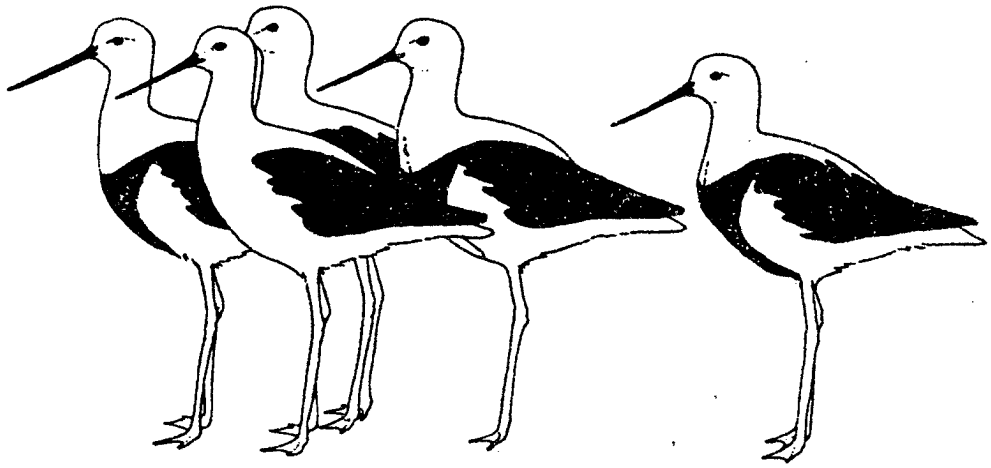
The Stilt



ISSN 0726-1888

BULLETIN OF THE AUSTRALASIAN WADER STUDIES GROUP

OF THE

ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

Number 20 APRIL 1992

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 1992:

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

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

CHAIRMAN'S REPORT FOR 1991

1991 was another year of solid achievement for wader studies in the East Asian-Australasian Flyway.

It is very pleasing to report that the intensity of wader studies is increasing in the Flyway.

Following the formation in 1990 of the New South Wales Wader Study Group, the Queenslanders have followed suit. Australia now has four active wader counting and banding groups - ourselves, and those in Victoria, New South Wales and Queensland.

The Asian Wetland Bureau has appointed a Waterbirds and Flyway Projects Officer and this move has already resulted in preliminary discussions on potential areas for increased AWSG/AWB cooperation.

To these two developments can be added substantial progress towards establishing ongoing co-operative migratory bird study programmes with the Japanese and Chinese (under the Japan- and China-Australia Migratory Bird Agreements). One important initiative is the identification of five species for special attention - these being Red-necked Stint, Great Knot, Latham's Snipe, Eastern Curlew and Little Tern.

The AWSG Expedition to the Red River Delta in Vietnam was successful, despite the single tide per day limiting catching and counting opportunities, and very useful abundance and biometric data was collected. A report will be issued describing the results and containing recommendations for future research activities. Already, as a result of the information obtained on hunting activities in the Delta, it has been decided to include the region in the AIDAB-funded and RAOU-managed project "Towards sustainable harvesting of waterbirds in the East Asia Flyway" - in addition to the existing sites in Thailand, Indonesia and China.

Assistance was also given to a group of Bangladeshi conservationists surveying a previously uncounted portion of the Ganges Delta. The results confirmed the very considerable importance of the Delta for waders, duck, gulls and terns during the non-breeding season.

Leg-flagging by the VWSG has continued apace, following considerable encouragement from sightings during 1991 of flagged birds in Hong Kong, Japan, New Zealand and around Australia. Our colleagues in the flyway have been asked to keep a watch for marked birds. Flagging will be extended to north-western Australia during the forthcoming AWSG Expedition (mid-September/mid-October) and much interest is being shown in use of the technique by other countries in the flyway.

The Stilt continues to get better, both in content and layout. The continuing flow of unsolicited high-quality material is testament to the sterling efforts of the Editor, Jeff Campbell, in creating a respected Flyway Wader Bulletin. *Stilt* is now being sent gratis to a number of wader workers throughout the flyway as a means of keeping them informed of study activities and developments elsewhere.

Our efforts to provide interesting wader news to bird groups and ornithological institutes, who may not receive or have access to *The Stilt*, have been very successful. The press releases prepared by Hugo Phillipps have been published, in full or part, in many Australian and overseas bulletins.

The AWSG's financial situation is very sound with balances in both the General and Research Accounts increasing (see the Treasurer's Report elsewhere). This encouraging position has much to do with the control we have managed to keep over *Stilt* costs, despite steadily increasing postage costs. It is now four years since the annual subscription cost was increased to $15 and a further increase is unlikely in the foreseeable future.

The AWSG continues to be involved in various matters concerning the conservation of waders and their habitat throughout Australia. The Conservation Officer has prepared letters and submissions on issues of planning and management of wader habitat in Victoria, New South Wales and Queensland during 1991.

Brett Lane has taken up a position with the Asian Wetland Bureau, in Kuala Lumpur, and, whilst we shall miss his experience and contribution as AWSG Research Coordinator, his extensive knowledge of Australian waders will be of great assistance to AWB. Brett has been intimately involved with wader studies in Australia for the last twelve years, firstly as Coordinator of the RAOU Wader Studies Programme and latterly as AWSG Research Coordinator. He has made an extremely significant contribution to wader conservation both through his organisation of wader study activities and his active involvement in the field and, particularly, in the publication in 1987 of his book, "*Shorebirds in Australia*". Many thanks Brett from all of us - and from the waders too!

Danny Rogers has replaced Brett Lane as Research Coordinator and his major task for 1992 is to review and further develop the AWSG Scientific Programme.

People come and go and we are always on the lookout for new blood to help us plan and run our activities. Anybody interested in assisting is very welcome to discuss the opportunities with me. New people not only help in sharing the work and relieving those who want to do other things, but also, very importantly, bring new ideas and directions to stop us getting into a rut.

As usual, my thanks must go to all who have helped us in 1991 - including counters, banders, expeditioneers and, not least, committee members.

Mark Barter

AWSG TREASURER'S REPORT FOR 1991

Our finances continue to remain in a healthy state as subscriptions received were slightly up on last year and expenditure related to the publication of "The Stilt" was reduced.

