from Dement'ev et al.1969).

RESULTS

Mean monthly weights and ranges are shown in Fig.1. Also shown in Fig. 1 are the overall mean weights of Red-necked Stints calculated from Fig.1 of Barter (1984b) and the mean monthly weights and ranges for the Little Stint at Rondevlei, South Africa calculated from Middlemiss' Table 2. In all these calculations possible differences arising from different sex ratios have been ignored. The mean difference between 51 females and 31 males collected in 1967/8 was 0.5g.

For the Red-necked Stint, the 1967/8 birds had a greater mean weight than the 1979/83 birds in all months except October and February, when the weights were almost identical, and in March and April when the mean weight is influenced by the proportion of the sample that is laying down pre-migratory fat. That the October and February weights are similar suggests that any weight differences between the two periods are small. The differences for other months could be influenced by annual differences and differences in the proportions of birds collected from the various sites in the area (Barter 1984b) as well as by differences in the sex ratio. In general terms, Barter's results should be the more accurate because of his larger samples. However, the possibility remains that the 1967/8 birds were, on average, slightly heavier. Tasmanian birds appear to be considerably heavier than Siberian birds for which Dement'ev et al. (1969) quote weights from Sudzukhe Preserve in "late northern summer" of 25.7 for "old" males (range 23.5 - 28g, N = 27) and 26.6g for females (range 22.1 - 31 g, N = 36).

There is a pronounced difference in the mean weights of Tasmanian Red-necked Stints and South African Little Stints. The monthly ranges show comparatively little overlap for any month except April with the heaviest Little Stint weighing less than the mean for the Red-necked Stint in the same month. Using Barter's (1984b) data, because of his larger sample sizes, the difference in mean weights between the two species ranges from 5.4g in November to no less than 12.4g in April, with an average difference of 7.9g. This is much greater than the difference of 3.2g calculated from the data in Dement'ev et al (1969). What makes this so interesting is that the weights of the South African Little Stints, Oct-Mar mean values 22.1-23.4g are similar to the Russian mean weight of 23.1 whereas the Tasmanian Red-necked Stints are consistently heavier, Oct-Mar mean values 28.8-31.1g, than the Russian mean weight of 26.3g. The Russian Little Stints weighed: males 23g (range 22-25g, N = 8), females 23.3 g (range 21-27g, N = 7).

The third Tasmanian Little Stint was caught and weighed in Nov 1981 (Newman 1982). At 32.5g it was heavier than any Rondevlei bird apart from some trapped in April when birds would be expected to be acquiring fat prior to migrating. Such a weight is above average for Red-necked Stints wintering in Tasmania in November. Its primary feathers were reported to have been in "pristine" condition so presumably it had completed primary moult.

Mean weights, related to primary moult score (PMS), are given in Table 1. Because sample sizes are small, there is little indication of change during primary moult (c.f. Thomas and Dartnall 1971b). Table 2 gives the results of the fat determinations. When fat content is plotted against PMS (Fig.2) there is some indication that it decreases during the first half of primary moult and then increases during the latter part. Again the sample size is small but if fat content does increase during the latter part of primary moult it must do so at a time when secondary, tail and body moult are getting under way (Thomas and Dartnall 1971b).

DISCUSSION

Several points worthy of comment emerge from the above results.

Surprisingly, Tasmanian Red-necked Stints appear to be heavier than Russian birds whereas South African and Russian Little Stints have similar mean weights. There are several possible reasons that could account for this. Thomas and Dartnall (1971b) reported that most birds retained some subcutaneous fat, as determined by palpation. Possibly such fat is needed in Tasmania, but not in South Africa, as protection against lower temperatures and/or greater wind-chill effects.

Alternatively, Tasmania may provide better feeding conditions than Rondevlei and Sudzukhe Preserve. However the most likely explanation may be that the Russian sample of Red-necked Stints contained some birds that were in very poor condition as weights as low as 22.1 and 23.5g were recorded for females and males respectively. Yet another alternative is that there is a cline in size across the non-continuous breeding range of the Red-necked Stint with the larger heavier birds migrating to southern Australia and the smaller lighter birds migrating elsewhere. I am not aware of any evidence to support this alternative. It could be argued that the mean lean weight of the Red-necked Stint, assuming a 6% fat content (Barter 1984b), should be taken as 24.7g based on the Russian birds. This is about 10% less than the lean weight used by Barter in calculating the flight range of Tasmanian birds, which would result in this being under-estimated. This is unlikely if, as suggested above, some Russian birds were in very poor condition when they could have been fat free. The mean lean weights of Tasmanian birds calculated from Table 2 are 26.5g for males and 28.4g for females, giving an overall mean lean weight of 27.4g, almost identical to Barter's assumed value. Given the unknown accuracy of the method used to determine fat content this close agreement may be no more than coincidental. The difference in lean weight between the sexes is more than expected.

The weight of the Little Stint caught in Tasmania in Nov 1981 is worthy of further comment. At 32.5g it is 9.1g heavier than the November mean of Rondevlei birds and 3.2g heavier than the heaviest bird. Middlemiss (1961) gives minimum, maximum and mean weights for his catches so the standard deviation cannot be calculated. If it is assumed that it is similar to the November value for the Red-necked Stint quoted by Barter (1984b), the difference in weight between the Tasmanian bird and the Rondevlei Nov mean is five times the standard deviation, a very large value. As the identification is not questioned another explanation of such an abnormally high weight must be sought. Possibly this individual had become disoriented during migration or been wind drifted to Tasmania. It may have remained here until it had completed moult of the flight feathers and, when caught, was in the process of laying down fat prior to leaving on re-directed passage to its normal wintering ground.

There have been several attempts to relate weight to PMS (e.g. Thomas and Dartnall 1971b,c, Barter 1984a,b, Table 1 above). As moult is a source of physiological stress there is little reason to assume that weight would be influenced only by primary moult because the primary feathers account for only 11% of the total feather dry-mass (Holmes 1966) and other feather tracts are in active moult during primary moult (Thomas and Dartnall 1971b,c). The start of secondary, tail and body moult may account for the slowing of the rate of primary moult reported by Barter (1984a). Boere (1977) demonstrated constant weight throughout moult of the flight feathers of seven species although there was a tendency for weight to increase towards the end of moult. In local studies differences in weights for different PMS may be statistically significant but biologically unimportant.

Rectrices and remiges comprise only about 20% of the feather mass (Holmes 1966). Consequently, body moult, which occurs twice a year, represents an even greater source of physiological stress. Thomas and Dartnall (1971b,c) recorded individual Curlew Sandpipers and Red-necked Stints shortly after arrival and before departure that had old and new feathers in some feather tracts but were not in active moult. Hale (1980), referring to moult of the flight feathers, states that moult and migration are normally mutually exclusive. A question that has received little attention is: do birds suspend body moult during migration? Hale argues that the timing of moult and migration have evolved so that the efficiency of flight is not impaired. For example, Lack (1968) records that Eurasian Curlews *Numenius arquata* increase their wing beats by 44 strokes per minute when in primary moult. This would decrease the potential flight range because of the increased energy requirements. Both the need to minimise physiological stress and maximise flight efficiency may have influenced the timing of moult but we need to know whether waders suspend body moult during migration before this can be established unequivocably.

The data presented here suggest that female Red-necked Stints are larger than males. This is based on the weights of the Russian birds, the 1967/8 Tasmanian birds and the mean lean weights of a very small sample of Tasmanian birds. Additionally, Thomas and Dartnall (1970a) showed that females had longer bills ($0.02<P<0.05$) bearing in mind that statistical and biological differences may not be the same. If this is the case, Barter's (1984b) conclusions regarding the differences between age-groups, years and sites should be viewed with caution.

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Table 1. RELATION OF WEIGHT TO PMS FOR THE PERIOD SEPTEMBER TO MARCH. STANDARD DEVIATIONS ARE GIVEN WHERE SAMPLE SIZE EXCEEDS EIGHT.

PMS	N	WEIGHT, g	
		Mean	Range
0	14	31.2 ± 1.7	27-34
1 - 20	9	29.1 ± 1.1	28-32
21 - 40	3	30.3	30-30.5
41 - 60	9	32.7 ± 3.1	27-36
61 - 80	6	29.8	27-31
81 - 99	15	31.2 ± 1.6	27.5-33.5
100	32	31.2 ± 2.9	26-36.6

Table 2. FAT CONTENT.

Sex	Date Collected	Total Weight g	Fat g	% Fat	PMS
M	26 Oct	28	2.53	9.0	1
	26 Nov	28	2.05	7.3	45
	31 Dec	31	3.81	12.3	76
	10 Mar	30	4.06	13.5	100
	16 Mar	33.5	4.59	13.7	100
F	9 Nov	30	2.35	7.8	0
	12 Dec	30.5	1.44	4.7	71
	2 Feb	32	3.30	10.3	91
	2 Feb	32.5	3.12	9.6	86
	16 Mar	32.5	5.03	15.5	100

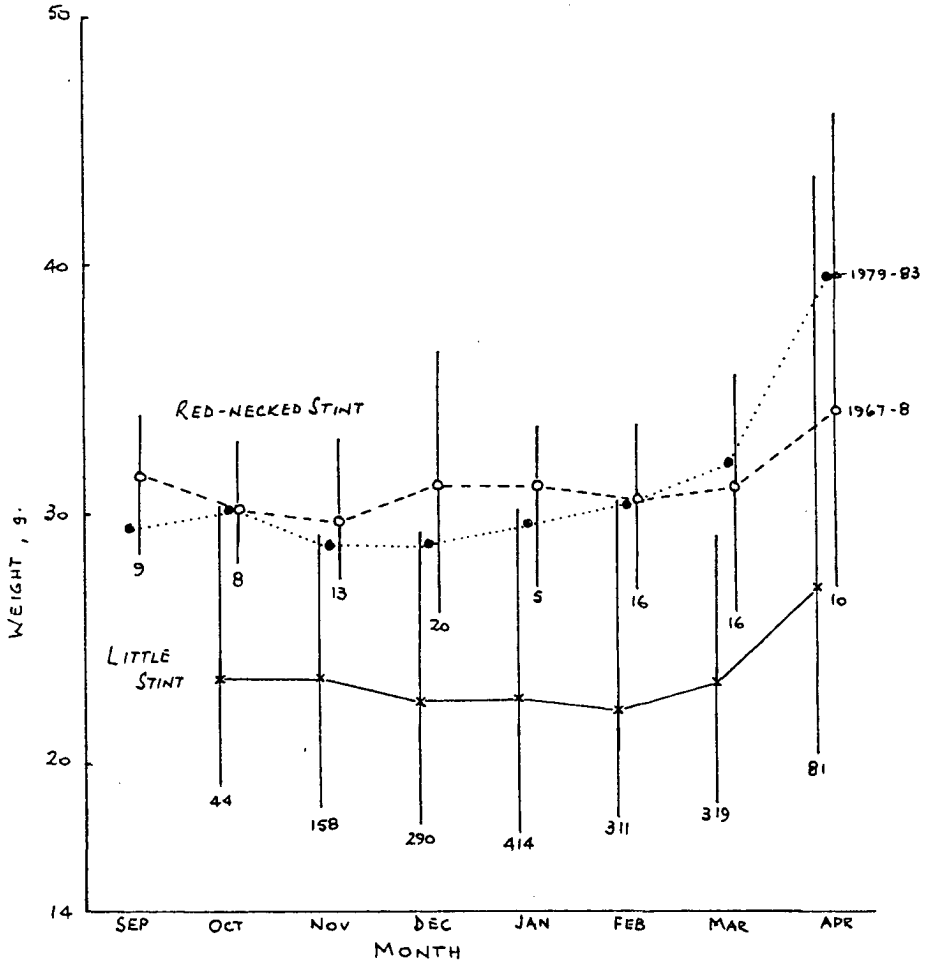
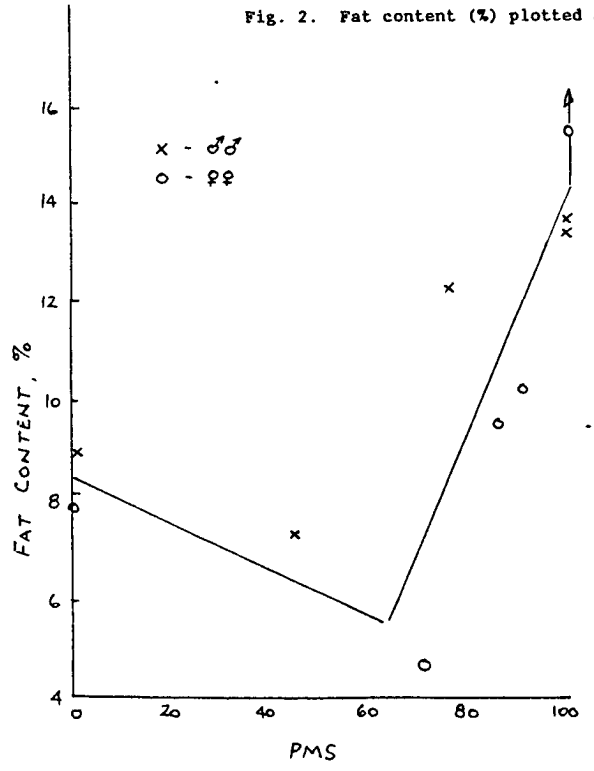


Fig. 1. Weights of Tasmanian Red-necked Stints and South African Little Stints. The monthly mean, range and sample size are shown.

Fig. 2. Fat content (%) plotted against primary moult score (PMS).



VARIATIONS IN NUMBERS OF PALAEARCTIC WADERS IN SOUTH-EASTERN TASMANIA.

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INTRODUCTION

In south-eastern Tasmania an almost unbroken series of summer wader counts spanning over 20 years is available for analysis. In this paper I investigate trends in the numbers of the six most numerous Palaearctic breeding species using simple time series analysis. I also seek to verify the suggestion made earlier (Thomas 1970) that the MacArthur-Wilson model for determining the equilibrium number of species on archipelagos is applicable to waders in south-eastern Tasmania.

The area considered, Pitt Water and the Derwent Estuary, is described in Thomas (1968). A preliminary analysis has been presented by Newman and Fletcher (1981). It is believed that the method of analysis used in the present study is more appropriate than that used by these workers because of the nature of the raw data.

The data are taken from the following sources:

1964/5 - 1968/9	Thomas (1970)
1969/70	Thomas (unpubl.)
1971/2 - 1986/7	BOAT Wader Counts reported in Tasmanian Bird Reports (Boat 1973 et seq.)

No data are available for 1970/1. The BOAT counts for 1971/2 and 1972/3 almost certainly are incomplete (Newman and Fletcher 1981) and have been ignored for most species. In determining the number of species present each season the same sources have been used, augmented by observations contained in the Systematic Lists in BOAT (1973 et seq.)

MIGRATORY SPECIES

Method of Analysis

The data for an individual species form a time series because numbers vary continuously with time. Methods of time series analysis are more applicable to this type of data than are cmparisons of means and standard deviations calculated for discrete periods. I have chosen to use the centred moving average of order five. In addition the standard deviation of each mean was calculated. This was also expressed as the coefficient of variation (CV) which is the standard deviation expressed as the percentage of the mean. As Hairston (1959, 1964) has pointed out, this statistic can be used to describe and analyse changes within the same habitat with time. In fact, it is a measure of the stability of a population with small CV values being associated with stable populations. The CV is quoted in the figures that follow which show the moving averages ± one standard deviation.

Thomas (1970) included seven Palearctic breeding species. Only six of these could be included here because the BOAT counts are conducted in February when many individuals of one species, the Sharp-tailed Sandpiper *Calidris acuminata*, have already left the area (Thomas 1970).

Results and Discussion

Pacific Golden Plover *Pluvialis fulva* (Fig.1).

Little overall trend is discernible apart from a slight tendency to increase in numbers over the last five years. The large values of the CV, particularly between 1973-4 and 1983-4, suggest that the numbers of birds reaching the area vary greatly from year to year. Maximum recorded 236 in 1975-6, minimum 83 in 1977-8.

Eastern Curlew *Numenius madagascariensis* (Fig.2)

Newman and Fletcher (1981) have drawn attention to the decline in the numbers of curlews reaching south-eastern Tasmania since 1948-50. This decline is shown clearly in Fig.2 although it appears to have been arrested since 1981-2. The extent of the decline is considerable: from 500-600 birds in 1948-50 to 140-150 since 1981/2. The CV values suggest that the greatest declines occurred between 1968/9 and 1973/4 and between 1977/8 and 1980/1. Newman and Fletcher (1981) consider that the Eastern Curlew has declined in numbers as a consequence of indiscriminate shooting at its preferred location, the Sorell mudflats. This cannot be the sole cause as the percentage of the population occurring in the Derwent Estuary has fallen from 30-40% in 1948-50 (based on Wall 1953) to c. 20% in 1964-70 and 5-10% since 1974/5. The maximum recorded was 284 in 1964/5 and the minimum 128 in 1985/6.

Greenshank *Tringa nebularia* (Fig.3)

Numbers have increased slightly up to 1980/1 since when they have tended to decline. Patterson (pers. comm.) has suggested that this decline may be more apparent than real because some birds present in the area may not have been located in at least one of the more recent BOAT counts. Maximum 115 in 1980/1, minimum 42 in 1983/4.

Bar-tailed Godwit *Limosa lapponica* (Fig.4)

The trend was for numbers to increase between 1966/7 and 1972/3 after which they have decreased steadily, a trend that appears to be continuing. The extent of the decline is illustrated by the maximum and minimum numbers: maximum 210 in 1968/9, minimum 52 in 1982/3. The CV values suggest that the period of maximum decline commenced in 1980/1. It is possible that some birds had already left the area before the BOAT counts in some years. Some left early in 1964/5 (Thomas 1968). The numbers present in 1948-50 cannot be estimated from the data in Wall (1953).

Red-necked Stint *Calidris ruficollis* (Fig.5)

Following an initial increase the trend line remained sensibly constant until 1973/4 after which it increased to a peak in 1978/9. Numbers remained high until 1981/2 after which they have declined. The CV values were determined largely by these trends. Maximum recorded 3925 in 1982/3, minimum 1430 in 1964/5.

Curlew Sandpiper *C. ferruginea* (Fig.6)

Initially the trend line showed an increase in the population size. From 1968/9 to 1979/80 the population remained sensibly constant, after which it has shown a continuous increase. The CV values reflect both trends and random variations about the trend line. Maximum 1815 in 1985/6, minimum 244 in 1964/5.

I have pointed out previously (Thomas 1970) that, as Tasmania is at the limit of the wintering range of migrants, it cannot be assumed that the area is saturated by either individuals or species. In other words, it is not known whether the carrying capacity of the area has been reached. The total biomass of the two small calidrid sandpipers was calculated using the lean weights given by Barter (1984a,b).

This has been plotted against time in Fig.7. It is possible to fit a straight line, shown dashed in Fig.7, to the plotted points. This suggests that the carrying capacity of the area has not been

reached. However, such a procedure ignores the apparent stepped nature of the data as shown by the full line in Fig.7. When such a "curve" is fitted, there are two periods when the total biomass is constant. Of particular interest is the later period starting in 1981/2. In this period the number of Curlew Sandpipers has increased whereas the number of Red-necked Stints has decreased. Both species have essentially similar diets (Thomas and Dartnall 1971). If the carrying capacity of the area has been reached, is the decline in Red-necked Stints the result of competition for the same resources by Curlew Sandpipers? Curlew Sandpipers forage mainly below the water's edge and Red-necked Stints above it so the Curlew Sandpipers could reduce the amount of food available to the stints as they follow the receding water line. This is possible although it is equally possible that the carrying capacity of the area has not been reached and that the numbers of both species are determined by factors operating on the breeding grounds or during migration. On the other hand, if the carrying capacity has been reached, this provides us with an almost unique opportunity to study interference competition.

NUMBER OF SPECIES

Since my previous attempt (Thomas 1970) to show that the MacArthur-Wilson (1967) equilibrium model applied to the number of species reaching Tasmania considerably more data have become available. Following the procedure used previously the numbers of immigrants and extinctions are plotted against number of species in Fig.8a and b. As in regression analysis the curves fitted include the mean values: number of species 19.5, immigrants 2.8 and extinctions 2.8. The fitted curves are plotted in Fig.8c. The point of intersection gives the value of S, the equilibrium number of species, 19.5. The mean number of immigrants can be taken to equal the mean value of the number of extinctions. This provides confirmation that the MacArthur-Wilson model is applicable. This model suggests that those species that are well established will remain so unless present environmental conditions change markedly. It further suggests that additional species are unlikely to become established permanently or in numbers. One such species, the Red Knot *Calidris canutus*, has varied in numbers from none to 52 but cannot be considered to be established in south-eastern Tasmania.

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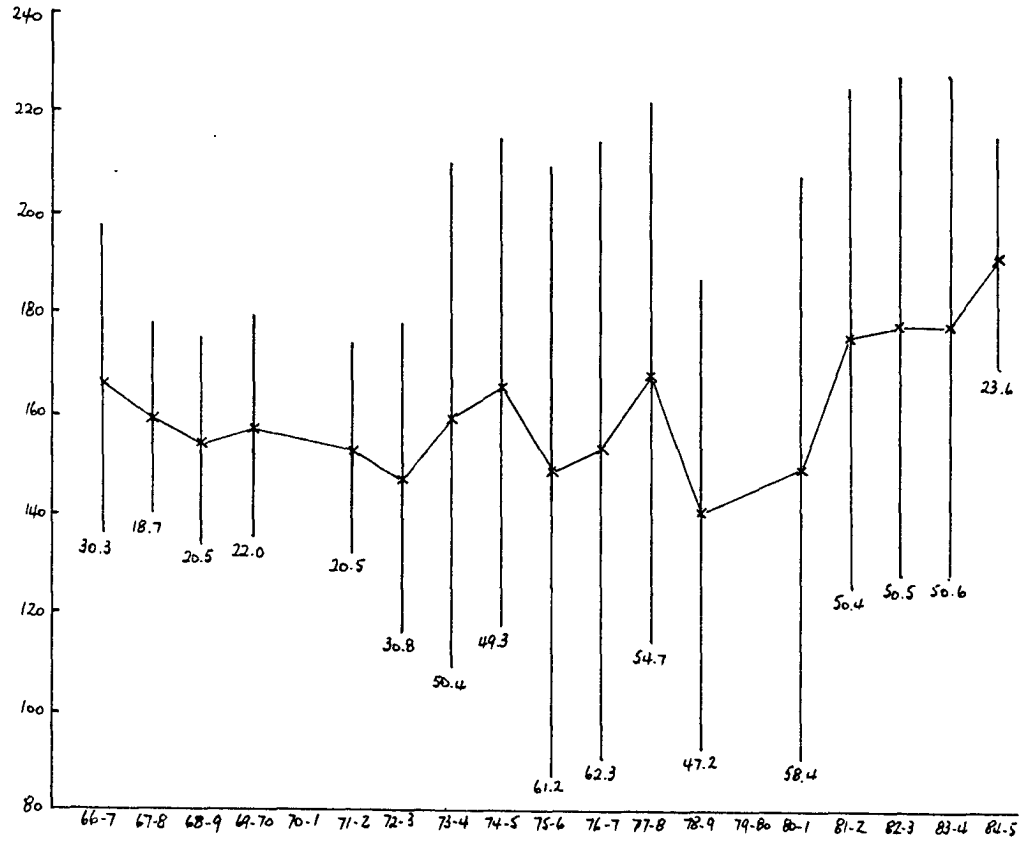


Fig. 1 Trends in the numbers of Pacific Golden Plovers. The graphs are based on the centred moving average (order 5) and show the mean ± one standard deviation and the value of the CV.

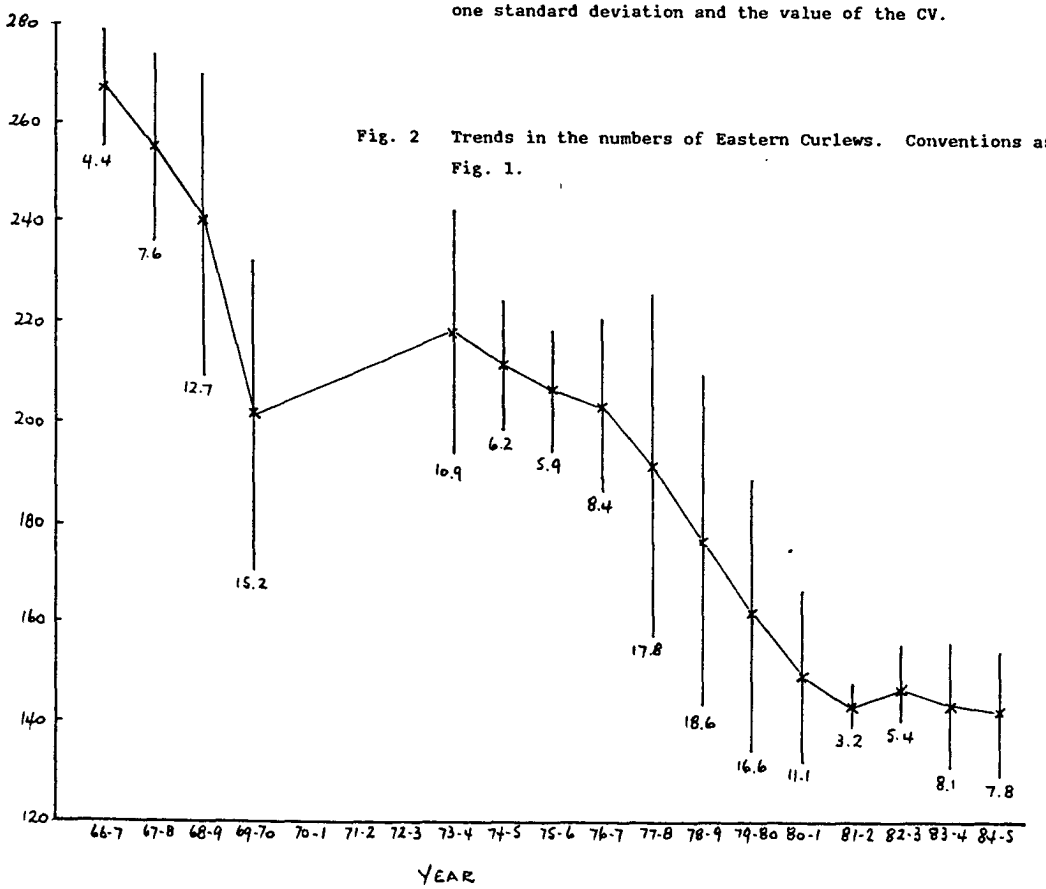


Fig. 2 Trends in the numbers of Eastern Curlews. Conventions as for Fig. 1.

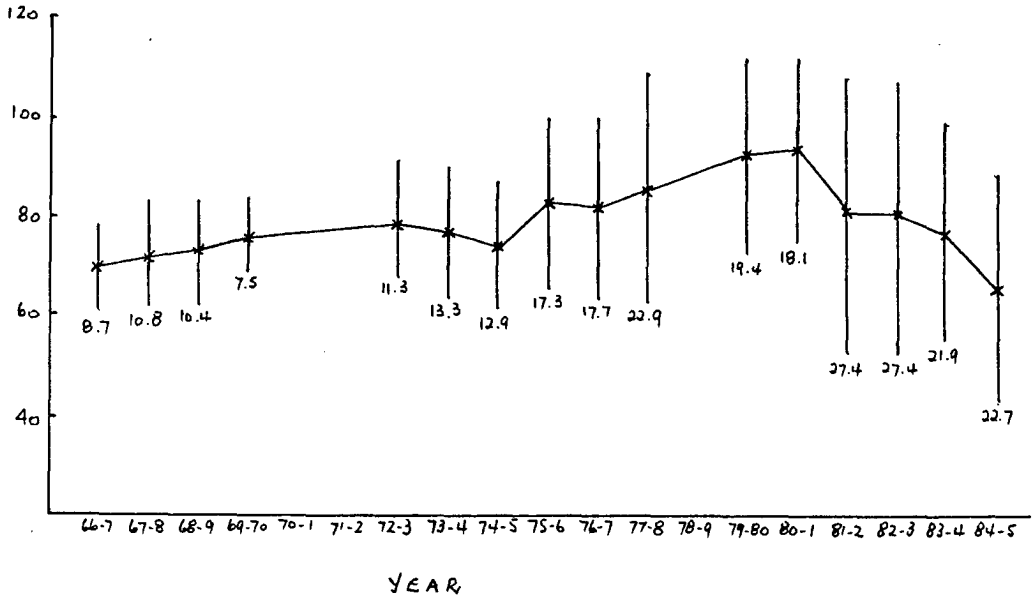
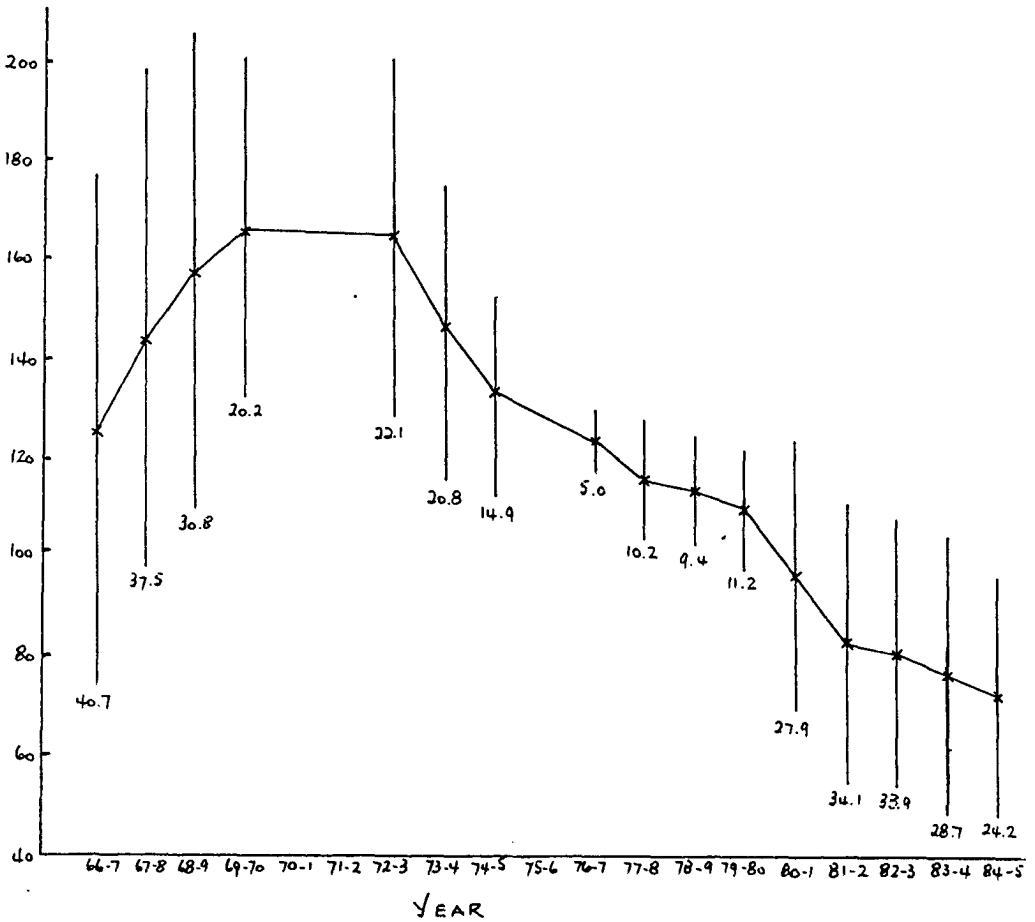


Fig. 3 Trends in the numbers of Greenshanks. Conventions as for Fig. 1.

Fig. 4 Trends in the numbers of Bar-tailed Godwits. Conventions as for Fig. 1.