The balance for the AWSG account is now lower than at the start of the year because $2000 was loaned to the Expeditions account to cover expenses for the Vietnam expedition which were incurred before donations were received from the RAOU.

An additional expenditure this year has been in the publication and distribution of "AWSG News". Issues of AWSG News are sent to natural history societies and institutions in Australasia and the East Asia/West Pacific region, and new members have resulted from its distribution.

Expenditures relating to the Research Fund include Personal Accident Insurance for voluntary workers involved in field studies and the purchase of weather strip maps which will help clarify the effects of local weather conditions on wader movements.

Mist-netting and banding equipment from the Java expedition was sold to AWB Indonesia, and the purchase of some replacement banding equipment was financed from the Expeditions account.

David Henderson

RAOU Research Fund
Statement of Receipts and Payments for the Period
1 January 1991 - 31 December 1991

Receipts

Balance B/F	1959.29
Donations	390.15
Bank Interest	109.37
	$2458.81

Payments

Personal Accident Insurance	186.38
Purchase of Weather Strip Maps	55.91
Postage	54.66
Bank Charges	12.00
State Govt. Tax	.34
Balance C/F	2149.52
	$2458.81

Australasian Wader Studies Group
Statement of Receipts and Payments for the Period
1 January 1991 - 31 December 1991

Receipts

Balance B/F	5493.96
Subscriptions	4145.39
Sales of "Stilt" Back Nos.	212.00
AWB Subscriptions/Book Sales	1161.30
WSG (UK) Subscriptions	159.55
Donations	11.52
Bank Interest	317.49
	$11501.21

Payments

Stilt - Typing	675.00
- Printing	1390.00
- Envelopes	76.80
- Labels	19.95
- Postage	980.20
AWB Subscriptions/Book Sales	712.19
WSG Subscriptions	243.85
Postage on "shorebirds" books	18.75
Loan to Expeditions Account	2000.00
Chairman's Expenses	36.68
Secretary's Expenses	320.45
Treasurer's Expenses	30.85
Printing + postage - "AWSG News"	163.30
Printing Membership Forms	30.00
Bank Charges	44.50
State Govt. Tax	3.54
Balance C/F	4755.15
	$11501.21

AWSG Expeditions
Statement of Receipts and Payments for the Period
1 January 1991 - 31 December 1991

Receipts

Balance B/F	259.88
Payment from AWB	1000.00
Sale of Banding Equipment	866.50
Transfer from AWSG A/c	2000.00
Bank Interest	57.80
	$4184.18

Payments

Purchase of Banding Equipment	737.20
Vietnam Expedition Expenses	2196.57
Chairman's Expenses	91.54
Govt. Duties	.85
Govt. Tax on Debits	.15
Balance C/F	1157.87
	$4184.18

CONSERVATION NEWS

As mentioned in the Chairman's Report various matters involving planning and management of wader habitat were dealt with in 1991. These ranged from commenting on the possible impact of seaweed harvesting on Hooded Plovers and Sanderlings on beaches near Portland (western Victoria), submissions on the Moreton Bay (Qld) Strategic Plan and Western Port Bay (Vic) Strategy to continued involvement in the NSW Standing Committee on State Development Coastal Planning and Management review.

The group has also assisted the RAOU in preparing submissions to the Coode Island Review Panel (Vic) which was charged with recommending the location of a new chemical storage facility to replace the current antiquated one at Coode Island. The value of a long and continuous series of wader counts as a tool to use when arguing for the conservation of a particular site was amply demonstrated in this case. Because of just such a series of counts for one of the proposed sites (Kirk Point) it was able to be shown that this was an extremely important one for waders and therefore should not be used for such a development. Although it is valuable to simply know that a particular site is valuable such count results are necessary if one wants to prove this to an organisation such as the Review Panel.

Jeff Campbell.

RECENT LITERATURE

The following is a selection of articles dealing with waders from recent publications.

BOLAND, J.M. 1990. Leapfrog migration in North American shorebirds: intra- and interspecific examples. Condor 92: 284-290. (Biol. Dep., San Diego State Univ., San Diego, CA 92182 USA)

CASTRO, G. & J.P. MYERS. 1990. Validity of predictive equations for total body fat in Sanderlings from different nonbreeding areas. Condor 92: 205-209. (Dep. Biol., Colorado State Univ., Ft. Collins, Co 80523 USA).

CASTRO, G., B.A. WUNDER & F.L. KNOPF. 1990. Total body electrical conductivity (TOBEC) to estimate total body fat of free-living birds. Condor 92: 496-499.

CHAFER, C.J. 1991. Waterbird Dynamics of Lake Illawarra and its Peripheral Wetlands. Australian Birds 25: 29-59 (69 Lake Heights Rd., Lake Heights, NSW 2502, Australia).

DANN, P. 1991. Feeding Behaviour and Diet of Double-banded Plovers *Charadrius bicinctus* in Western Port, Victoria. Emu 91: 179-184. (Penguin Res. Com. of Management, P.O. Box 403, Cowes, Vic. 3922, Australia).

HEATHER, B.D. 1991. Oriental Plovers on Lord Howe Island. Australian Birds 25: 59-60 (10 Jocelyn Crescent, Silverstream, New Zealand).

HILL, L.A. & L.G. TALENT. 1990. Effects of capture, handling, banding and radio-marking on breeding Least Terns and Snowy Plovers. Journal of Field Ornithology 61: 310-219. (USFWS, 222 S. Howton Ave., Tulsa, OK 47127 USA)

KREMENTZ, D.G. & G.W. PENDLETON. 1990. Fat Scoring: Sources of Variability. Condor 92: 500-507 (USFWS, Patuxent Wildl. Res. Centre, Laurel, MD 20708 USA)

MORRIS, A.K. 1991. Hudsonian Godwit: First Australian and New South Wales Record Australian Birds 25: 24-25 (1 Wombat St., Berkeley Vale, NSW 2259, Australia).

Editor

TITLES OF INTEREST ADDED TO RAOU LIBRARY COLLECTION IN 1991

BAKER-GABB, D.J. The biology and management of the Plains-wanderer *(Pedionomus torquatus)* in New South Wales. N.S.W. N.P. & W.S. species management report No. 3. Hurstville.