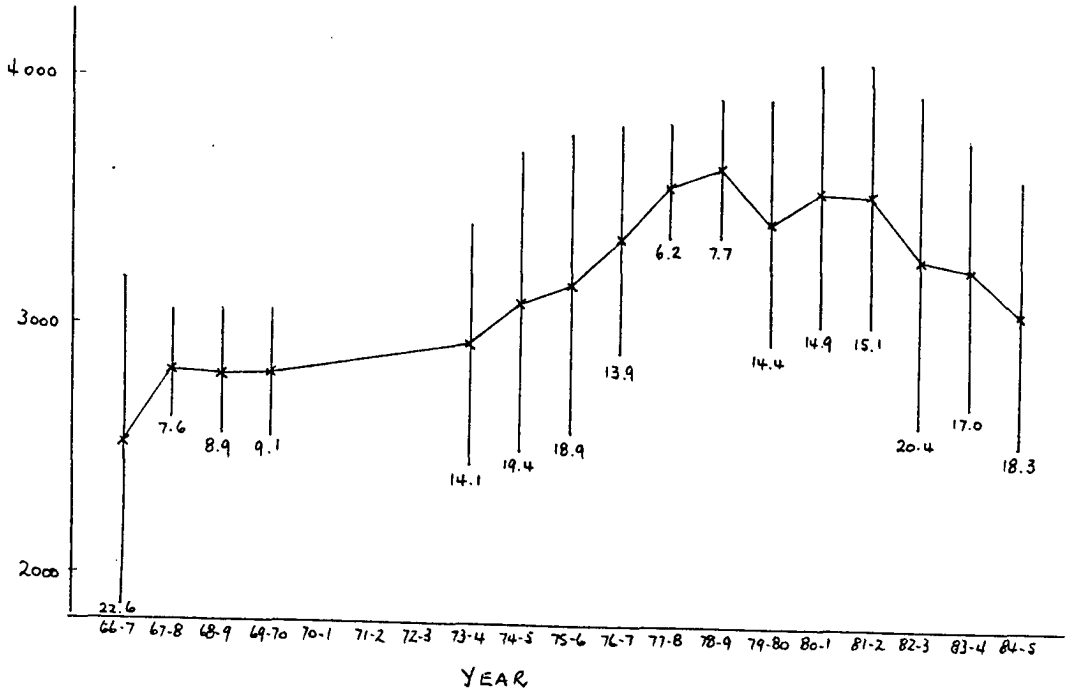
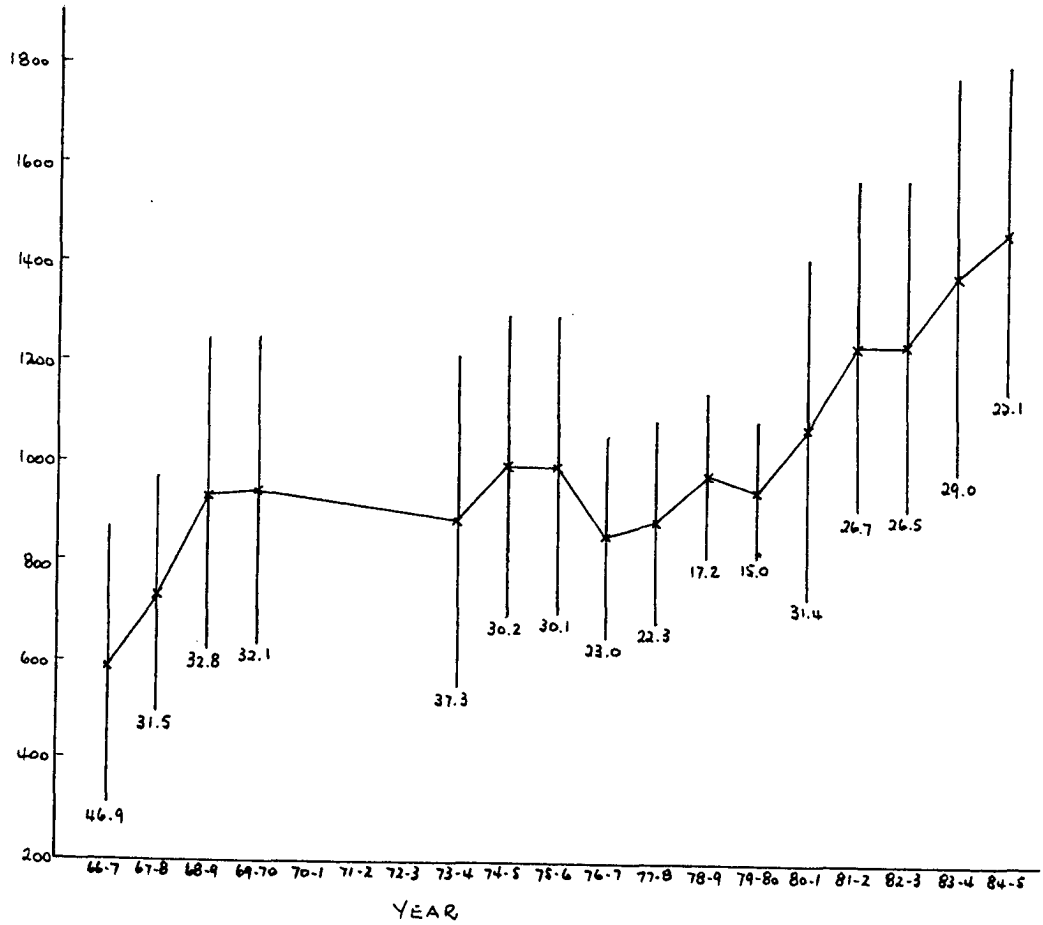


Fig. 5 Trends in the numbers of Red-necked Stints. Conventions as for Fig. 1.

Fig. 6 Trends in the numbers of Curlew Sandpipers. Conventions as for Fig. 1.



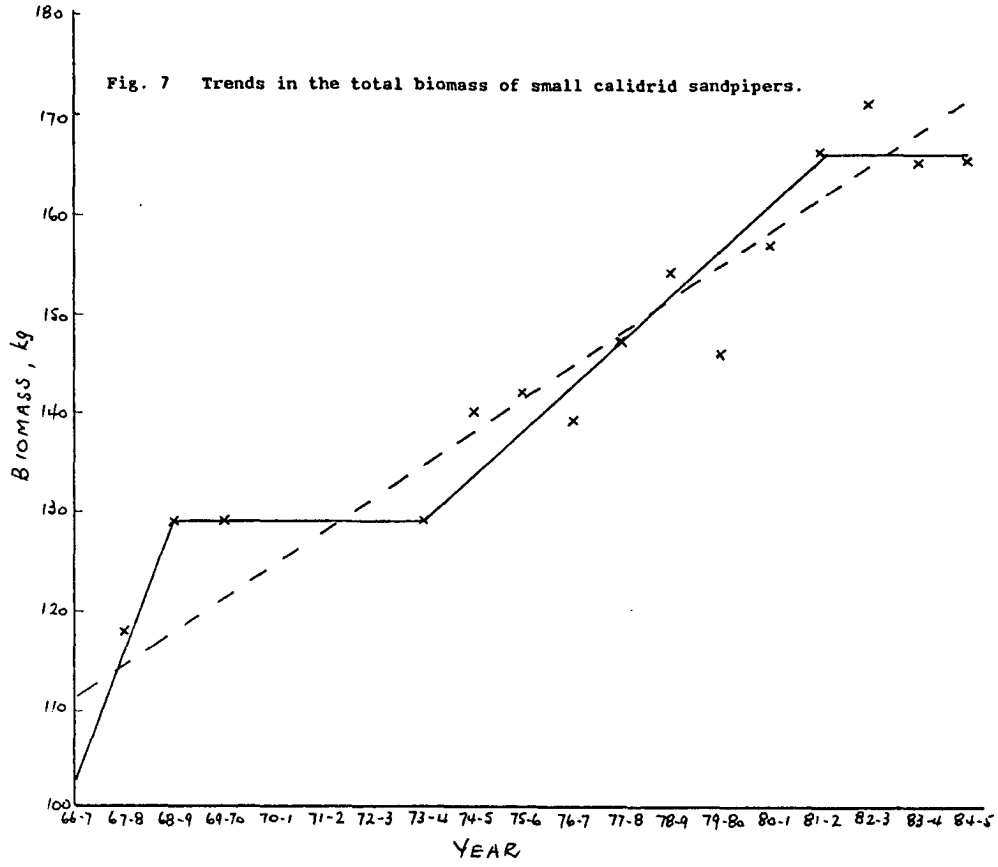
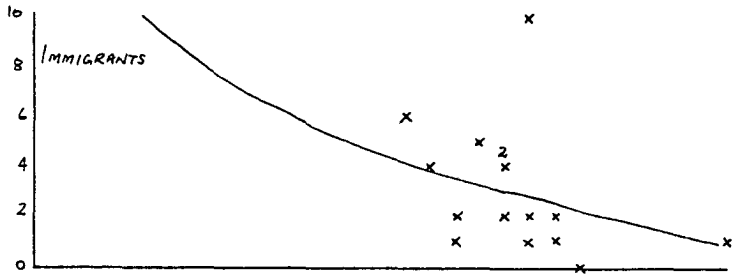


Fig. 7 Trends in the total biomass of small calidrid sandpipers.



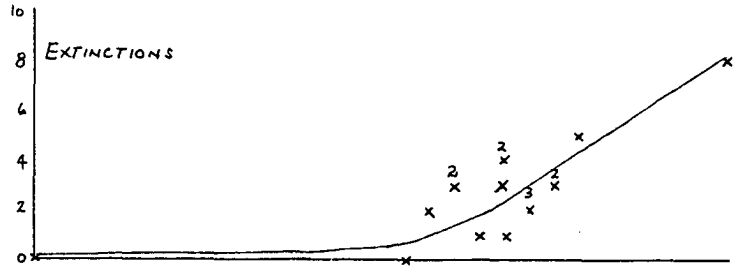
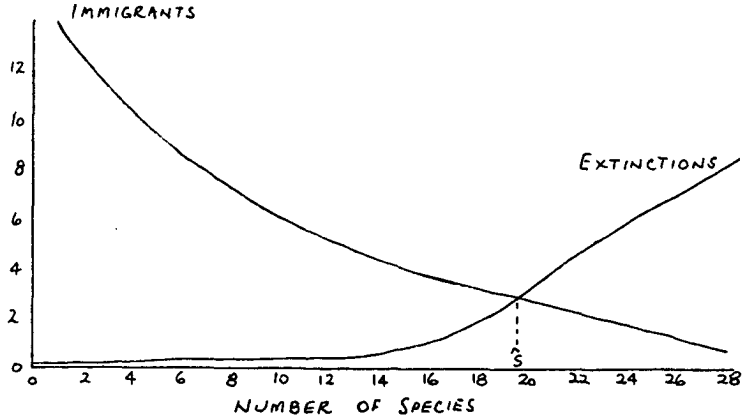


Fig. 8 Number of (a) immigrant and (b) extinctions plotted against number of species. The resulting curves are plotted in (c) to determine the equilibrium number of species, S.



OVERVIEW OF INTERWADER'S OPERATIONS IN 1986.

During 1986 INTERWADER continued its expansion, both in size and in the scope of operations. Many more wetland projects were undertaken compared to previous years and more training and education projects were developed.

Wetland Surveys

During 1986 INTERWADER conducted a number of wetland surveys. These are summarised below:

Site	Month
1. West Coast Peninsula Malaysia	January - July
2. South-East Thailand	February
3. Java Wetlands	February - April
4. East Coast Peninsula Malaysia	February - May
5. Kota Belud Heron Study	March
6. South-West Peninsula Malaysia	March
7. South East Sumatra	March - April
8. South Sulawesi	March - April
9. Mindanao, Philippines	March - May
10. Pulau Bruit, Sarawak	April
11. Luzon, Philippines	April - May, October - December
12. Limbang/Lawas, Sarawak	May
13. Chong Ming Island, China	May
14. Kapar Forest	August - October
15. Brunei Bay	September - October
16. Cebu, Philippines	September - November
17. Sabah	September - December

Table 1. Wetland Surveys carried out during 1986.

These surveys pinpointed a number of important wetland sites for future conservation action. In terms of discoveries, the most exciting was that of 4,000 Asian Dowitchers in S.E. Sumatra. This group was four times larger than the previous estimates of the world population. Surveys in S.W. Peninsular Malaysia and Sulawesi identified new sites for the Milky Stork, and located new heron colonies. The Pulau Bruit and Kota Belud surveys provided important data for preparation of conservation plans. The surveys in the Philippines were conducted independently by Filipino scientists who had been trained during INTERWADER training courses in 1984.

Waterbird Studies

A number of waterbird studies were carried out in 1986 to gather data on endangered species, or information for management. These are summarised below:

Project	Month
18. Hunting Evaluation Java	January - May
19. Hunting Study, South Thailand	January-December
20. Northward Migration Project	March - May
21. Wader Feeding Ecology	April
22. Status Reports	May - December
23. Heron Ecology Studies, Malaysia	June, October - November
24. Southward Migration Project	August - November
25. Migration Study, China	August - November

Table 2. Waterbird Studies carried out during 1986.

The two studies on hunting showed that 300,000 waterbirds and 10,000 waders are killed annually in the Cirebon - Indramayu region of Java, and Pattani Bay, Thailand respectively. Management recommendations for these areas are now being prepared. Heron and wader ecology studies included gathering data on Asian Dowitchers, Sumatran Heron, and Chinese Egrets. The Migration projects linked watchers in eight East Asian countries to track wader migration across the region. The INTERWADER waterbird status report series was started in 1986 with the production of a report on the Sumatran Heron, and preparation of reports on Milky Stork, Asian Dowitcher and Nordmann's Greenshank.

Habitat Studies

A major effort in 1986 was put into preparation of National Wetland Inventories for Malaysia and Indonesia as a contribution to the Asian Wetland Inventory. A total of 60 man-weeks were spent on these projects. Vegetation studies were conducted in Sarawak, Sumatra and Peninsula Malaysia. Benthic faunal studies were carried out in Thailand.

Training and Education

A training course in Australia was conducted with the RAOU/AWSG. The course was attended by four promising Asian wetland biologists who have since developed wetland projects in their own countries. An Education poster was also prepared in 1986 together with WWF Malaysia.

RINGING THE CHANGES - INTERWADER AND THE IPT ASIAN WETLAND BUREAU.

During its four years of operations, INTERWADER has gradually evolved from a species-orientated study programme to a wetland habitat management and conservation programme. INTERWADER has also grown considerably in size from one man and three short-term volunteers in 1983 to a full-time team of eight plus many short-term participants in projects throughout the region.

In these four years, INTERWADER completed over 40 projects in conjunction with 8 government agencies, 6 universities and 10 non-governmental agencies. During this period INTERWADER operated under the auspices of World Wildlife Fund Malaysia.

In March 1987, INTERWADER metamorphosed into the IPT Asian Wetland Bureau for Conservation, Research and Management (the IPT-AWB). The AWB was created in conjunction with the Institute of Advanced Studies of the University of Malaya (IPT). The new IPT-AWB will be part of IPT and in late 1987 will be housed in a new IPT Headquarters building on the campus of the University of Malaya.

The IPT-AWB will be operated by former INTERWADER staff but will be able to draw on the expertise of the different faculties of the University of Malaya. The name INTERWADER will be used for some existing projects and for future projects solely on waterbirds.

The IPT-AWB will act as a focal point for wetland conservation, research and management in Asia. It will have a number of programmes:

Wetland Management and Inventory Programme:

- follow-up to the "Asian Wetland Inventory" by providing assistance for preparation of National Wetland Inventories;
- preparation of development guidelines, advice on national policies of wetland zoning and management;

- provision of technical assistance for conservation agencies throughout Asia to conduct both air and ground surveys of wetlands.

East Asia/Pacific Waterbird Study Programme (INTERWADER):

- co-ordination of the migration monitoring network;
- studies on ecological requirements of waterbirds;
- promotion of waterbird conservation.

Wetland Reserach Programme:

- co-ordination of applied research projects on benthic fauna, hydrography and wetland flora and fauna;
- investigation of the importance of wetlands to man and the effects of man on wetlands.

Wetland Information Service:

- publication of "Asian Wetland News", a regional newsletter with broader scope than the INTERWADER newsletter,
- operation of a publications database for wetlands and waterbirds throughout Asia.

Training and Education Programme:

- publication of training manuals on shorebird studies and wetland evaluation techniques;
- organisation of workshops for Asian biologists;
- publication of education materials such as posters, brochures, audio-visual material and films on wetlands.

Environmental Impacts/Feasibility Studies Programme:

- offer of a commercial consultancy service to wetland developers.

PRELIMINARY OVERVIEW OF SHOREBIRD MIGRATION RESULTS IN ASIA, 1986.

John Howes, Interwader.

Active research in recent years has led to the discovery of some important sites in S.E. Asia for migratory waterbirds. However, most of the work has concentrated on the southward migration and relatively little was known concerning northward migration routes through the region. With this in mind, INTERWADER's aim in 1986 was to expand knowledge of northward migration and to consolidate the available knowledge on southward migration.

- Two circulars, on northward and southward migrations were sent to scientists and conservation agencies in over 15 countries within the East Asia/Pacific Region, asking for assistance with the project.
- Observers were requested to look out for colour-marked birds, more than a thousand of which had been treated with blue-dye by the AWSG in S.E. Australia in April. The dominant species were Red-necked Stints and Curlew Sandpipers.

A preliminary overview of results from Japan, Hong Kong, Thailand, Philippines and Brunei Darusallum are outlined below for both migration phases. Results were also received from Malaysia and Sri Lanka for northward migration and USSR, People's Republic of China and Indonesia during southward migration.