BODSWORTH, F. 1966. Last of the Curlews. Longmans Green. London.

COWLING, S. 1991. Explore Melbourne's wetlands. National Trust of Australia. (Victoria).

DONOHUE, R. & B. PHILLIPS (eds.) 1991. Educating and managing for wetlands conservation - Wetlands Conservation and Management Workshop, Feb. 1991. Australian N.P. & W.S. with Australian Wildlife Fund.

HOWES, J. & D. BAKEWELL. 1989. Shorebird Studies Manual. AWB Publication No. 55. Kuala Lumpur.

HOWES, J. *et al.* n.d. Introductory manual for field studies on waterbirds W.W.F. & A.W.B. (in Chinese).

HUTTON, R. 1991. Australian Softbill management - aviary studies of wrens, robins, chats and dotterels. Singil Press. Austral.

JACKSON, R. 1991. Extracts from Waterbirds in nature reserves of south-western Australia. Supplement to RAOU Report No. 30. RAOU. Melbourne.

JAENSCH, R. 1989. Birds of wetlands and grasslands in the Kimberley division, W.A.: Some records of interest, 1981-1988. RAOU Report No. 61. RAOU. Canning Bridge.

KINGSFORD, R. 1991. Australian Waterbirds - a field guide. Kangaroo Press. Kenthurst.

McCOMB, A.J. & P.S. LAKE (eds.) 1988. The conservation of Australian Wetlands. Surrey Beatty in association with World Wildlife Fund Australia. Chipping Norton.

MAHER, P.N. 1990. Bird survey of the Lachlan/Murrumbidgee confluence wetlands. N.S.W. N.P. & W.S. Sydney.

RIEGEN, A. 1990. North-west Australia '90-Wader Expedition - March-April 1990. Video cassette. Photographed by A. Riegen as a member of the expedition.

SCHULZ, M. 1991. Altona Coastal Park - draft management plan. Vict'n Dept. of Conservation and Environment, Altona City Council and Western Region Commission. Melbourne.

SCHULZ, M. 1989. The importance of wetlands in Kakadu National Park to selected waterbirds. Report of Australian N.P. & W.S. Canberra.

Victorian Dept. of Conservation & Environment. 1990. Swan Bay: Marine and Wildlife reserves proposed management plan - Dept. of Cons. & Env. Melbourne.

Victorian Dept. of Conservation & Environment. 1990. The Western Wetlands - Information Kit.

AWSG COMMITTEE FOR 1992 - 1994

As no nominations were received for committee positions, the new committee to take office from 1 June 1992 for two years is as follows:

Chairman	Mark Barter
Administrative Secretary	Brenda Murlis
Treasurer	David Henderson
Research Co-ordinator	Danny Rogers
Membership and Liaison Officer	Hugo Phillipps
Editor	Jeff Campbell
Committee Members	Clive Minton
	Mick Murlis
	Brenda Murlis

BACK ISSUES OF *THE STILT*

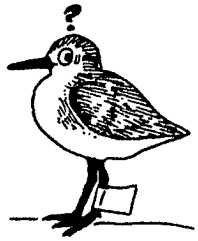
Back issues of *The Stilt* are available from Brenda Murlis (see inside back cover for address).

Prices are: Australia and New Zealand
Single copies - $5.00 post paid
Complete set (1-17) - $55.00 post paid

Other countries
Single copies - $6.00, surface post paid
Complete set (1-17) - $65.00 surface post paid

Limited quantities only of Nos. 5 and 6 are available.
Stilt No. 7 contains the Index for Nos. 1-6 and
Stilt No. 13 the Index for Nos 7-12.
Stilt No. 19 the Index for Nos 13-18.

FLAG WATCH 1992



Orange leg-flagging of waders has continued during the last year in south-eastern Australia with a further 3000 birds being marked. The project is aimed at increasing our knowledge of migration routes in the East Asian-Australasian Flyway, at a time when habitat destruction is rampant and populations of some wader species appear to be in serious decline. Such information is essential for the formulation of soundly-based management plans to ensure long term survival of the different wader species.

Allowing for a conservative annual survival rate of 85%, it is estimated that approximately 5500 leg-flagged birds are now flying up and down the Flyway.

Estimated numbers of flagged birds of each species are as follows:

Red-necked Stint *Calidris ruficollis*	2600
Curlew Sandpiper *Calidris ferrunginea*	1200
Oriental Pratincole *Glareola maldivarum*	450*
Ruddy Turnstone *Arenaria interpres*	300
Red Knot *Calidris canutus*	300
Sharp-tailed Sandpiper *Calidris acuminata*	300
Sanderling *Calidris alba*	150
Bar-tailed Godwit *Limosa lapponica*	150
Greenshank *Tringa nebularia*	30
Pacific Golden Plover *Pluvialis dominica*	20

* = flagged by AWSG team in Java.

Small numbers of Eastern Curlew *Numenius madagascariensis*, Great Knot *Calidris tenuirostris* and Terek Sandpiper *Tringa terek* have also been leg-flagged.

Additionally, some Bar-tailed Godwit have been flagged **green** in Australia and New Zealand has commenced flagging Red Knot and Bar-tailed Godwit **white**.

Checks on recaptured flagged birds have shown that flag retention is almost 100% over the last year. Details of the flag manufacturing and attachment techniques are published in this issue of *Stilt*.

Results to date have been extremely encouraging. Two Sanderling have been seen on southwards migration in Japan, five Red Knot and two Red-necked Stint have been identified in New Zealand and Red-necked Stints and Curlew Sandpipers have been seen on northward migration in Hong Kong. Additionally, very useful information on both northwards and southwards movements within Australia has been obtained.

The great majority of flags have been placed on the upper right leg (tibia), but a few are on the lower right leg (tarsus) - especially Ruddy Turnstone - and on the left leg. The exact position is **not** important.

Would you and your colleagues keep a watch for leg-flagged birds, particularly during the migration periods in

April/May and July/September and also in the breeding season. Reports of sightings should include species name, place (including latitude and longitude), date and also approximate numbers and species of waders present. The information should be sent to:

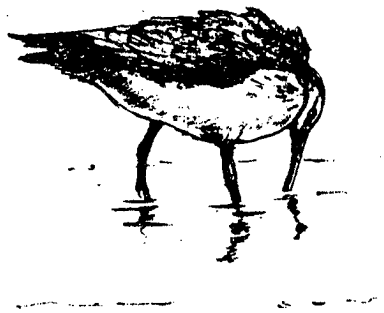
Australian Bird Banding Scheme
GPO Box 8
Canberra ACT 2601 AUSTRALIA
Tel: (61)-(06)-2500321 Fax: (61)-(06)-2500399

GOOD LUCK!!

Mark Barter

SURVEY OF VICTORIAN BEACHES FOR HOODED PLOVERS AND OYSTERCATCHERS

In October this year, (exact date yet to be fixed) another survey of Victorian beaches is scheduled to take place. Two species of resident waders are the focus of the survey; Hooded Plover *Charadrius rubricollis* and Pied Oystercatcher *Haematopus longirostris*. This years organiser is Michael Weston. If you wish to participate in any way please contact Michael on 870 1586 (after 6.30 pm) or at RAOU headquarters on 370 1422. Your involvement would be appreciated.



JAMBA in Broome

(The following is reprinted from *Wingspan* 4, December 1991, with the kind permission of the author and David Andrew, *Wingspan* Editor.)

Since being signed in 1974 six consultative meetings have been held for the Japanese Australia Migratory Birds Agreement (JAMBA), with the venue alternating between Australia and Japan. At these meetings conservation issues covered by JAMBA are considered, together with progress on research and management of birds migrating between the two countries. The RAOU has always sent a delegate to these meetings, generally to represent non-government conservation organisations. Three NGO representatives were included in the eleven-strong Australian delegation at Broome: I attended on behalf of the RAOU, Ellen McCulloch represented the Bird Observers' Club of Australia, and Alaric Fisher represented WWF Australia, ACF and Greenpeace.

The formal discussions of the meeting lasted two days and were followed by a day and a half of field excursions. The second day of the discussions and all the field trips were hosted by the RAOU at the Broome Bird Observatory. The comfortable air-conditioned conference room in the Woodside Building at the Observatory was scarcely 150 metres from the Roebuck Bay mudflats and thousands of the migratory birds being talked about. The handy presence of the birds (we even adjourned the meeting at one point to go and see the high-tide roosts), the informality of the Observatory and the superb hospitality of the Wardens and their assistants ensured that the meeting was most successful.

Little Terns were encountered at several places along Roebuck Bay - they must have known that they were being talked about at the meeting. The Australian status of these birds has been debated inconclusively at previous JAMBA meetings. They are classified as Vulnerable here and have now been listed in the Endangered Species Annex of JAMBA. These Japanese accepted this listing but declined to give Little Terns similar status in Japan.

Yozo Tsukamoto, a delegate from the Wild Bird Society of Japan, presented information that 38 Little Tern breeding colonies were found in Japan in 1991. Twenty-five of these contained fewer than 100 birds, and only three exceeded 1,000 birds. The total Japanese population is estimated to be 7-10,000 birds with about 3,000 breeding pairs. No banding movements are known yet between the Australian and Japanese populations, but their taxonomic relationships, and those of the Australian winter and summer-breeding populations will be investigated in 1991-92.

Other decisions from the meeting included the appointment of liaison officers in each country to maintain progress on JAMBA matters between meetings. Liaison officers were also agreed upon between the Japanese and Australian Banding Schemes. A particular priority for them will be co-ordination of international colour-marking schemes and the regular provision of information about banding projects, band returns and colour-marking along the East Asian Fly-

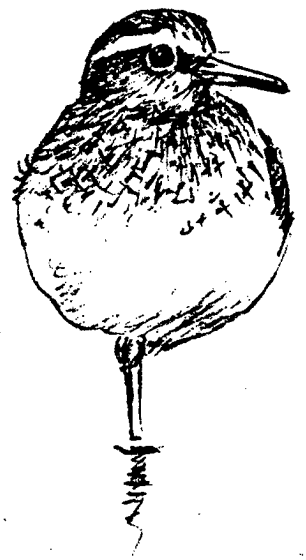
way. This will involve collaboration with other national banding schemes and the Asian Wetlands Bureau.

Three birds were identified as Species of Special Interest for JAMBA - the Eastern Curlew, Latham's Snipe and Little Tern. Recommendations were made for research, management information or habitat protection needed for these birds in the next couple of years. Future JAMBA meetings will identify other species of special interest for research and management.

Both delegations recognised the need for better co-ordination between Australian and Japanese support for conservation projects on the East Asian Flyway, especially in countries such as Papua-New Guinea, Indonesia, Thailand, China and Vietnam. Duplication of funding should be avoided and a common approach developed for project priorities.

Ultimately the conservation of migratory birds will be best served by a multi-lateral agreement between all the countries along the Flyway, rather than the series of bilateral agreements now existing or planned (Australia is also considering migratory birds agreements with Papua-New Guinea and the USSR). This approach will be discussed at meetings in Japan in 1992, and delegates from other flyway nations will be invited to the next JAMBA meeting in Japan in 1993.

Philip Moors



CAMBA in Beijing

In September 1991 the first consultative meeting concerning the China Australia Migratory Birds Agreement was held in Beijing. As most of the species listed for conservation under the agreement are waders I thought the following notes might interest members:

1. Liaison officers were appointed by both sides. The Australian liaison officer is Dr. Bill Phillips of the Australian National Parks and Wildlife Service, with Jamie Pook of the Australian Bird and Bat Banding Scheme as his back-up. Liaison officers will maintain contact and initiate action in the period between formal meetings.

2. It was agreed that each side would provide the other with information on all international recoveries of taxa listed under the treaty, regardless of the country of banding or recovery.

3. Both countries have agreed to co-operate in helping set up an international colour marking register to avoid confusing duplication.

4. The Chinese Banding Centre will welcome banders coming on official visits, including, if they wishes, a team of Australians equipped with cannon nets.