NORTHWARD MIGRATION

Brunei Darussalam - Daily wader counts by Jenny Elkin and Derek Harvey in the Seria area, the two most-watched sites in the region, produced some interesting results. The February counts showed the six most common species to be Asian Golden Plover, Kentish Plover, Little Ringed Plover, Mongolian Plover, Long-toed Stint and Greater Sandplover. A surprise visitor was a Ruff on 2 February. During March there was a gradual decrease in most of these species conciding with a sharp increase in numbers of Long-toed Stints. By April, all the Asian Golden Plovers had left, coupled with a steady rise in Long-toed Stint numbers and a marked increase in Wood Sandpiper numbers. Two Sharp-tailed Sandpipers joined the Ruff from 1-5 April. By May most species were reduced to small numbers, with a steady increase in only Red-necked Stints.

Thailand - Data were received from the continuation of regular counts in the Inner Gulf by INTERWADER Thailand Co-ordinator Phil Round, accompanied by various visiting birdwatchers from Europe and resident Thai birders. Results from the Inner Gulf show its continuing importance as a migratory stop-over site for the Asian Dowitcher, with 71 on 6 April and 162 on 25 May at "Kilometre 50", Samut Sakhon. Between 3,000 and 5,000 waders were present during March, the main species being Marsh Sandpiper, Mongolian Plover, Common Redshank, Common Greenshank and Black-tailed Godwit.

A visit to Pattani during March revealed low numbers of waders, although 6 species of herons were observed, comprising a total of 187 birds. The destruction of the intertidal flats to make way for an aquaculture (shrimp farming) complex could be the reason for a decrease in wader numbers.

At Ko Libong, 6 Nordmann's Greenshank remained in March, possibly a remnant of 11 seen here during December 1985 or an influx of passage birds. Also 6 Crab Plovers, including one immature, remained here until February.

Twice monthly counts by David Ogle at Nakhornsawan, Central Thailand, resulted in unusual observations of small flocks of Black-winged Stilts passing through the ricefield study area in April. Two birds showed a pale pink colouration which was probably the result of staining by pollution as neither bird had a ring on either leg.

Philippines - Three major regions within the Philippine archipelago were covered during 1986, these were Luzon, Cebu and Mindanao. The results for each region are outlined below:

Luzon: During April and May, Simplicia Alonzo-Pasicolan conducted wetland surveys in Northern Cagayan and Southern Luzon in order to assess their importance to migratory waders (Alonzo-Pasicolan, 1987). In all, seven sites were visited and a further six sites were identified as potentially important for shorebirds. During April, a total of 3,087 waders was observed, dropping to 1,710 at the same sites in May. Site summaries follow:

Buguey: This was the most important site for waterbirds in Luzon: 14,400 ha of intertidal mudflats, marshes, lagoons, mangrove, fishponds and rice fields were surveyed. The local economy is dependent on the maintenance of these wetlands for

food (fishery, rice) as well as associated products (wood).

A total of 17 waterbird species was identified at Buguey. Numbers in April totalled 1,258, which by May had decreased to 793. Waterbird counts are given in Alonzo-Pasicolan (1987) and a summary of interesting species is listed below:

- Little Ringed Plover, the most abundant wader with more than 200 in April, decreasing to 76 by May.
- Asian Dowitcher, a maximum of 6 in April with 4 remaining in May.
- Grey-tailed Tattler, a maximum of 41 in April decreasing to 16 by May.
- Schrenck's Bittern, a total of 17 were found in the marshes in April, this had increased to 21 by May.

Threats to the area include increased waterbird shooting, pesticide use and destruction of mangrove for conversion to aquaculture ponds.

Palawi Islands: Approximately 10,000 ha of these islands off the northern coast of Cagayan, have been proposed as a bird sanctuary by the Bureau of Forest Development. The small coral islets of Pugarao, Sibatu and Dos Hermanors support large populations of waterbirds such as Pacific Reef Egret (200+ throughout the survey). Twelve waterbird species totalling 1,829 in April and 917 in May were observed. The commonest species was Little Ringed Plover with a maximum count of about 200 in April. Of particular interest was a flock of 600+ Black-headed Gulls near B. Cape Engano in April. This species is described by Delacour and Mayr (1946) as an occasional winter visitor to the Philippines.

Calatagan Bay: A preliminary visit to Calatagan Bay during May established contact with local residents. Local people report large numbers of waterbirds at Balon-bato, Balubatikan, Palo Bandera and Fortune Island.

Manila Bay: On 6th June, 150+ unidentified waders were counted between Baclaran and Las Pinas.

Further potentially important shorebird areas in Luzon are:

Pagbilao, Quezon; Lamon Bay, Pampanga; Pollilio Island, Pampanga; Candaba Marsh, Pampanga.

Cebu: Seven sites from five Municipalities were surveyed by a Haribon Foundation, Cebu Chapter wader study team from April to July 1986, led by Perla Magsalay. All sites were coastal and the habitats surveyed were intertidal mudflats (Tungkil, Minglanilla) and fishponds with associated mangrove vegetation (Jugan, Consolacion; Silot Bay, Liloan; Tunga/Tuble, Moalboal and Solongon/ Manduyong, Badian).

The numbers of shorebirds utilizing the coastal areas on Cebu during northward migration was found to be low. A total of 289 shorebirds of 16 species were counted. Interesting records included:

- Ruff, one at Tunga, Moalboal on 5/7/86.
- Green Sandpiper, one at Tuble and two at Tunga, Moalboal on 6 July, 1986.

Hong Kong - Regular weekly and monthly shorebird counts were conducted at six wetland sites from January to June by Peter Kennerley. The six sites were San Tin, Mai Po, Ha Tseun, Tsim Bei Tsu, Pak Nai and Kai Tak. The most important site for waders in Hong Kong is Tsim Bei Tsu and therefore northward migration studies were concentrated there. A summary of the results is given below (all records refer to Tsim Bei Tsu unless otherwise stated):

January: Peak count of 723 (on 14 Jan). Avocet 215; Grey Plover 110; Eurasian Curlew 107 and Spotted Redshank 215.

February: Peak count of 321 (on 23 Feb). Reduction in all numbers except rise in Kentish Plover to about 100.

March: Peak count of 188 (on 28 Mar). Reduction in all numbers except Spotted Redshank (about 120). Arrival of the spring's first Asian Dowitcher at Mai Po on 31 Mar. Peak in Kentish Plover of 160 (on 1 Mar).

April: Huge influx of most species with a monthly maximum of 1609 (on 6 Apr), this figure gradually fell to 114 on 27 May. Species influxes:

- Greater Sandplover, none during March, with a peak count of 550 on 13 Apr, decreasing to 30 on 29 Apr.
- Red-necked Stint, none during March, an influx of 200 on 6 Apr remained throughout the month.
- Curlew Sandpiper, none in March, a monthly peak of 300 on 6 Apr.
- Spotted Redshank, gradual increase on March totals to a monthly maximum of 350 on 6 Apr.

Rarities

- Oriental Plover, one at Kai Tak on 14 Apr.
- Spoon-billed Sandpiper, one on 17 Apr, the only record from Hong Kong this Spring.
- Asian Dowitcher, maximum 3 on 6 Apr, with 15 on 12 Apr and 12 on 27 Apr at Mai Po.
- Eastern Curlew, one on 13 Apr.

Two new species were added to the Hong Kong list in this month, Little Stint, one at Tsin Bei Tsu on 26 Apr. and Pectoral Sandpiper, one trapped at Mai Po on 25 Apr.

May: A further build up in numbers to a monthly maximum 2150 on 12 May. An increase in Greater Sandplover, Red-necked Stint, Grey-tailed Tattler and Terek Sandpiper numbers throughout the month.

June: A monthly maximum of 220 on 1 Jun decreasing to 69 by Jun 7. Surprise-of-the-month was 3 Nordmann's Greenshank on 7 Jun - presumably non-breeding birds.

Japan - counts were conducted every two weeks by various observers under the co-ordination of Tamostu Mumahato. Results from Gamo, at the mouth of the Nanakita River, showed the area was

important for Dunlin during March and April with a huge decrease towards the end of April and all birds gone by May. Data from counts by Kazuyuki Kuwabara at Yatsu Tidal Flats showed the site was also most important for Dunlin with monthly maxima of 3862 (Jan), 4382 (Feb), 5630 (March), 3901 (April) and 4626 on May 4 which decreased to 20 by 24 May with only 1 bird in June. As on southward migration, the site held reasonable numbers of Kentish Plover, Grey Plover but very few Mongolian Plovers were observed.

SOUTHWARD MIGRATION

Japan - Bi-monthly counts were co-ordinated at three sites within the country. At Tamotsu Numahata's study area at Gamo the autumn passage was again dominated by Dunlin, with a gradual increase in numbers to 416 on 26 Oct. A total of 23 species were found to utilize the area, including:

Spoon-billed Sandpiper, 5 on 28 Sep.
Eastern Curlew, 1 on 31 Aug.
Pectoral Sandpiper, 1 on 12 Aug, 14 Sep, and 28 Sep

Counts during August by K. Ohata at Lake Utonaito produced small numbers of shorebirds of 9 species.

Two sites (Nabeta Innings and Shonai River Estuary) were visited by Atsuo Tsuji on 14 Sep. The counts produced 299 birds of 12 species and 1243 birds of 18 species at the respective sites. Of interest were large numbers of Dunlin, Red-necked Stint, Kentish Plover and Grey Plover. A single Baird's Sandpiper was observed at Nabeta. The Shonai River Estuary is currently threatened by a reclamation project by Najoya city government.

Kazuyuki Kuwabara has been studying wader migration through the Yatsu Tidal flats since 1974. His counts throughout 1986 revealed a build-up in shorebird numbers during July with a monthly maximum of 1196 of 18 species. During August the population had increased to a maximum of 2288 of 19 species by 23 Aug. The area was most important for Kentish Plover, Mongolian Plover, Grey Plover and Grey-tailed Tattler. During July and August a maximum of 7 Dunlin were seen.

Hong Kong - data from Peter Kennerley, Mike Chalmers and the HKBWS Bulletin:

August: Asian Dowitchers at Mai Po (12 on 16 Aug, 2 on 23 Aug and 8 on 24 Aug)

September: Waders widespread during the month, particularly Wood Sandpipers, Whimbrel, Redshank and Greenshank.

October: 20 Black-winged Stilts (2 Oct) at Mai Po. Eastern Curlew, 1 at Mai Po on 4 Oct with c200 other *Numenius* spp. At Tsim Bei Tsui on 19 Oct the big surprise was a Lesser Yellowlegs, the first record for Hong Kong and China. The same bird reappeared at Mai Po 2 weeks later (see below).

November: Lesser Yellowlegs on 2 Nov. Eastern Curlew, one at Mai Po on 16 Nov.

December: 1 Great Knot at Mai Po on 17 Dec. An unusually high number for the winter period was c30 Asian Golden Plovers at Mai Po around 14 Dec. Also 1 Eastern Curlew wintering amongst 270 Eurasian Curlew.

Philippines - A comprehensive survey was conducted at 23 sites on Cebu by Perla Magsalay and the Haribon Foundation, Cebu Chapter wader study team. Four major sites were identified:

Tajao, Pinamungahah: 160 waders present on 24 Aug increasing to 730 by 28 Sep. Fourteen species were seen, with a marked increase in Common Sandpipers (maximum 359 on 28 Sep) and Red-necked Stint (maximum 223 on 28 Sep).

Jugan, Consolacion: Only 38 waders present on 17 Aug increasing to 721 on 5 Oct. Thirteen species with increasing numbers of Common Redshank (to 244 on 5 Oct) and Charadriid plovers (maximum 160 on 5 Oct).

Tuble, Moalboal: Only counted on 31 Oct with 640 waders of 11 species present. Maximum numbers: Little Ringed Plover (175), Common Sandpiper (262).

Tunga, Moalboal: A maximum count of 90 on 17 Aug increased to 362 by 21 Sep. An influx of 276 Common Sandpipers on the latter date.

Thailand - Data from Nukul Ruttanadakul and Surapol Ardseungnurn at Prince of Songkhla University, Pattani show that over 5000 waders were caught by local hunters in 9 villages during southward migration 1986. Common Redshank accounted for about 50% of all birds caught and the peak period for shorebird catching was in August and September.

Brunei Darussalam - Extensive thrice-weekly coverage at two sites - Sungei Bera and Sungei Seria. These again proved to be the most well-watched sites in S.E. Asia. Although shorebird numbers were relatively low some interesting patterns emerged from the data. On the whole shorebird numbers gradually built up to an autumn maximum of 602 on 21 Oct at Bera and 617 on 17 Nov at Seria. A total of 29 shorebird species were observed during August - November. A summary of species composition and influx are given below:

- Little Ringed Plover, a gradual increase in number reaching the maximum count of 185 at Bera on 21 Oct, a marked decrease through November.
- Red-necked Stint, peak count of 95 at Bera on 20 Sep and decreasing numbers through October and November.
- Long-toed Stint, second most common species present. A maximum of 242 at Bera on 7 Nov.
- Wood Sandpiper, a maximum of 102 at Bera on 30 Sep with the population remaining relatively stable throughout the Autumn.
- Asian Golden Plover. The most common species present. A gradual increase in numbers at both sites with a maximum of 374 at Seria on 25 Nov.

Some unusual sightings included:

- Ruff, one present at Bera from 17 Oct to 27 Nov.
- Oriental Pratincole, 3 at Bera on 30 Oct.
- Black-winged Stilt, at Bera, one on 26 Oct, 2 from 9 Nov to 27 Nov.
- Temminck's Stint, a single on Bera on 25 Nov.
- Northern Lapwing during December.

A joint Brunei Museum/INTERWADER survey of Brunei Bay wetlands produced regular counts during October 1986. Shorebirds were few, but a different species composition to Bera/Seria was noted. Whimbrel and Asian Golden Plover were the commonest species. Of interest were 1 Asian Dowitcher on 5 Apr. and 31 Grey-tailed Tattlers on 3 Nov, both at Pulau Muara Besar.

WADER RINGING IN MALAYSIA AND THAILAND

As part of the continuing study of wader migration in South-East Asia by INTERWADER two small ringing trips were made by John Howes, and Dudley and Moray Iles: one to Kuala Selangor, West Malaysia from 6-7 September, and a second to Pattani, South-east peninsula Thailand from 15 to 21 September, 1986.

Kuala Selangor new town site, Selangor, West Malaysia

This site provides roosting and feeding for passage waders at high tide, often between 1000-2000 and sometimes over 5,000 birds. On 6 September, a total of about 600 birds arrived at the roost, largely from the north-west. A total of 61 birds were caught, including 24 Common Redshank, 13 Mongolian Plover and 10 Curlew Sandpiper. Only 4 birds were juveniles, and most of the adults were half-way through their wing moult.

Pattani Bay, south-east Peninsula, Thailand

The session at Pattani was conducted on Pattani Bay mudflats in conjunction with Prince of Songkhla University. This was primarily a ringing training session for Nukul Ruttanadukul and Surapol Ardseungnurn, 2 biologists at PSU who are already undertaking extensive wader studies with respect to trapping by local villagers.

About 2000 waders of 18 species, including 1-3 Asian Dowitchers were recorded in the Bay on 15 September. Up to 35 Asian Dowitchers had been seen at Pattani on 13 September. A total of 41 birds were processed during four ringing sessions. These included 1 Asian Dowitcher, 13 Mongolian Plovers and 10 Terek Sandpipers. Only 3 birds showed signs of moult, the majority of birds having new flight feathers. Twenty-one birds were dyed with blue dye on the belly, flanks and under the wing. Two dyed birds (1 Black-tailed Godwit, 1 Common Redshank) were observed two days later 1 km away from the ringing site.

INTERWADER provided funding and equipment for both ringing trips. Prince of Songkhla University provided accommodation and facilities at Pattani.

PHILIPPINES BANDING WORKSHOP

A bird-banding workshop was organised over the weekend 21-22 March 1987 by Simplicia Alonzo-Pasicolan, with expertise provided by Mark Barter of the AWSG. Much of the time was spent discussing catching strategies and tactics and also on improving identification skills.

RINGING RECOVERIES

Common Redshank *Tringa totanus*

Ringed by INTERWADER at Serangoon Sewerage Farm, Singapore on 11 September 1983. Controlled at Senoko Ponds, Singapore on 13 September 1983 by INTERWADER. Recovered by Nukul Ruttanadakul at Ban Bang Ta Wa, Pattani, Thailand (6 degrees 55 minutes N, 101 degrees 18 minutes E) in 1986 from a villager who caught and ate the bird, probably in June 1985.

Little Egret *Egretta garzetta*

Ringed as a pullus by H.C. Woo of the Institute of Ornithology, Kyung Hee University, Seoul on 25 June 1969 at a maxed *E.alba/E.garzetta* breeding colony at Haenam, Chulla Namdo in South Korea (34 deg. 32'N, 126 deg.40'E). Recovered at the mouth of the She Yang River, She Yang County, Jiang-Su Province in China (33 deg. 40'N, 120 deg. 30'E) on 20 March 1984.

RUSSIAN WADER NEWS

In September 1986, INTERWADER International Co-ordinator Duncan Parish spent 24 hours in Moscow. During this period he had long discussions with Dr. Pavel Tomkovich of the Zoological Museum who briefed him on the status of Soviet Shorebird Studies in Siberia. One potential major development in Soviet wader research is the planned formation of a Russian Working Group on Waders in the near future. Another major event will be the publication in early 1988 of a book of collected papers presented at the 3rd All-Union Meeting on wader problems.

Dr. Tomkovich carried out studies of the breeding biology and behaviour of the Spoon-billed Sandpiper *Eurynorhynchus pygmaeus* at Belyaka Spit, northern Chukotski Peninsula. This is the only know locality holding large breeding numbers of the species, according to Kingratiev, A. Ya., (1982). Biology of waders in tundras of NE Asia. Moscow. 192pp.

About 40 pairs were accessible for regular observation. Sixty-six adults were caught by walk-in traps. Only 50 pulli were marked due to high loss of clutches because of Arctic Fox predation. It is planned to continue the studies in summer 1987.

The trapped waders were colour-ringed, always with one metal ring on the tarsus - above the joint. Combinations of up to 3 coloured celluloid rings were used: mainly red and white for adults (plus a few yellow); yellow and green for pulli. There are no more than 2 rings on each leg (including metal ring).

Other East Asian species colour-ringed using the same system are: Dunlin *Calidris alpina* (34 adults and pulli), Red-necked Stint *C. ruficollis* (19), Temminck's Stint *C. temminckii* (25), Ruddy Turnstone *Arenaria interpres* (22) and Ringed Plover *Charadrius hiaticula* (7).

Other wader research has concentrated on the description of two new subspecies of Dunlin - one from Kamchatka and another from Sakhalin.

AUSTRALIAN VOLUNTEERS.

As a non-profit organisation INTERWADER/AWB has limitations on staff recruitment, as a result we have always placed high emphasis on volunteer participation in our projects. To date the majority of volunteers have come from Europe and North America, with little input from Australia. We need personnel with skills in the following:

1. Field experience in shorebird identification and wetland assessment techniques.
2. Office skills, ideally with experience in computer programmes and usage.
3. Report preparation.
4. Production of educational materials.

So, if you can help us, please send details of relevant experience (i.e. a C.V.) to the Administration Officer, Asian Wetland Bureau, IPT, Universiti Malaya, Lembah Pantai, 59100 Kuala Lumpur, West Malaysia.

There are also a few long-term salaried positions, so please indicate if you would also be interested with these.

OTHER INTERWADER ACTIVITIES.

Shorebird hunting in South Thailand

The joint project between Prince of Sonkla University (P.S.U.) and INTERWADER on hunting and wetlands in South Thailand continued in 1986. Studies were concentrated in Pattani Bay where waders were counted monthly at seven sites from January to December 1986. In addition the daily wader catches of hunters in nine of the 14 villages in the bay were recorded throughout the year. These studies were organised by Nukul Ruttanadukul and Surapol Ardseungnurn of P.S.U.

A total of 29 wader species were recorded in the bay with a yearly maximum count at the seven sites of 7,657 birds, of which over 37% were counted on the mudflats adjacent to the P.S.U. campus. The commonest species recorded were Red-necked Stint (1537), Long-toed Stint (1175), Little Ringed Plover (910), Mongolian Plover (690), Greenshank (523), and Curlew Sandpiper (402). Of the rarer species at least one Nordmann's Greenshank and 35 Asian Dowitchers were counted. The study showed that certain species had marked preferences for certain habitats. For example Long-toed Stint, Wood Sandpiper, and Little Ringed Plover were found almost exclusively on saltpans or saltmarsh, while those on intertidal mudflats were generally Curlew Sandpiper, Red-necked Stint, Common Redshank and (in September) Broad-billed Sandpiper. Those preferring areas of sandy mud included Asian Golden Plover, Terek Sandpiper, and the Common Greenshank. Species such as Mongolian Plover and Common Sandpiper were found to be capable of foraging on all substrates.

The study also showed that the bay is utilised by more waders during the southward migration than during the northward migration.

Methods and techniques of shorebird hunting were described from 9 of the 14 villages involved in such activities in the area. Within the 9 villages, a total of 146 shorebird hunters were identified. The hunters use lines of snares, each line generally containing between 100-150 snare loops. Since a total of 473 snare lines were used for hunting in the 9 villages, a total of between 71,550 and 97,000 individual loops were available, each one capable of trapping a shorebird. The hunters are very knowledgable concerning movements of shorebirds around their villages, and hunting days are restricted to those with suitable tides, with birds present, and the potential for attracting the birds into the hunting area.

The snarelines were laid out in numerous patterns across the area, either in lines, circles, zigzags or squares. This was usually done by a group of hunters from one village, after which they retired to a make-shift shelter near the hunting area, and imitated the shorebird calls to attract birds from adjacent areas. The use of decoy birds was a popular practice, with waders being tied by one leg to a stake among the snares, to attract other birds.

The daily hunting records from the nine villages monitored showed that at least 5412 waders of 22 species were caught during 1986. Extrapolating from these figures gives an estimated annual catch for the 14 villages of over 8,000 waders. The most commonly caught species was Redshank, which constituted nearly 50% of the total catch. Mongolian Plovers, Curlew Sandpipers, Little ringed Plovers and other wader species are caught in smaller numbers. A minimum of 23 Asian Dowitchers were caught. Hunting activities were concentrated during August-September - the main period of southward migration of waders. Numbers of birds caught and numbers of birds observed in the field during this period were closely synchronised. In November-December, although the number of birds observed in the field was high, the number of birds caught was relatively low because most of the late migrants are small species not preferred by the hunters (e.g. Red-necked Stints). During northward migration, very small numbers of birds are caught (only 13 recorded in 1986). There are two possible reasons for the low spring catch. Firstly the numbers of migrating waders are lower during this period, and secondly most villagers are busy at this time harvesting salt, and consequently have no time to trap birds.

In some villages people earned a living from fishing, salt harvesting and coconuts. In others, such as Bang Ta Wa, high seas prevented fishing at certain times of the year, and there was less choice for other activities. These villages with low socio-economic status had the highest rates of bird hunting. Four reasons for hunting were identified:

(a) for consumption as a luxury food item,
(b) for sale at a local market as food,
(c) for recreation,
(d) to provide birds for pets.

In order to eliminate hunting activities, alternative economic activities have to be effectively encouraged among villagers, and villager's hunting attitudes will have to be changed by conservation education. The principal investigators have already been successful in encouraging some hunters to find other occupations and have organised village football matches to provide alternative recreation activities.

The project will be continued in 1987 and will concentrate on education as well as conducting more detailed studies on specific species.

Full details are given in:

Ruttanadukul and Ardseungnurn 1986, in prep. a and b.

Waterbird Hunting in Java

Funds were provided by INTERWADER to enable Agus Marhadi of PHPA to collect data from January-May 1986 on waterbird hunting in the Cirebon-Indramajo region of North Java. This was the culmination of a two year study organised by WWF and PHPA. The study looked at the number and diversity of species caught, harvesting techniques and costs involved, seasonality of species caught, marketing methods and hunting areas.

The birds are caught by mobile teams of trappers who nightly visit different sites along a 100km stretch of coastline. Birds are attracted with whistles and horns and trapped in mist nets. At dawn the next morning, one or two members of the trapping team bring the birds (which are still alive) to one of ten or more major wholesalers who, within hours, sell the birds to retailers. By nightfall all the birds have normally been eaten. During the study it was found possible to persuade wholesalers to record the number of species bought each day. Monthly visits were made to collect data and check accuracy.

The study showed that each year a minimum of 300,000 waterbirds are trapped. About 100,000 of these birds are waders, in particular Oriental Pratincoles. A further 100,000 were other migrant waterbirds such as watercocks, and the remainder were resident species of rails, ducks, herons and storks.

It is hoped that the data collected will allow introduction of a management system to control harvesting of endangered species and maintain hunting of other species at a sustainable level.

Feeding behaviour of the Asian Dowitcher

During surveys on Pulau Bruit Sarawak, in April 1986, observations were made on the feeding behaviour of the Asian Dowitcher.

This ICBP Red Data Book Endangered species currently has an estimated world population of between 7000 and 10000 (INTERWADER, in prep.). A maximum of 36 were recorded on Pulau Bruit in Sarawak.

A total of 130 one-minute intervals of foraging observations were conducted on this species. During the observations three types of prey could be identified; bivalve molluscs, worms and surface insects. Sampling of invertebrates in the feeding area revealed the bivalve mollusc *Orbicularia orbiculata* as well as numerous, as yet unidentified, polychaete worms. No surface insects or other possible prey items were found in the samples. It is therefore assumed that Asian Dowitchers were feeding exclusively on *O. orbiculata*, polychaete worms and some surface insects. A total of 526 prey items were seen to be taken during foraging observations. Of these 6 (1%) consisted of insects pecked from the surface water, 304 (58%) were *O. orbiculata*, and 216 (41%) polychaete worms.

The birds were feeding in a flock of between 10 and 20 individuals, in the liquid mud at the water's edge. The flock foraged at both high and low tide, and initial analysis suggests that more *O. orbiculata* were taken at low tide (in the liquid mud) while more polychaete worms were taken on the harder substrate at high tide.

Full details are given in : Howes, J.R. in prep.

Feeding behaviour in Nordmann's Greenshank

In early 1986 observations were made on feeding behaviour of the Nordmann's Greenshank at Ko Libong in South Thailand. Foraging behaviour was distinctly different from that of the Common Greenshank. Nordmann's Greenshank appears to be a less active feeder, moving slowly and making continuous multiple pecks in the sandy bottom of pools, and feeding primarily on crabs. The Common Greenshank at this site chased small fish while running rapidly through the shallows. Quantitative data on feeding behaviour were collected and analysed.

Full details are given in : Lambert, F. and Howes, J.R. in press.

Wader ringing

As in 1985, little wader ringing was carried out by INTERWADER due to shortage of funds and personnel.

Ringing totals are as follows:

West Malaysia	61 birds	9 species
Thailand	41 birds	10 species

East Asian Waterbird Status Reports

There are over 340 species of waterbirds in the East Asia/Pacific region, and over 25% of these species are considered endangered or vulnerable. In addition, since many waterbirds have highly specialised ecological requirements and are therefore vulnerable to environmental changes, the more common species can be used as indicators of environmental qualities. In order that vulnerable species can be monitored and common species can be used as indicators, data on population and distribution of these species need to be gathered.

In 1986, INTERWADER started to prepare status reports on some species of endangered waterbirds: Asian Dowitcher, Nordmann's Greenshank, Spoon-billed Sandpiper, Sumatran Heron, and Milky Stork. The status report on the Sumatran Heron was completed and published (See Lansdown, 1986b).

Waterbirds as biological indicators

A paper on the use of waterbirds as biological indicators in evaluation of tidal lowlands was presented by INTERWADER staff at the Symposium on Lowland Development in Indonesia in August 1986.

The paper analysed the links between waterbirds and productivity of coastal wetlands, and described techniques for rapid assessment of coastal resources using aerial surveys of waterbirds. Execution of such surveys at an early stage of coastal wetland development planning will have an overall cost-reducing effect on feasibility studies, and will reduce the chance of severe conflict between conversion for other land uses and sustainable resource utilisation/conservation.

Full details are given in : Silvius, M.J. and Parish, D. 1986.

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REPORT ON THE CONFERENCE ON WETLAND AND WATERFOWL CONSERVATION IN ASIA FEBRUARY 1987, MALACCA, MALASIA: AN AUSTRALIAN PERSPECTIVE.

Doug Watkins, Lot 25, Kinley Rd., BANJUP, 6164.

In January 1987, shorebird workers in Australia were concerned that no one from Australia was planning to attend the Conference on Wetland and Waterfowl Conservation in Asia. The R.A.O.U. swung into action and was successful in sending a representative to the conference. At the last minute, Australian representation was bolstered by the attendance of Tim Richmond of the Australian National Parks and Wildlife Service.

The first thing one needs to learn at these conferences is all the acronyms. Here is a quick guide to some of the important ones:-

IWRB International Waterfowl Research Bureau
IUCN International Union for the Conservation of Nature and Natural Resources,
ICPB International Council for the Protection of Birds,
WWF World Wilflife Fund,
NGO's and GO's - Non-Government and Government Officials,
JAMBA Japan-Australia Migratory Bird Agreement and
EDWIN Environmental Database on Wetland Interventions

The second thing is to be able to speak clear english, at times difficult for an "Aussie". Third is not to eat too much at scrumptious buffet meals!

The Conference

The Conference was organised by the International Waterfowl Research Bureau and Interwader. It consisted of four and a half days of discussions followed by a study tour and a workshop.

The main topics on the conference program were; the Asian Wetland Inventory, Interwader, IWRB, international and regional agreements on wetland and waterfowl conservation, and the management of wetlands.

The meeting was attended by 103 participants from 23 countries. Representation was made from the following countries and organisations; (Asian Wetland Inventory), Australia, Bangladesh, Brunei Darassalam, (EDWIN), Hong Kong, (ICBP), India, Indonesia, (Interwader), (IUCN), (IWRB), Japan, Malaysia, Nepal, Peoples Republic of China, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Sri Lanka, Taiwan, and Thailand.

Asian Wetlands Inventory

This is a two year project set up to assist Asian nations to prepare national wetland inventories. The project covers 24 countries from Pakistan to China, Japan, Indonesia and Papua New Guinea. The project is sponsored by IUCN, ICBP, and IWRB, with funding from WWF-International. It follows the successful completion of the "Directory of Neotropical Wetlands (ie. South America).

Reports on the progress of national wetland inventories were presented by people from; Malaysia, Indonesia, Brunei Darassalam, Peoples Republic of China, Hong Kong, India, Korea, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan and Thailand. It was reported that an inventory had been completed for Vietnam. Involvement with the inventory had been unsuccessful in Bhutan, Burma, Kampuchea, the Democratic People's Republic of Korea, Laos and Mongolia. Publication of the "Directory of Asian Wetlands" is planned for early 1988.

The Asian Wetland Inventory is a constructive means of assisting regional conservation because it works at a national level with local people. In most cases the inventories have been compiled by the relevant government departments. In this way the work is intergrated into Government policy.

It is interesting to note that, as yet, some states of Australia have no wetland inventories.

IWRB

IWRB (a well kept secret in this neck of the world) gave a presentation on its activities across the world. The organisation was established to "stimulate and co-ordinate research and conservation concerning waterfowl and their habits". Today, it is increasingly becoming involved at the "wetland" as opposed to the "waterfowl" level. Of particular interest to Australia are IWRB's involvement in: the Ramsar Convention, publications on wetland management and the organisation of research groups.

Did I hear you say, "what's the Ramsar Convention"? It is formally known as the "Convention on Wetlands of International Importance especially as Waterfowl Habitat". The name "Ramsar" comes from the city at which the first meeting was held. Countries are urged to sign the agreement and nominate wetlands of their country that are of international significance in terms of ecology, botany, zoology, limnology or hydrology. In early 1987 the Convention had 43 Contracting Parties, including Australia.

Perhaps we should be encouraging the RAOU to join IWRB. In this way we would be supporting the work undertaken by IWRB and be able to plug into the knowledge and expertise of this international network.

International Conservation Agreements

Two types of international conservation agreements were presented at the Conference: "world agreements" such as Ramsar and Bonn, and "regional agreements" such as JAMBA. A valuable contribution was made by Tim Richmond with a discussion on JAMBA in which ASEAN nations showed particular interest. Many of the nations represented at the meeting were apprehensive about the relevance of "world agreements" and felt more comfortable with the concept of "regional agreements".

Interwader

In the four years since its formation, Interwader has made a major contribution to information on waterbird's and wetlands in the ASEAN nations. Over 600 man weeks of work have been conducted on over 40 projects across six nations. This has resulted in more than 30 reports and other publications. The success of Interwader is a tribute to the people who have been involved in conducting and supporting the work. It is continuing proof that the seemingly impossible can be achieved! All Australian wetland workers should give some thought to giving a few months (or even years!) to work in Asia. Find the real meaning of stretched resources and difficult field conditions!