5. The Chinese side proposed that a survey of waders on the Chinese coast be undertaken involving both Chinese and Australian ornithologists. It was hoped that the Australian side would provide transport. Details will be decided by the liaison officers.

6. Efforts will be concentrated on the Eastern Curlew, the Great Knot and the Red-necked Stint. Eastern Curlew provide more meat than most waders and are thus likely to be particularly vulnerable to hunting. Great Knot are known to fly directly from north-west Australia to at least the Shanghai region of eastern China, an area under heavy pressure as habitat is reclaimed for prawn and other farming. Red-necked Stint are among the most abundant of migrants but surveys in south-east Australia have suggested a steady decline over the last decade for which there is no obvious explanation. It is hoped that changes in the status of these three will reflect what is happening to other, less common species.

7. A number of sites in Australia and China may be officially 'twinned' to encourage conservation of both. Obvious candidates for twinning are Broome and Shanghai with Great Knots providing a direct link, but this is still being investigated by the Chinese side.

For the first meeting the results were substantial and I hope will lead to useful conservation action in both countries.

Stephen Garnett, non-Government representative, Australian delegation to CAMBA

WADERBIRDS - ODYSSEY OF THE WETLANDS

What is Waderbirds?

Waderbirds - Odyssey of the Wetlands is an independent international Arts/Science project which aims to contribute to a greater awareness of the vital importance of preserving our environment.

The story of the Eastern Curlew and the importance of their wetland habitats provides the focus for the project. A series of inter-related events to be staged in selected locations along the East Asian Australasian Flyway will celebrate the birds flight in 1993. Each year, over two million wading birds attempt a journey of over 13,000 kilometres from South East Australasia through asia to Siberia and Alaska to breed before returning to their southern feeding grounds.

The destruction of the wetlands throughout the flyway, together with the hunting of the Eastern Curlew is placing the bird under great danger.

The project will draw attention to a number of key wetland sites in the Asia Pacific region.

At each site visited there will be an outdoor theatre event staged with the local community, scientific research studying the behavioural patterns of the Eastern Curlew and an education outreach programme. Australia is a member of the RAMSAR Convention and has signed a migratory bird agreement with the governments of China (CAMBA) and Japan (JAMBA). Waderbirds intends to end its journey at the International RAMSAR Wetlands Convention in Kushiro, Japan in mid 1993.

A busy year ahead

1992 looks set to be a busy year for the Waderbirds team, which is made up by Meme McDonald, the artistic director, Neil White, project manager and Kate Clere, assistant director.

We are now well and truly launched into Stage 2 of Waderbirds - the nitty gritty of planning and fundraising. A most important step for the project was the announcement late last year by the Australia Council that it will be focussing on projects which forge new links between Asia and Australia.

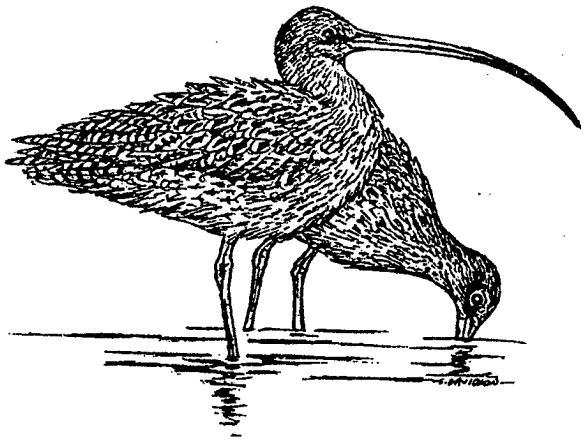
Kate was at the launch of the policy at the invitation of the President of the Arts Council of Australia and member of the Australia Council, Clive Scollay. We thank Clive for his support and enthusiasm.

Advisory team

In 1991, we set up a Research Advisory Panel to give advice and oversee the development of the research component of Waderbirds.

Members of the panel are Dr Phil Moors, Director of the Royal Australasian Ornithologists Union (RAOU), Mr Mark Barter, President of the Australasian Wader Studies Group, Dr Clive Minton, Chairman of the Victorian Wader Study Group and Vice President of the RAOU, Mr Brett Lane, Asian Wetlands Bureau based in Malaysia, Mr Richard Loyn, from the Victorian Department of Conservation and Environment and Dr Bill Phillips, Australian National Parks and Wildlife. We are looking forward to working with all of them closely and thank them for their initial encouragement and advice.

For further information contact Nell White, 03 481 1850



1992 NORTH-WEST AUSTRALIA WADER EXPEDITION

19 September to 17 October

C.D.T. Minton

Introduction

The next Australasian Wader Studies Group expedition to N.W. Australia will take place between 19 September and 17 October 1992. This document provides relevant information for prospective participants. Anyone interested in taking part should contact Clive Minton or Doug Watkins.

Background

Previous expeditions (8 major and 4 smaller), involving 242 days of fieldwork over the last 11 years, have obtained good data on wader numbers and distribution in the Broome to Port Hedland area of N.W. Australia.

The peak annual population, reached in October/November, is around 750,000 waders of 40 different species - distributed approximately 550,000 on Eighty Mile Beach; 150,000 at Roebuck Bay, Broome; and 50,000 at Port Hedland Saltworks. Associated banding (25,000 birds caught - see attached table) and biometric studies have produced outlines of migration routes, migration and moult strategies and biometric measurements of relevant populations.

Recent expeditions have mainly been in the March/April northward departure period. Earlier visits covered the late August/early September arrival period and there was one expedition in late October/early November.

Objectives

The broad objective of the 1992 expedition is to continue the studies of waders in N.W. Australia, especially those species which do not occur in significant numbers elsewhere in Australia.

The 1992 expedition is timed for late September/early October to fill a temporal gap in the data and in particular to coincide with the arrival, from their Arctic breeding grounds, of the main waves of juvenile birds.