Papers of particular interest to Shorebird Workers

Eight papers presented at the Conference are of particular interest in that they add to our knowledge of shorebird migration patterns. These papers contain information on the shorebird populations of specific areas in the Asian region.

Alonzo-Pasicolan, S. Status of Wetlands in Luzon.

Howes, J.R. The Importance of Intertidal Wetlands in Sarawak for the Conservation of Migratory Shorebirds.

Melville, D.S. Wintering Waterfowl in Deep Bay, Hong Kong.

Mohd. Jaya bin Haji Sahat. Evaluation of Coastal Wetlands in Brunei Bay. A joint project between Brunei Museum and Interwader.

Rashid, S.M.A. and A. Khan. Waterfowls of the Teknaf Peninsula, Bangladesh.

Ruttanadakul, N. and S. Ardseungnern. Evaluation of Shorebird Hunting in the Villages around Pattani Bay, Pattani, Thailand.

Ruttanadakul, N. and S. Ardseungnern. The use of Pattani Bay by Migratory Shorebirds.

Yao-Sung Lin, Kuang-Yang Lue, Ming-Yih Chen and Ching-Hsia Chen. Development of Guandu Nature Park.

A copy of the papers presented, and the report on the conference are available for loan from the RAOU Library in Melbourne. Copies may be purchased from IWRB at Slimbridge or Interwader.

The problem with international conferences is that they are too short and too few people can attend. My impression from the Conference is that we need to upgrade "cultural interchange" within the flyway. I think there would be tremendous benefits to be gained if we can get shorebird workers to do a bit of "migrating". Interwader is an ideal vehicle through which this could occur.

RAOU representation at the conference was made possible by donations from - W.A. Group RAOU, private donations from W.A., Australasian Wader Study Group, ICI, and the Research Committee RAOU. I wish to thank all the people and groups involved.

BANDING NEAR AUCKLAND - 1986/7.

Stephen Davies and Adrian Riegen, Department of Philosophy, University of Auckland, Auckland, New Zealand.

The Red Knot (*C. canutus*) is second only to the Bar-tailed Godwit (*L. limosa*) as the most common wader migrant to New Zealand. The majority of Knot are found within 100 km of Auckland (25,000+). The north of the North Island holds about 10,000 birds, as does the Nelson area in the north of the South Island. Only a few hundred birds are recorded each year south of Nelson. The sub-species involved (*Rogersi*) breeds not on the Siberian mainland, but on islands off the north coast of Siberia, some 15,000 km via Australia and Asia from New Zealand.

In 1986, mainly as a result of encouragement from the A.W.S.G., cannon-netting was revived in New Zealand. The group was led by Stephen Davies, who has had experience of cannon-netting in the U.K. and Australia. The group was convened under the auspices of the Miranda Naturalists' Trust. But, because Miranda, on the Firth of Thames, is not ideal for cannon-netting, the catches were attempted at Jordan's Farm on the Kaipara Harbour some 80 km north-west of Auckland. At Jordan's Farm the birds roost on reclaimed land which allows vehicular access. The site is used by 5,000+ Knot during the summer, and as many as 500+ Knot during the winter.

Unsuccessful catches were attempted in November and December, with Bar-tailed Godwit as the target species. The birds, always present in large numbers, were also elusive on a further trip in January - 4 Wrybill (*Anarhynchus frontalis*) were trapped when nothing else proved to be co-operative. Commendably, the group retained suficient enthusiasm for one further attempt. By this time it was thought that Knot would be more easily captured. And so it proved to be on February 28th 1987, when about 680 Knot, 1 Bar-tailed Godwit and 76 South Island Pied Oystercatcher (*H. finschi*) were trapped. The age, wing-length, moult and weight of all the captured Knot were recorded.

The catch included four birds carrying Australian bands. All had been banded at Swan Island, Queenscliff, by the Victorian W.S.G., some 2,600 km from our catching site. Three of the birds were banded as adults in October/November, and one was known to have come on to New Zealand in the same season (banded 8 Nov 86; controlled 28 Feb 87). This suggests that at least some Knot pass through Victoria on their way to New Zealand. The fourth bird had been banded in mid-winter as a first-year bird (3 Jun 84). Another 1st year bird, banded at Queenscliff on the same day, had been found dead by a member of our banding team, Adrian Riegen, at Karaka in mid-May of 1985. Together, these recoveries indicate that first-year birds over-wintering in Victoria spend subsequent seasons across the Tasman.

In addition, two birds with New Zealand bands were retrapped. Both had been banded on 2 Mar 80, nearly seven years to the day (and 200,000 km later!), elsewhere on the same farm.

A seventh bird bore an illegible band. Subsequently this band was sent to Chris Mead, of the B.T.O. in Britain, in the hope that it might be deciphered. Chris speculated that the ring had been made from the top of a sauce bottle, but confessed that the brand of sauce was difficult to identify. As yet he has not been more forthcoming on the subject.

Approximately 10% of the birds captured were aged as 1st year. All these birds could be expected to remain in New Zealand and all were low in weight (90-120g). Most of the remainder sported some degree of breeding plumage, and their weights (as high as 190g) revealed their preparedness for long-distance migration.

As yet, the migration patterns of Knot summering in New Zealand is little understood. In spring, such birds may pass through north-western Australia and Victoria en route to New Zealand. In Autumn, they may pass through the Gulf of Carpentaria as they head for Asia. A single New Zealand-banded Knot has been recovered in March in Queensland. It is to be hoped that the continuation of banding efforts in Victoria and New Zealand in the coming summer season will contribute to our understanding.

NEW ZEALAND NATIONAL WADER COUNTS - SUMMER 1986.

Paul Sagar, 38A Yardley Street, Christchurch 4, New Zealand.

The fourth national summer wader count was completed in New Zealand during November/December 1986. Once again over 200 observers converged on wader sites around the country and this resulted in over 158,450 birds being counted.

Totals for the migratory waders are shown in Table 1. Bar-tailed Godwits and Red Knots again comprised the majority of the birds counted and the order of abundance of the top five species remained the same as in previous years - Bar-tailed Godwits, Red Knots, Ruddy Turnstones, Lesser Golden Plovers and Red-necked Stints.

It was a good summer for Lesser Golden Plovers with the total being more than twice the previous highest recorded (548 in 1985). The number of Ruddy Turnstones was virtually the same as in 1985, still down by over 1,000 on the totals for 1983 and 1984. Totals for all other species were similar to those recorded in previous years.

Once again Manukau Harbour, Kaipara Harbour, Firth of Thames, and Farewell Spit were the only areas where 10,000+ waders were counted. Farewell Spit topped the totals list with 29,906 birds, which included 11,920 Bar-tailed Godwits and 15,734 Red Knots. Godwits and knots also comprised the majority of birds recorded at the other major areas. However, observers at the Firth of Thames were very pleased to record a probable Litle Stint among the 11,000+ birds counted. If confirmed this will be a new species for the New Zealand list.

The fourth winter wader count was conducted in June 1987.

Table 1. Migratory waders counted in New Zealand during the November/December 1986 national wader survey.

Lesser Golden Plover	1,120
Large Sand Plover	5
Ruddy Turnstone	4,420
Eastern Curlew	39
Asiatic Whimbrel	65
Whimbrel spp.	50
Tattler spp.	13
Greenshank	4
Marsh Sandpiper	2
Terek Sandpiper	9
Hudsonian Godwit	2
Bar-tailed Godwit	77,314
Red Knot	47,377
Sharp-tailed Sandpiper	93
Pectoral Sandpiper	9
Red-necked Stint	194
Little Stint	1
Curlew Sandpiper	102
Sanderling	4

OBSERVATIONS ON THREE BREEDING PAIRS OF BLACK-FRONTED PLOVER.

John Hobbs, 12 Hume Street, Dareton 2717, New South Wales.

In October 1983 overflow from Tucker's Creek, Dareton, New South Wales formed a narrow billabong 700 metres long. Three pairs of Black-fronted Plovers *Charadrius melanops* took up territories along the billabong and their subsequent breeding was monitored. Daily visits were made to the area. No other adult plovers were seen. Some details of the nests appear below.

PAIR 1

Nest 1

23.11.83	1500	2e.	Sitting. Apparent full clutch.
16.12.83	1700	2e.	Sitting. Young cheeping in both eggs.
17.12.83	1400	2e.	Still cheeping.
18.12.83	1000	2e.	Cheeping. 1 egg pipped.
19.12.83	0600	0e.	Distraction display. Successful hatch.

Nest 2

40 metres from Nest 1.

06.02.84	1400	3e.	Sitting. Apparent full clutch.
16.02.84	1100	3e.	Sitting.
17.02.84	2000	0e.	Large pieces broken eggshell near nest. Failure. Predator unknown.

PAIR 2

Nest 1

24.11.83		3e.	Sitting. Distraction display.
14.12.83	1500	3e.	Straddling. Shade temperature 35°C.
15.12.83	1900	2e.1y.	
16.12.83	0700	1e.2y.	Distraction display.
16.12.83	1700	3y.	1 adult standing near nest.
17.12.83	1300	0y.	Distraction display. Successful hatch.

Nest 2

Same nest as Nest 1. No extra material added.

23.01.84	0700	1e.	Warm.
23.01.84	1400	1e.	Warm.
24.01.84	1500	2e.	Warm. Apparent full clutch.
06.02.84		2e.	Sitting.
10.02.84		0e.	2 crumbled half shells 3 metres from nest. Failure. Predator unknown.

Nest 3

8 metres from Nests 1 & 2.

15.02.84	1300	1e.	Sitting.
16.02.84	1100	1e.	Sitting.
16.02.84	2000	2e.	Sitting.
18.02.84	1100	2e.	Sitting. Probable full clutch.
20.02.84	1200	0e.	Small pieces shell close to nest. Failure. Predator unknown.

PAIR 3

Nest 1

09.12.83	1500	2e.	Sitting.
10.12.83	1200	2e.	Sitting.
11.12.83	1800	3e.	Sitting. Apparent full clutch.
02.01.84	1100	3e.	Sitting. Young cheeping in one egg.
03.01.84	1000	3e.	Warm. Young cheeping both eggs. One egg pipped.
04.01.84	1300	3y.	1 chick just emerged, wet, shell in nest. Sitting. Sitting adult returned to nest after flushing, then stood 1 metre away. 1 dry chick walked to it and was covered.
06.01.84		0y.	

A few details emerge from this cursory monitoring which are either additional or at variance to presently recorded facts.

Antagonistic behaviour indicated the 700m long, 50m wide billabong was divided into three equal sized territories about 235m long. As both sides were used the breeding territory of each pair covered 470m of water's edge. Two pairs commenced second clutches after a successful hatch, one pair using the same nest again.

One pair had a third replacement clutch after loss of the second. Two second or replacement clutches were of 2 eggs but one, after a first clutch of 2 eggs was of 3 eggs.

Second clutches after initial successful hatchings were commenced after 38 days in one instance and a maximum of 46 days in the second. A replacement clutch after egg loss was commenced between 5 and 9 days after the loss.

Eggs were laid on alternate days, the exact period being between 31, 32 and 51 days, all three imprecise calculations.

In the two instances where nests were found with the first egg only, incubation, or at least covering, of the eggs had already commenced. Incubation period, i.e. the period between laying of the last egg and hatching of the last egg, was a minimum of 25 days in one instance and in a more precise instance as between 22 days 16 hours and 25 days 1 hour i.e. 23.20½ ± 1.4½d. Marchant (1980) has been followed for calculation. Courtney & Marchant (1971), using RAOU Nest Record Scheme data, gave one precise period as 25.13 ± 0.11 days and two imprecise minimum periods as 27 days and 26±½ days. Maclean (1977), using his own imprecise observations surmised that the full incubation period was about 26 days. This conjecture has been used by subsequent authors, e.g. Johnsgard (1981), Readers Digest (1986) and Lane (1987).

Young were heard cheeping in the egg up to 20 days before hatching. Pipping of eggs started 1 day before hatching. Hatching was spread over 20, 22 and 25 hours, chicks apparently remaining in the nest until the last was hatched when they left soon after, if not immediately. Lane (1987) states young leave the nest within 2 or 3 days of hatching. It is possible my daily visits may have caused more hasty departures.

Fuller details of all nests are filed with the RAOU Nest Record Scheme.

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NORTHWARD MIGRATION OF THE CURLEW SANDPIPER (*Calidris ferruginea*) IN NORTH QUEENSLAND.

Richard Johnson, 21 First Ave., Railway Estate, Qld. 4810.

It has been suggested that northward migration of the Curlew Sandpiper (*Calidris ferruginea*) tends to occur largely in a movement from south-eastern Australia to the north west coast and out of Australia (Lane 1987).

Starks and Lane (1987), in an analysis of wader counts throughout Australia from February to April 1985, showed that while counts of Curlew Sandpiper in southern Australia declined markedly from mid-February to late March, the number of birds recorded in northern Australia was uniformly low for this period. They concluded that the Curlew Sandpiper was most likely to fly to the north west coast (Starks and Lane 1987).

On April 5, 1987 at Alva Beach near Ayr, North Queensland, in the company of several others, I observed an estimated 950 Curlew Sandpiper on tidal lagoons behind the beach dunes. At the time the wind was blowing strongly from the south east (gusts in excess of thirty knots) with intermittent rain. The majority of the birds were actively feeding in the water and most were in partial or complete breeding plumage. The Curlew Sandpiper were accompanied by approximately 200 Sharp-tailed Sandpiper (*C. acuminata*), 95 Marsh Sandpiper (*Tringa stagnatilis*) and 21 Greenshank (*T. nebularia*).

In regular counts at Townsville (approx. 100 km north) Curlew Sandpiper have been encountered only in small numbers (*pers. obs.*). Large numbers of Curlew Sandpiper have not been previously recorded at Alva Beach. (R. Wyatt, pers. comm.). This extraordinarily large flock may indicate that significant numbers of Curlew Sandpiper do migrate north along the eastern Australian coast, possibly overflying to areas beyond Australia. This is within the proposed flight range of this species (Stark and Lane 1987) and Garnett did not encounter the species in the Gulf of Carpentaria in April (Garnett 1986). The bad weather prevailing at the time of this record may have temporarily "grounded" this flock.

REFERENCES

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BANDING ROUND-UP

Compiled by Kim Lowe, Australian Bird & Bat Banding Schemes, Australian National Parks & Wildlife Service, GPO Box 8, Canberra ACT 2601.

The following lists are from data supplied to the Australian Bird and Bat Banding Schemes between June 1986 and July 1987 (with the exception of the data for 060-01718 which was omitted from the list in Stilt 10). Permission must be sought from the banders and clearance given by ABBBS before using these data in publications.

The maps show the places outside of Australia where the birds listed in 'Recovery Round-up' in Stilt 10 were banded or recovered. These maps may not be reproduced without the permission of ABBBS.

Symbols used:

Age code: U = unknown; P = nestling; J = juvenile; 1 = within the first year of life; +1 = within the first year or older; 2 = within the second year; +2 = within the second year or older; etc.

Sex: U = unknown; M = male; F = female.

Method of encounter: 01 = probably trapped but device unknown to banding office; 02 = trapped but device unknown to banding office; 03 = trapped in a mist net; 04 = trapped with cage trap; 05 = trapped with cannon net; 06 = trapped in clap trap, etc; 08 = caught by hand or with handheld net; 15 = deliberately trapped for food or aviary; 23 = trapped accidentally in marine/aquatic animal trap; 25 = sick or injured; 35 = collided with a lighthouse or stationary night light; 40 = band found on bird, no further data re method of encounter; 43 = band number only reported; 46 = colour marking sighted in field, bird one of a cohort marked this way; 48 = colour marking sighted in field; 54 = beachwashed; 57 = band found on another species; 61 = shot; 67 = shot for food; 68 = shot for food or sport; 81 = taken by domestic or wild cat; 99 = found dead, cause unknown.

Status after encounter: 00 = unknown by banding office for bird and band; 02 = status of bird unknown,band removed; 03 = bird was dead,band status unknown; 05 = bird is dead and band was removed; 13 = bird released alive with band; 14 = bird released alive and the band was removed; 16 = bird rehabilitated,released with band; 18 = bird is alive in captivity, band status is unknown; 19 = bird alive in captivity with band; 26 = bird alive in wild with band; 29 = bird partially decomposed,band removed.

Layout of data: Line 1 - band number, banding place, co-ordinates, date, age, sex, bander; Line 2 - recovery method, status, place, co-ordinates, date, age, sex, finder; Line 3 - distance, direction, time elapsed.

Note: Band numbers beginning with letters are from foreign banding schemes. The band beginning 'UNK' is the coded band number for a sighting of a colour-banded bird for which the real band number is not known.