Specific objectives are:-

a) to count the numbers of birds at the main locations at regular intervals over these 4 weeks of the arrival period.

b) to catch and band worthwhile samples of all the main species of waders and to record moult, weight and other biometric data. Based on previous expeditions it is expected that some 3-6,000 waders will be caught, of around 30 different species. (see Table for 1990 catches) Cannon-netting will be the main catching technique used, but there will be some mist-netting.

c) to examine the extent of onward migration of adult birds through N.W. Australia to southern Australia by looking for weight gains, lack of moult and by colour leg flagging. This is the first time colour flagging will have been carried out in N.W. Australia. It should also further increase overseas movement information in the future.

d) to determine the arrival period of juvenile birds of each species in N.W. Australia. Also to examine arrival condition and evidence for further planned migration, via weight measurements.

e) to concentrate efforts particularly on species recently nominated for special study under the JAMBA and CAMBA treaties - Eastern Curlew (only five so far banded in N.W. Australia!), Great Knot (3665 to date) and Red-necked Stint (3767 so far).

f) to further spread knowledge and interest in waders, and their study techniques, especially via the participation of people from a number of different countries. On the 1990 expedition 30 people from 7 countries took part.

Itinerary

The expedition is planned to last for four weeks, commencing at Broome on Saturday 19 September and finishing there on Saturday 17 October. The expedition will operate at Broome (Roebuck Bay and Lake Eda, Roebuck Plains), 80 Mile Beach (Anna Plains Station) and Port Hedland Saltworks. The following schedule indicates the planned itinerary. There may be minor variations depending on circumstances at the time.

Sat. 19 Sept.		Meet at Broome (Bird Observatory)
Sun. 20 Sept.		Broome
Mon. 21 Sept.		Move to 80 Mile Beach
Tues. 22 Sept.	)	80 Mile Beach
to Fri 25 Sept.	)	
Sat. 26 Sept.	)	Move to Port Hedland Saltworks
Sun. 27 Sept.	)	Port Hedland Saltworks
to Tues. 29 Sept.	)	
Wed. 30 Sept.		Move to Broome
Thur. 1 Oct.	)	Broome
to Sun. 4 Oct.	)	(4 Oct.-Rest Day-passerines)
Mon. 5 Oct.		Move to 80 Mile Beach
Tues. 6 Oct.	)	80 Mile Beach
to Sat. 10 Oct.	)	
Sun. 11 Oct.		Move to Broome
Mon. 12 Oct.	)	Broome
to Fri. 16 Oct.	)	
Sat. 17 Oct.		Depart from Broome

Complete days at each location:- Broome - 10, 80 Mile Beach - 9, Port Hedland - 3.

WADERS CAUGHT ON NW AUSTRALIA EXPEDITIONS 1981-1990

	Newly Banded	Retraps	Total
Sooty Oystercatcher	7	-	7
Masked Lapwing	5	-	5
Grey Plover	42	-	42
Lesser Golden Plover	2	-	2
Red-kneed Dotterel	98	5	103
Mongolian Plover	213	31	244
Large Sand Plover	2835	222	3057
Oriental Plover	85	-	85
Red-capped Plover	258	5	263
Black-fronted Plover	5	-	5
Black-winged Stilt	120	-	120
Banded Stilt	90	-	90
Red-necked Avocet	82	1	83
Ruddy Turnstone	592	69	661
Eastern Curlew	5	-	5
Whimbrel	18	-	18
Little Curlew	347	-	347
Wood Sandpiper	1	-	1
Grey-tailed Tatler	1838	157	1995
Common Sandpiper	1	-	1
Greenshank	23	-	23
Redshank	1	-	1
Marsh Sandpiper	40	1	41
Terek Sandpiper	1764	176	1940
Swinhoe's Snipe	1	-	1
Asiatic Dowitcher	15	-	15
Black-tailed Godwit	27	-	27
Bar-tailed Godwit	2129	92	2221
Red Knot	1787	78	1865
Great Knot	3572	93	3665
Sharp-tailed Sandpiper	393	2	395
Red-necked Stint	3576	191	3767
Long-toed Stint	4	-	4
Curlew Sandpiper	3559	170	3729
Sanderling	7	-	7
Broad-billed Sandpiper	767	35	802
Red-necked Phalarope	1	-	1
Oriental Pratincole	84	-	84
38 Species	24394	1328	25722

Participants

Previous experience has shown that the most efficient team size is 18-25 people, with preferably two-thirds of the team having significant wader banding (or at least general mist-net extraction) experience. Such a team is necessary to cope with the special problems of operating in N.W. Australia - very high tidal ranges (10 metres) and high temperatures (necessitating erection of shade over keeping cages and, sometimes, nets). Too large a team, however, presents logistical problems, particularly in relation to transportation (the sites visited are each 300km. apart).

Participants are requested to participate for a minimum of two weeks - but preferably for the full month! Too frequent changes of personnel detracts from team efficiency. Participants are welcome to join/leave at any stage - to suit their own convenience - but this will generally be more practicable when the expedition is at Broome or Port Hedland, rather than the more remote 80 Mile Beach location.

All offers of participation will be extremely welcome. Please contact the organisers as soon as possible with an indication of likely availability.

Costs

The expedition will need to fully cover its costs. It is hoped to obtain some limited external financial assistance, and several modest donations have been promised. There is also a limited carry-over of surplus funds from previous expeditions.

Participants should budget for paying:-

a) their own cost of transport to/from N.W. Australia. Travel options and costs can be provided if required.

b) a cost of $15 per day for food (communal catering) and associated minor expenses (eg. $5 per night camping when at Broome Bird Observatory).

c) a contribution of $200 towards the costs of vehicle car hire for local transportation.

There will be an opportunity for up to five people to travel up from Perth (and vice versa) at the beginning of the expedition in the 4WD vehicle which is being provided (at special rates) by the Dept. of Conservation and Land Management (CALM) in W.A. This vehicle will leave Perth on the morning of Tuesday 15 September, and will return to Perth by Wednesday 21 October. Participants will be required to make a contribution to these travel costs.

Weather

September/October is in the hotter part of the April to November dry season in N.W. Australia. Rain is not expected (though a light parka for the unexpected might be wise!). Day temperatures will be hot (28-35 degrees C.) and night temperatures warm (20 degrees C.) Insects are not a problem, except in the mangroves, at this time of year.

Equipment

Transport limitations and the climate respectively demand/enable the expedition to travel 'light'.

In addition to catching and banding equipment, the vehicles travelling from Perth will bring limited general camping/cooking equipment.

Individual participants are each asked to bring:-
Knife, fork, spoon, cup, bowl and plate
Torch
Lightweight tent (some may prefer to bring, in addition, a mosquito net so that they can sleep outside - cooler - if the weather is settled).
Sleeping bag/cotton lining - high night temperatures usually make it more comfortable to sleep in the latter and on the former.
The 'softer' members of the expedition (including CDTM) usually bring a foam rubber mattress and a pillow.

Clothing should be extremely light but several 'changes' are necessary to cater for the sweaty conditions! It is usually possible to launder clothing daily in Broome and Port Hedland, or under the hot springs at Anna Plains. Whilst shorts/T-shirts are generally the most appropriate clothing, a very light covering (eg. tracksuit) can be useful to keep insects at bay when necessary. A **hat** is **essential**. There is an opportunity for a daily swim at Broome.

It is well worth bringing a tripod and telescope, as well as binoculars if you have room in your luggage.

Anyone who can bring banding pliers, balances, callipers and other processing equipment is encouraged to do so.

Joint Organisers

Clive Minton, 165 Dalgetty Road, Beaumaris, (Melbourne), Vic. 3193 Ph. (03) 670 9466 work (03) 589 4901 home Fax. (03) 670 5030 work

Doug Watkins, Lot 25, Kimley Road, Banyup, Perth, W.A. 6164 Ph. (09) 417 2422

STOP PRESS: Vacancies still exist for this expedition, especially for experienced banders. Contact Clive or Doug as soon as possible.

NSW WADER STUDY GROUP NEWS

This is the second of a series of annual reports bringing news of the activities of the NSW Wader Study Group to those outside that state. The material is taken from NSW Wader Study Group Newsletters with the kind permission of the Editor Phil Straw. For further information contact: The Secretary, NSW Wader Study Group, PO Box 165, Engadine, NSW 2233.

NSW WSG STANDS ALONE

The NSW Wader Study Group received a helping hand in its formation from the Australian Bird Study Association. ABSA have been looking after the finances and giving support where needed. the NSW Wader Studies Group has developed into an active conservation group airing views on the conservation of waders and other Charadriiformes and their habitat. As such we have moved into a direction away from some of the aims and objectives of our parent body and are defining our own pathway. I would like to thank all of those in ABSA, many who are members of NSW WSG, in particular Durno Murray for actively encouraging and supporting the formation of the group.

Phil Straw.

INLAND WETLAND BANDING EXPEDITION - THE SEQUEL

As a follow-up to the successful banding trip to Booligal in the states south west in early January this year (1991) another expedition involving members of the NSW Wader Study Group was organised for the January long weekend.

David Geering and Pat Thomson, a 'C' class bander from Woolgoolga, made the 1230 km journey from Grafton on Wednesday, January 24 to evaluate conditions and report back to Phil Straw on Thursday as to whether the other members should travel from Sydney. Unfortunately soon after our arrival at 'Wongalea' it started to rain, causing us to abandon our task of setting mist-nets in the failing light before heading for the shearers quarters. However we soon had to abandon the car 500 metres from 'home' due to the inability to control it in the thick, slippery red clay but not before almost putting it into an irrigation canal. Rain during most of the night was somewhat worrying but the next morning, whilst heavily overcast, saw only one heavy shower. The major concern was getting to Booligal, 16km away on a dry-weather road, to ring Phil. At 2pm we decided to chance the drive knowing that people were waiting for our report. We actually got to within 4km of the township before getting bogged but with much digging, ripping up of saltbush and pushing made it to the phone with the advice that the trip was inadvisable only to be told by Phil that if we were to get stuck we were to make sure that it was where we could band waders!!

Over the four days we were there the conditions varied from excellent of an evening when the wind dropped but generally ranged from bad to atrocious during the day with strong winds prevailing. The Sunday morning in particular was very cold and windy to the point where the waders were sitting under salt bush and were very reluctant to fly. Nevertheless we managed to band 86 Red-kneed Dotterels (plus 6 retraps from early January), 13 Black-winged Stilts, 7 Sharp-tailed Sandpipers and 1 Marsh Sandpiper. 12 Species of wader were present at the wetland, in addition to those already mentioned were Black-fronted Plover, Red-capped Plover, a single Red-necked Stint (despite much effort to turn it into a Long-toed), Latham's Snipe, Masked Lapwing, Banded Lapwing, Red-necked Avocet and Australian Pratincole. In addition an Inland Dotterel was seen on the road about 10km east on Wongalea.

Despite the trying conditions much was gained from the trip with a total of 174 Red-kneed Dotterels banded in the two trips. Information gathered on morphometrics and moult will be particularly valuable as is the information gained on the use of ephemeral inland wetlands, and often neglected but important habitat, by waders.

David Geering.

WADER STUDY SEMINAR

A wader study seminar will be held over the weekend of 12/13 September 1992. The seminar will commence at 10 am on Saturday, with two hours of illustrated talks on topics of special interest to members. This will be followed by social lunch and an outing to areas of special interest looking at waders. Saturday evening will be spent mist-netting waders followed by cannon-netting on Sunday morning. A fee of $5.00 will be charged and will cover a light lunch on the Saturday and for use of lecture room.

Anyone interested in attending is invited to write to the Secretary, NSW Wader Study Group, P.O. Box 165, Engadine, NSW 2233.

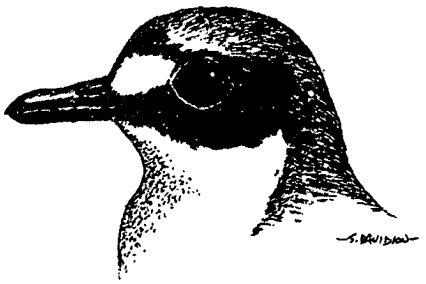
Phil Straw

QUEENSLAND WADER STUDY GROUP

Queensland wader enthusiasts have followed the examples of Victoria and New South Wales by forming their own Wader Study Group. Some activities have already been held, including cannon-netting, and more are planned for the future. Membership of the group costs $10.00. For more information contact: QWSG, C/- Kees Hulsman, Division of Environmental Sciences, Griffith University, Nathan, Qld 4111 (Phone 07 297 0384 A.H.).