129 RUDDY TURNSTONE ARENARIA INTERPRES

060-01718 KOORAGANG ISLAND NSW 32d52mS 151d46mE 12/01/74 +1 U VAN GESSEL
61 00 BARABASHEVKA PRIMORJE USSR 43d 6mN 131d33mE 15/08/75 U U SOVIET BANDING SCHEME
Distance: 8661 km Direction: 344 degs. Time elapsed: 1 yrs 7 mths 3 days

130 PIED OYSTERCATCHER HAEMATOPUS LONGIROSTRIS

100-83670 AERIAL LAGOON LAUDERDALE TAS 42d56mS 147d29mE 12/07/81 J F SHOREBIRD STUDY GROUP (BOAT)
04 13 MORTIMER BAY NORTH SITES 0 TO 2 TAS 42d58mS 147d28mE 25/11/86 6 F NEWMAN
Distance: 5 km Direction: 187 degs. Time elapsed: 5 yrs 4 mths 13 days

100-88035 PIPECLAY LAGOON CALVERTS PROPERTY TAS 42d58mS 147d32mE 26/12/86 P U NEWMAN
23 05 EAGLEHAWK BAY TAS 43d 1mS 147d53mE 15/06/87 U U SWARTZFAGGER
Distance: 29 km Direction: 100 degs. Time elapsed: 0 yrs 5 mths 20 days

137 LESSER GOLDEN PLOVER PLUVIALIS DOMINICA

061-37792 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 07/01/84 +2 U VICTORIAN WADER STUDY GROUP
25 18 MOORE ROAD BUNDABERG QLD 24d52mS 152d21mE 23/09/86 U U LINDEMAN
Distance: 1638 km Direction: 29 degs. Time elapsed: 2 yrs 8 mths 16 days

138 HOODED PLOVER CHARADRIUS RUBRICOLLIS

051-30437 BLACK POINT BEACH KANGAROO ISLAND SA 35d53mS 137d58mE 28/01/87 +1 U LASHMAR
48 26 2KM EAST OF STOKES BAY KANGAROO ISLAND SA 35d37mS 137d14mE 01/03/87 +1 U LASHMAR
Distance: 71 km Direction: 293 degs. Time elapsed: 0 yrs 1 mths 4 days

051-30437 BLACK POINT BEACH KANGAROO ISLAND SA 35d53mS 137d58mE 28/01/87 +1 U LASHMAR
48 26 DESTREE'S BAY KANGAROO ISLAND SA 35d57mS 137d36mE 07/03/87 +1 U LASHMAR
Distance: 33 km Direction: 255 degs. Time elapsed: 0 yrs 1 mths 10 days

140 DOUBLE-BANDED PLOVER CHARADRIUS BICINCTUS

040-96019 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 17/06/79 1 U VICTORIAN WADER STUDY GROUP
04 13 HAKATARAMEA RIVER NEW ZEALAND 44d44mS 170d29mE 09/11/85 +2 F NEW ZEALAND BANDING SCHEME
Distance: 2282 km Direction: 117 degs. Time elapsed: 6 yrs 4 mths 22 days

040-99247 RAILWAY POINT BARILLA BAY TAS 42d49mS 148d29mE 31/05/81 J U SHOREBIRD STUDY GROUP (BOAT)
04 14 ASHBURTON RIVER NEW ZEALAND 43d50mS 171d40mE 16/11/86 +2 F NEW ZEALAND BANDING SCHEME
Distance: 1878 km Direction: 101 degs. Time elapsed: 5 yrs 5 mths 16 days

041-01280 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 23/05/81 +2 U VICTORIAN WADER STUDY GROUP
04 13 CASS RIVER NEW ZEALAND 43d53mS 170d30mE 21/11/86 +2 M NEW ZEALAND BANDING SCHEME
Distance: 2269 km Direction: 114 degs. Time elapsed: 5 yrs 5 mths 29 days

NB53566 CASS RIVER NEW ZEALAND 43d53mS 170d30mE 24/12/84 J U NEW ZEALAND BANDING SCHEME
05 13 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 18/05/85 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2269 km Direction: 277 degs. Time elapsed: 0 yrs 4 mths 25 days

NB53566 CASS RIVER NEW ZEALAND 43d53mS 170d30mE 24/12/84 J U NEW ZEALAND BANDING SCHEME
05 13 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 31/05/87 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2269 km Direction: 277 degs. Time elapsed: 2 yrs 5 mths 7 days

UNK00001 POINT COOK, ALTONA VIC 37d55mS 144d46mE 00/00/86 U U VICTORIAN WADER STUDY GROUP
46 26 COAL RIVER CANTERBURY PROV NEW ZEALAND 43d47mS 170d34mE 22/12/86 U U NEW ZEALAND BANDING SCHEME
Distance: 2260 km Direction: 114 degs. Time elapsed: 0 yrs ? mths ? days

161 CURLEW SANDPIPER CALIDRIS FERRUGINEA

040-97417 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 26/01/80 +2 U VICTORIAN WADER STUDY GROUP
02 13 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 08/03/80 +2 U VICTORIAN WADER STUDY GROUP
Distance: 0 km Direction: 0 degs. Time elapsed: 0 yrs 1 mths 13 days

040-97417 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 26/01/80 +2 U VICTORIAN WADER STUDY GROUP
61 05 RICE FIELD 15K S HO CHI MINH CTY VIETNAM 10d44mN 106d45mE 26/04/83 U U NGUYEN VAN DAU
Distance: 6680 km Direction: 315 degs. Time elapsed: 3 yrs 3 mths 0 days

040-99828 KOORAGANG ISLAND NSW 32d52mS 151d44mE 15/10/82 +1 U BARDEN
05 13 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 06/12/86 +3 U SHOREBIRD STUDY GROUP (BOAT)
Distance: 1188 km Direction: 197 degs. Time elapsed: 4 yrs 1 mths 22 days

041-04218 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 10/01/82 +2 U SHOREBIRD STUDY GROUP (BOAT)
03 13 MAI PO MARSHES HONG KONG 22d29mN 114d 2mE 26/04/87 +2 MELVILLE
Distance: 8021 km Direction: 327 degs. Time elapsed: 5 yrs 3 mths 16 days

041-24668 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 03/01/87 +2 U VICTORIAN WADER STUDY GROUP
03 13 MAI PO MARSHES HONG KONG 22d29mN 114d 2mE 26/04/87 +2 U MELVILLE
Distance: 7446 km Direction: 329 degs. Time elapsed: 0 yrs 3 mths 23 days

162 RED-NECKED STINT CALIDRIS RUFICOLLIS

032-11349 LAKE FORRESTDALE WA 32d 9mS 115d56mE 08/12/79 U U LANE
05 13 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 23/03/85 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2691 km Direction: 112 degs. Time elapsed: 5 yrs 3 mths 15 days

032-22550 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 02/01/83 J U SHOREBIRD STUDY GROUP (BOAT)
05 13 BARRY BEACH CORNER INLET VIC 38d42mS 146d23mE 02/03/86 U U VICTORIAN WADER STUDY GROUP
Distance: 487 km Direction: 349 degs. Time elapsed: 3 yrs 2 mths 0 days

032-23004 PIPECLAY LAGOON (EAST SIDE) TAS 42d58mS 147d32mE 23/11/79 +1 U SHOREBIRD STUDY GROUP (BOAT)
01 13 PIPECLAY LAGOON (EAST SIDE) TAS 42d58mS 147d32mE 10/10/82 +2 U SHOREBIRD STUDY GROUP (BOAT)
Distance: 0 km Direction: 0 degs. Time elapsed: 2 yrs 10 mths 17 days

032-23004 PIPECLAY LAGOON (EAST SIDE) TAS 42d58mS 147d32mE 23/11/79 +1 U SHOREBIRD STUDY GROUP (BOAT)
05 13 BARRY BEACH CORNER INLET VIC 38d42mS 146d23mE 02/03/86 +2 U VICTORIAN WADER STUDY GROUP
Distance: 484 km Direction: 348 degs. Time elapsed: 6 yrs 3 mths 9 days

032-26374 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 09/11/80 +2 U VICTORIAN WADER STUDY GROUP
05 13 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 12/01/86 +2 U SHOREBIRD STUDY GROUP (BOAT)
Distance: 604 km Direction: 156 degs. Time elapsed: 5 yrs 2 mths 3 days

032-26374 WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC 38d 3mS 144d32mE 09/11/80 +2 U VICTORIAN WADER STUDY GROUP
05 13 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 09/03/86 +7 U SHOREBIRD STUDY GROUP (BOAT)
Distance: 604 km Direction: 156 degs. Time elapsed: 5 yrs 4 mths 0 days

032-41958 INVERLOCH (ANDERSONS INLET & PT. SMYTHE) VIC 38d37mS 145d45mE 24/11/84 +2 U VICTORIAN WADER STUDY GROUP
05 13 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 28/03/86 +2 U VICTORIAN WADER STUDY GROUP
Distance: 103 km Direction: 292 degs. Time elapsed: 1 yrs 4 mths 4 days

032-42019 INVERLOCH (ANDERSONS INLET & PT. SMYTHE) VIC 38d37mS 145d45mE 28/11/84 +2 U VICTORIAN WADER STUDY GROUP
05 13 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 28/03/86 +2 U VICTORIAN WADER STUDY GROUP
Distance: 103 km Direction: 292 degs. Time elapsed: 1 yrs 4 mths 0 days

032-42118 INVERLOCH (ANDERSONS INLET & PT. SMYTHE) VIC 38d37mS 145d45mE 24/11/84 J U VICTORIAN WADER STUDY GROUP
05 13 BARRY BEACH CORNER INLET VIC 38d42mS 146d23mE 02/03/86 +2 U VICTORIAN WADER STUDY GROUP
Distance: 56 km Direction: 99 degs. Time elapsed: 1 yrs 3 mths 8 days

032-42241 INVERLOCH (ANDERSONS INLET & PT. SMYTHE) VIC 38d37mS 145d45mE 24/11/84 1 U VICTORIAN WADER STUDY GROUP
02 13 YALLOCK CREEK, NEAR KOOWEERUP VIC 38d13mS 145d28mE 26/12/84 +2 U VICTORIAN WADER STUDY GROUP
Distance: 51 km Direction: 330 degs. Time elapsed: 0 yrs 1 mths 2 days

032-42284 INVERLOCH (ANDERSONS INLET & PT. SMYTHE) VIC 38d37mS 145d45mE 24/11/84 +2 U VICTORIAN WADER STUDY GROUP
05 13 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 28/03/86 +2 U VICTORIAN WADER STUDY GROUP
Distance: 103 km Direction: 292 degs. Time elapsed: 1 yrs 4 mths 4 days

032-42966 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 30/09/84 +3 U SHOREBIRD STUDY GROUP (BOAT)
05 13 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 27/01/85 +2 U VICTORIAN WADER STUDY GROUP
Distance: 579 km Direction: 335 degs. Time elapsed: 0 yrs 3 mths 27 days

032-46830 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 29/12/84 1 U VICTORIAN WADER STUDY GROUP
05 13 INVERLOCH (ANDERSONS INLET & PT. SMYTHE) VIC 38d37mS 145d45mE 01/03/86 J U VICTORIAN WADER STUDY GROUP
Distance: 103 km Direction: 113 degs. Time elapsed: 1 yrs 2 mths 3 days

032-46916 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 29/12/84 1 U VICTORIAN WADER STUDY GROUP
05 13 INVERLOCH (ANDERSONS INLET & PT. SMYTHE) VIC 38d37mS 145d45mE 01/03/86 J U VICTORIAN WADER STUDY GROUP
Distance: 103 km Direction: 113 degs. Time elapsed: 1 yrs 2 mths 3 days

032-51501 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 06/12/86 2 U SHOREBIRD STUDY GROUP (BOAT)
03 13 MAI PO MARSHES HONG KONG 22d29mN 114d 2mE 23/05/87 +2 U MELVILLE
Distance: 8021 km Direction: 327 degs. Time elapsed: 0 yrs 5 mths 17 days

032-52541 PORT HEDLAND SALTWORKS WA 20d11mS 118d54mE 08/11/83 +3 U AUSTRALASIAN WADER STUDY GROUP
03 13 OYSTER HARBOUR 8 KM NORTH-EAST OF ALBANY WA 34d57mS 117d58mE 24/01/87 +3 U SMITH
Distance: 1639 km Direction: 183 degs. Time elapsed: 3 yrs 2 mths 16 days

032-54300 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 23/03/85 +2 U VICTORIAN WADER STUDY GROUP
05 13 BARRY BEACH CORNER INLET VIC 38d42mS 146d23mE 02/03/86 +2 U VICTORIAN WADER STUDY GROUP
Distance: 158 km Direction: 108 degs. Time elapsed: 0 yrs 11 mths 10 days

032-54960 YALLOCK CREEK, NEAR KOOWEERUP VIC 38d13mS 145d28mE 18/01/86 1 U VICTORIAN WADER STUDY GROUP
05 13 RALPHS BAY (WEST) TAS 43d 2mS 147d26mE 06/12/86 U U SHOREBIRD STUDY GROUP (BOAT)
Distance: 558 km Direction: 163 degs. Time elapsed: 0 yrs 10 mths 19 days

163 SHARP-TAILED SANDPIPER CALIDRIS ACUMINATA

040-77229 STOCKTON SANDSPIT KOORAGANG ISLAND NSW 32d52mS 151d46mE 21/03/81 U U BARDEN
99 05 NEAR LAVERTON CREEK ALTONA VIC 37d52mS 144d49mE 03/01/87 +3 U JESSOP
Distance: 840 km Direction: 226 degs. Time elapsed: 5 yrs 9 mths 13 days

164 RED KNOT CALIDRIS CANUTUS

051-02342 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 31/10/82 +2 U VICTORIAN WADER STUDY GROUP
05 13 SE KAIPARA HARBOUR NEW ZEALAND 36d30mS 174d20mE 28/02/87 +2 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 4 yrs 3 mths 28 days

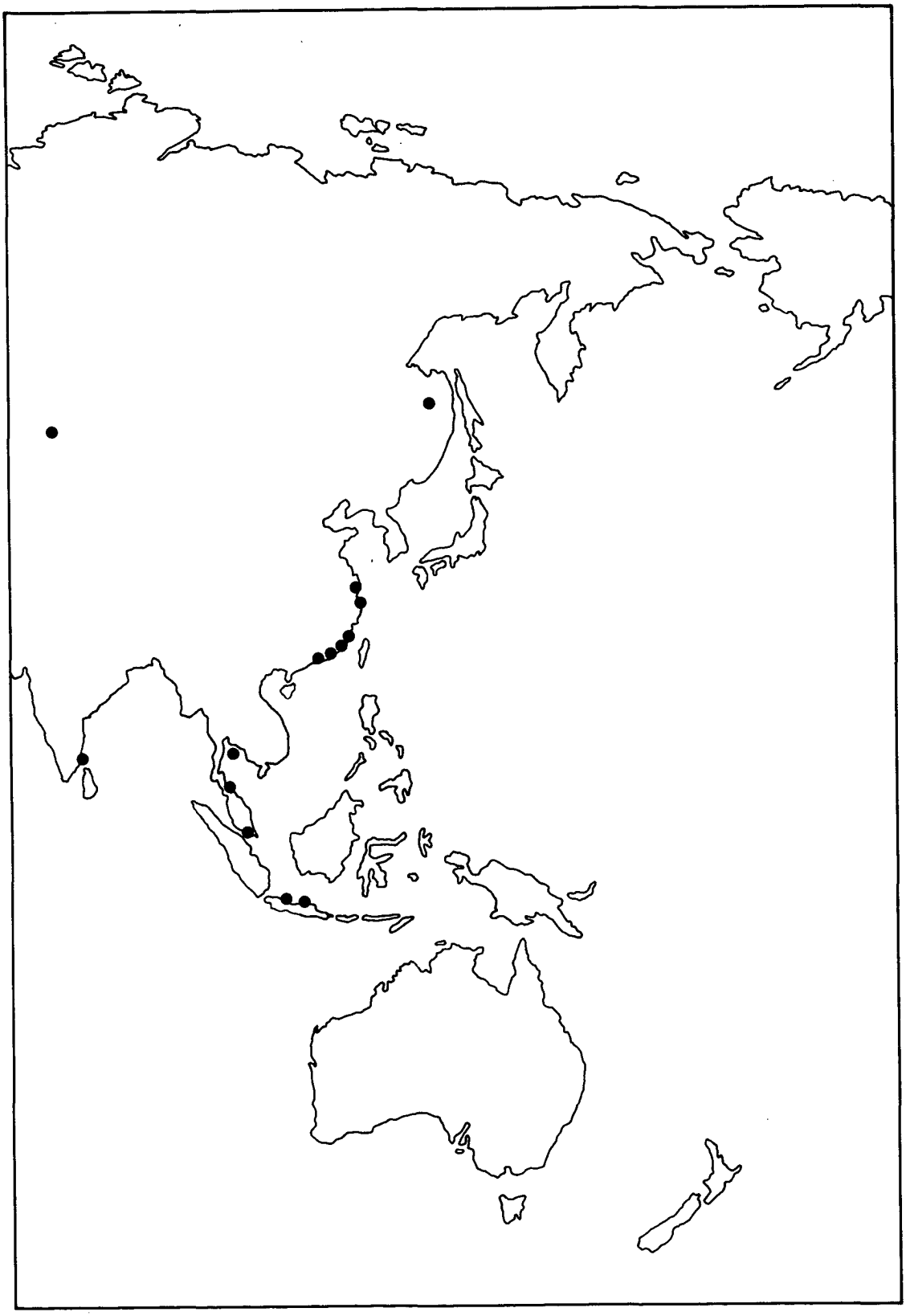
051-15386 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 08/11/86 +3 U VICTORIAN WADER STUDY GROUP
05 13 SE KAIPARA HARBOUR NEW ZEALAND 36d30mS 174d20mE 28/02/87 +3 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 0 yrs 3 mths 20 days

051-16166 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 03/06/84 1 U VICTORIAN WADER STUDY GROUP
05 13 SE KAIPARA HARBOUR NEW ZEALAND 36d30mS 174d20mE 28/02/87 1 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 2 yrs 8 mths 25 days

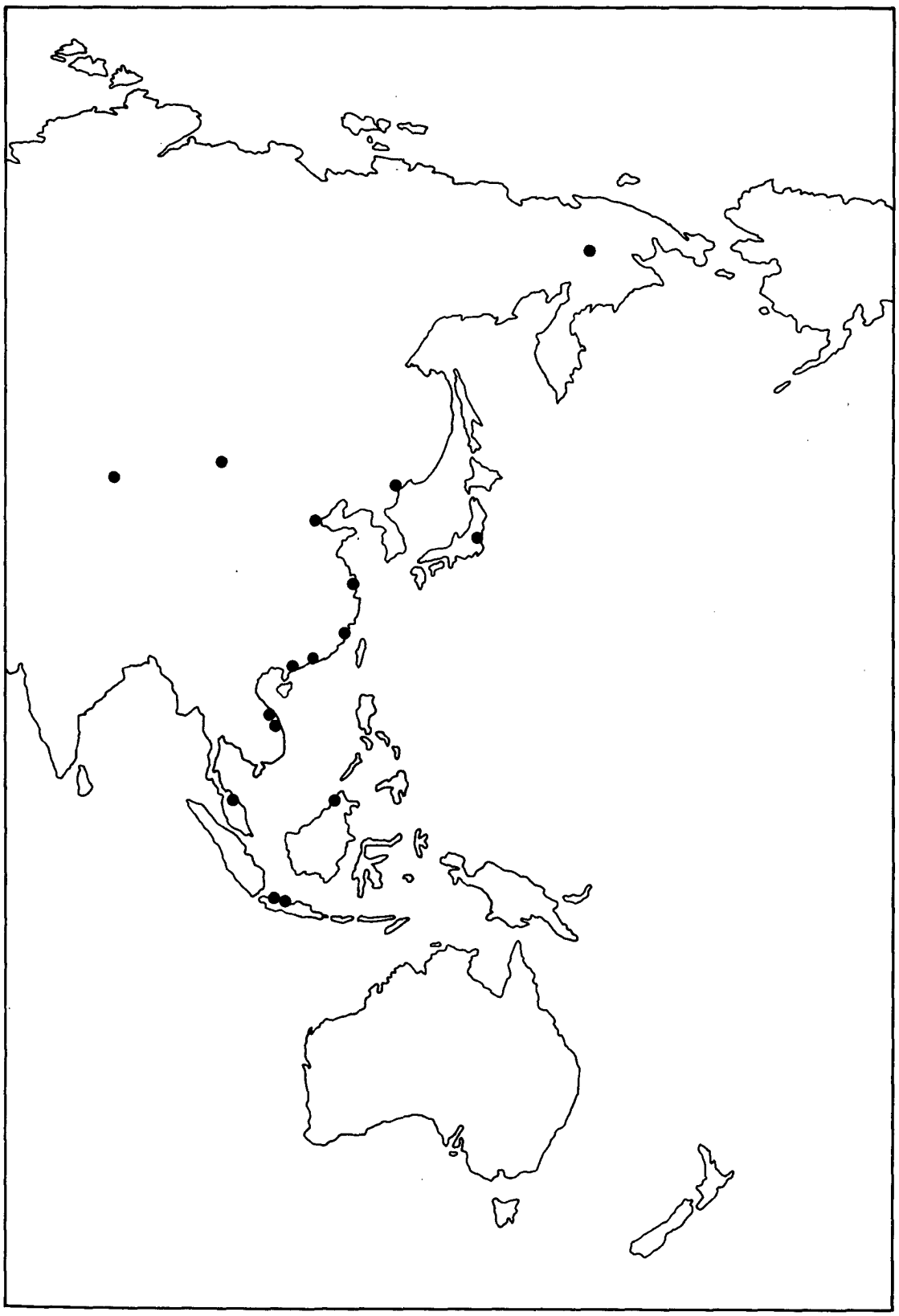
051-18305 SWAN ISLAND QUEENSCLIFF VIC 38d15mS 144d40mE 19/10/85 +3 U VICTORIAN WADER STUDY GROUP
05 13 SE KAIPARA HARBOUR NEW ZEALAND 36d30mS 174d20mE 28/02/87 +3 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 1 yrs 4 mths 9 days

165 GREAT KNOT CALIDRIS TENUIROSTRIS

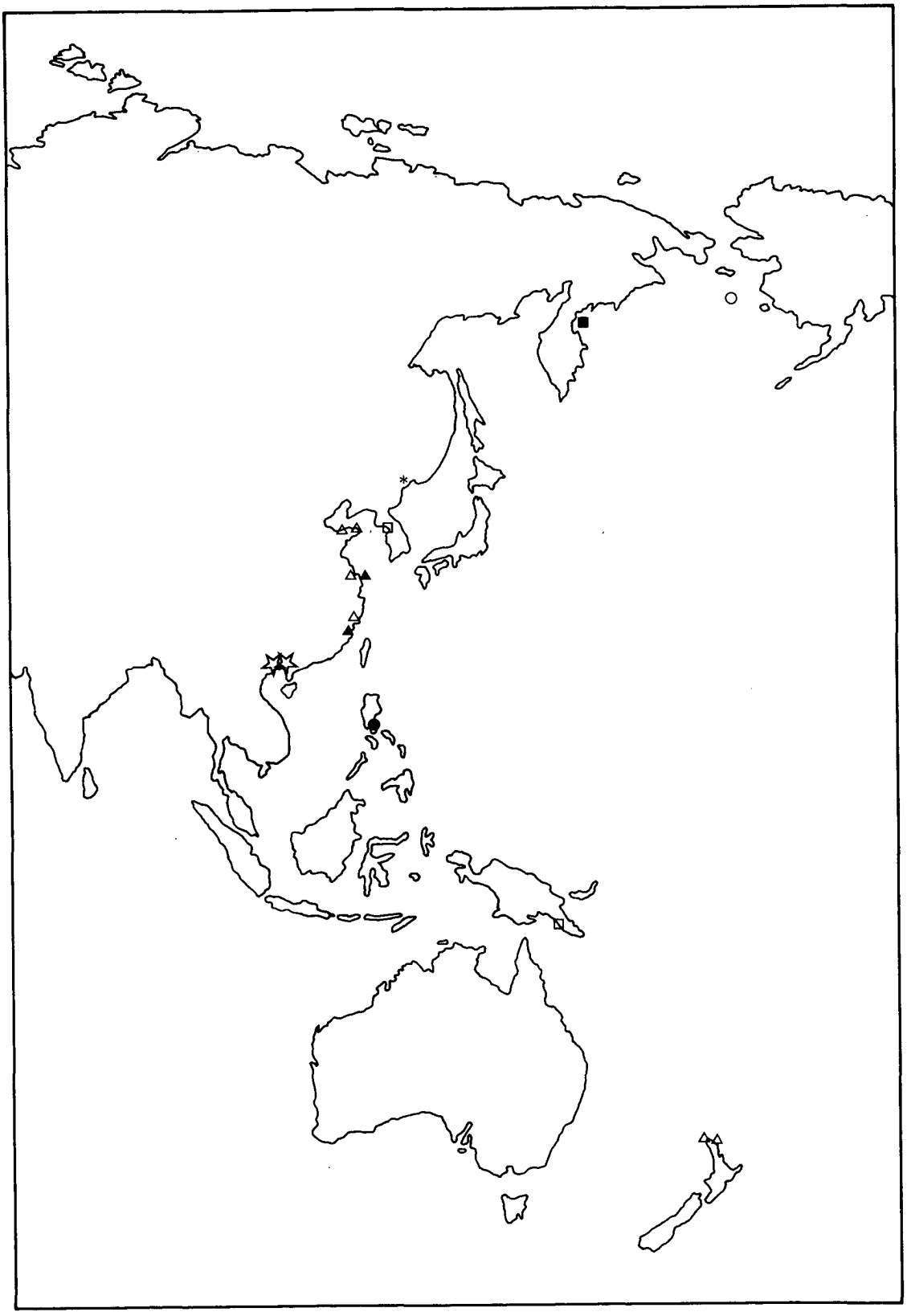
061-41066 ROEBUCK BAY NORTH WA 17d59mS 122d18mE 27/10/83 +3 U WA WADER STUDY GROUP
06 05 ESTUARY OF YANGTZE RIVER SHANGHAI CHINA 30d52mN 121d25mE 17/04/87 U U TIANHOU
Distance: 5406 km Direction: 358 degs. Time elapsed: 3 yrs 5 mths 21 days



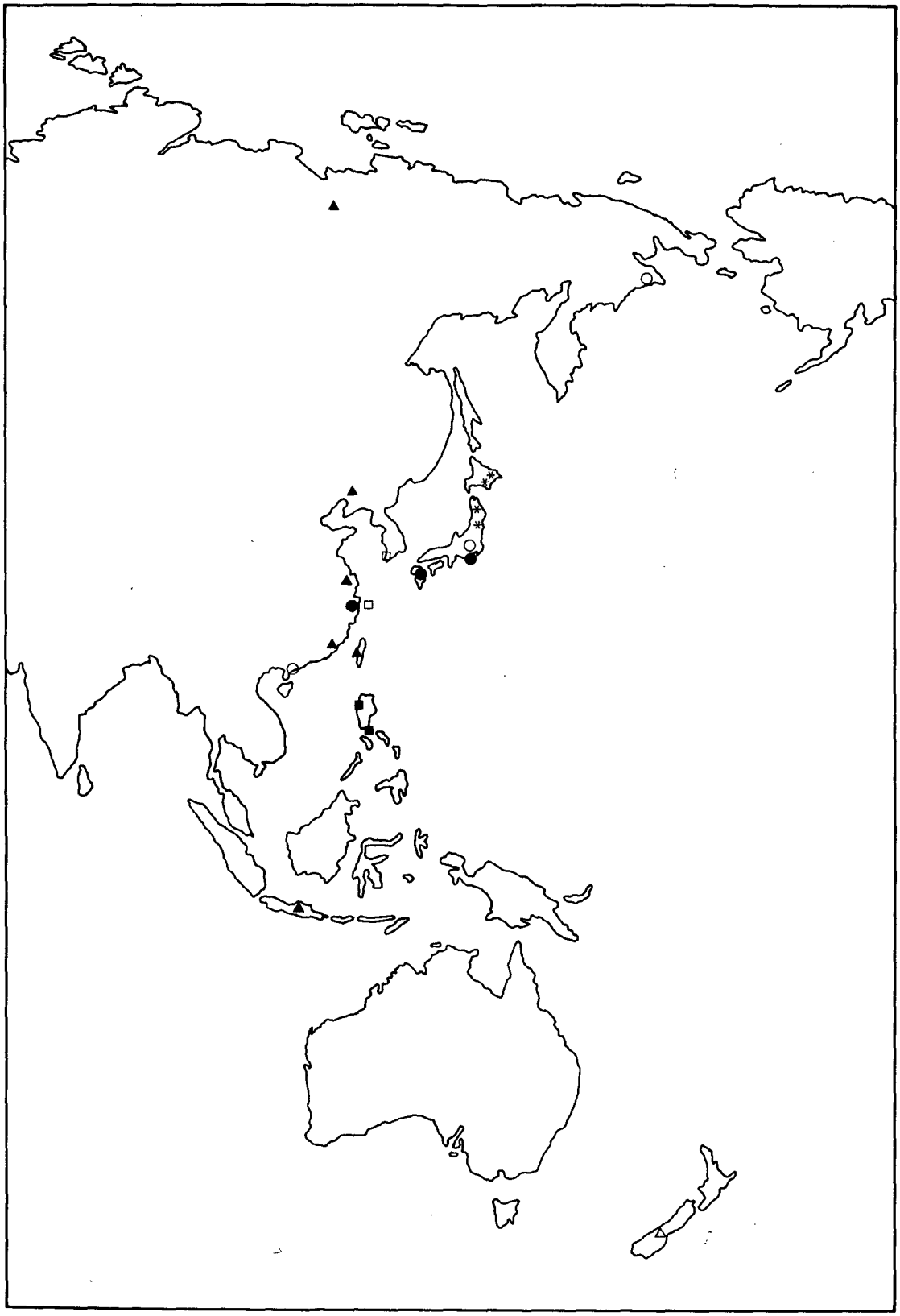
● Curlew Sandpiper



● Red-necked Stint



○ Lesser Golden Plover
● Mongolian Plover
☆ Large Sand Plover
* Ruddy Turnstone
□ Eastern Curlew
■ Whimbrel
△ Red Knot
▲ Great Knot



○ Grey-tailed Tattler
● Terek Sandpiper
* Latham's Snipe
■ Swinhoe's Snipe
□ Bar-tailed Godwit
△ Double-banded Plover
▲ Sharp-tailed Sandpiper

1986 WADER BANDING TOTALS.

	Tasmanian Shorebird Study Group (B.O.A.T.)	Western Australia Wader Study Group	N.W. Australia Expedition	Alan Lashmar (Kangaroo Island, S.A.)	Wilma Barden* (Kooragang Island, (N.S.W.)	Victorian Wader Study Group
Pied Oystercatcher				20		
Sooty Oystercatcher				2		
Masked Lapwing	23					3
Grey Plover						14
Lesser Golden Plover	6				6	84
Red-kneed Dotterel					2	
Hooded Plover				172		3
Mongolian Plover			4		3	8
Double-banded Plover	2					743
Large Sand Plover			37			3
Red-capped Plover	25	13	3	197	1	34
Black-fronted Plover						2
Ruddy Turnstone			6	7		24
Eastern Curlew						1
Grey-tailed Tatler			9			28
Terek Sandpiper			10		4	6
Latham's Snipe					18	
Bar-tailed Godwit			6		4	178
Red Knot			2		6	341
Great Knot			4			132
Sharp-tailed Sandpiper			4	180		133
Red-necked Stint	674	216	152	118	4	5987
Curlew Sandpiper	186		125	6	44	1477
Broad-billed Sandpiper		1	17			
	916	230	379	702	92	9201

Totals include newly banded birds and retraps.
* 1985-86, not calendar 1986.

The above table contains details of over 10,000 waders caught in Australia during 1986. Highlights were:-

(a) S.S.G. (B.O.A.T.) - 23 Masked Lapwings and over 900 birds for the year.

(b) W.A.W.S.G. - first Broad-billed Sandpiper caught in Perth and a 13 year old Red-necked Stint retrap.

(c) N.W.A. Expedition - 17 Broad-billed Sandpipers and 37 Large Sand Plovers.

(d) Alan Lashmar - 172 Hooded Plovers were caught by dazzling at night. Also 197 Red-capped Plovers and 180 Sharp-tailed Sandpipers.

(e) Wilma Barden - 18 Latham's Snipe.

(f) Victorian Wader Study Group - 743 Double-banded Plover, 132 Great Knot and 84 Lesser Golden Plover a record total of 9201 (previous best was 7922 in 1979), well above the 1979-86 average of 6049.

Clive Minton

AUSTRALASIAN WADER STUDIES GROUP

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THE STILT

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ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

NUMBER ELEVEN OCTOBER 1987

A.W.S.G. Items

Interwader.

New Zealand.

Open Notebook.

Banding Round-up.