VICTORIAN WADER STUDY GROUP NEWS

This is the second of a series of annual reports bringing news of the activities of the Victorian Wader Study Group to those outside that state. The material is taken from the VWSG Bulletin with the kind permission of the Editor John Dawson. For further information contact: The Chairman, VWSG, 165 Dalgetty Road, Beaumaris, Vic., 3193.



SUMMARY OF VWSG ACTIVITIES IN 1990

1990 was an average year for VWSG. The catch total of 6,044 was slightly below the 12-year average of 6,951. This was in fact due to the absence of the main cannon netting equipment in NW Australia for most of March and April. However we also failed to make the large summer catches at some locations in February, and our success on Pied and Sooty Oystercatchers was lower that in the previous year. The absence of a consistent wader roost on Sand Island, Queenscliff - due to disturbance from sand dredging operations - also reduced the variety and quantity of waders caught there.

Nevertheless some important catches were made. These included:-

* 133 Eastern Curlew in four separate catches at the Gurdies - halfway down the eastern side of Western-port. This is by far the best year ever for this species and raises the previous grand total of 178 by 70%.

* a further 100 Ruddy Turnstones - in one catch - at Swan Island, Queenscliff. This follows the 109 caught there a year previously (Nov 89). It increases the previous grand total of 275 by 35%.

* 245 Double-banded Plover - mainly at Queenscliff, the ongoing annual productivity/survival rate monitoring site for this species.

* 120 Bar-tailed Godwits. These were in a mid-winter catch (June) of McLoughlins Beach, Corner Inlet.

* A catch of over 2,800 Red-necked Stints and Curlew Sandpipers at North Spit, Werribee Sewage Farm, on 30 December. This included many hundreds of retraps - some up to 12 years ago. This was the Group's largest catch (and significantly larger than intended!).

* In contrast no Greenshank were caught. The site at Warneet used successfully in 1988 and 89 has been disturbed by local housing development and the roost abandoned. We again failed on Red Knot (only seven caught). Sharp-tailed Sandpiper (110) and Lesser Golden Plover (13) were improvements on the previous year but not as high as desired.

The highlight of the recoveries reported during the year was the same bird which was top of the list in 1989. It is our first 'double journey recovery' (except for Double-banded Plovers to/from New Zealand). The Ruddy Turnstone banded at Swan Island, Queenscliff on 18 November 1989, and recaptured on migration through Taiwan in April 1990, was caught back again at Queenscliff on 18 November 1990 - exactly one year after the original banding.

Other recovery highlights included:-

* a Red Knot from Queenscliff caught for a second time in New Zealand. It was at a different location to the first recapture.

* two Red-necked Stints in North Vietnam. These birds were obtained from a local hunter by Brett Lane, one of our members.

* the capture of a Hong Kong-banded Curlew Sandpiper at Werribee SF. The compliment was returned by Hong Kong catching one of our Curlew Sandpipers there in April 1991. this was one of three Australian banded Curlew Sandpipers caught at the Mai Po Nature Reserve on the one night (out of 60 Curlew Sandpipers caught that night).

Colour banding programmes again provided an effective supplement to normal recovery methods. The orange leg-flagging of several species of palearctic wader provided the hoped-for sightings of birds on migration through Asia - a Red-necked Stint and at least two Curlew Sandpipers observed at Mai Po, Hong Kong during northward migration in April. But an unexpected bonus was the sighting of a colour-flagged Red-necked Stint at Christchurch in New Zealand - the first proven movement of this species between the two countries. Other sightings of Red-necked Stints showed strong westerly components in their March/April migration (to South Australia and Western Australia).

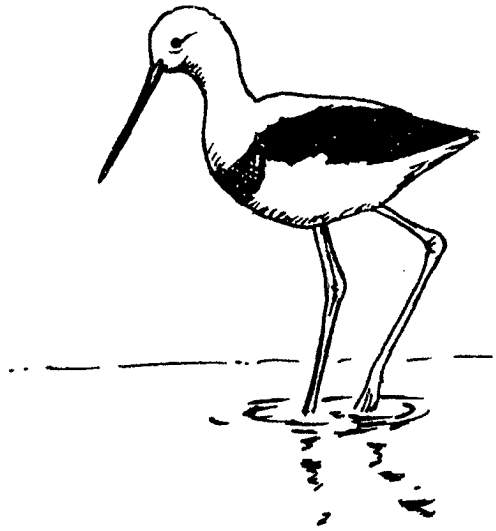
Sightings of colour-banded Pied and Sooty Oystercatchers exceeded all expectations with many individuals moving over 200km (up to 400km) - along the Victorian coast into South Australia and across Bass Strait into Tasmania. Nearly every time intrepid beach walkers like Martin Schulz (Discovery Bay) and Sir Edward Woodward (Port Fairy) set forth they return with sightings of colour-banded birds. It is not possible to discern any real pattern in the movements yet. A systematic search for banded birds during the breeding season in late 1991 will be mounted, following another good banding season in Feb-July 1991.

The VWSG programme on terns also continued in 1990-91. The colony of Crested Terns at Mud Island continued to grow (to 1,850 pairs) and 1,650 chicks were banded. Unfortunately the colony in Corner Inlet, off Mann's Beach, was washed out (twice) by high tides this year and few (if any) chicks fledged. The grass on the hummock on which they previously nested grew too thick - due to fertilising by their droppings from previous years - forcing them to nest on lower, less safe, sand hummocks. The Caspian Terns there were also unsuccessful for the same reason. Adult tern banding at Spermwhale Head was carried out for the third year, although fewer Common Terns were caught than in Jan-Mar 1990.

The VWSG now has an extremely experienced core of wader banders, enabling it to successfully carry out an intensive complex fieldwork programme throughout the year (and to support studies elsewhere in Australia and Asia). Some 10 to 15 people are regulars (Ros Jessop and Ira Savage being the most outstanding), but are supported by 20-30 others who come when they are able to or when there are urgent needs for additional help. In parallel with the fieldwork Mark Barter continues to organise the analysis and publication of biometric and moult data on a species by species basis. In due course (? when Clive Minton retires) more major papers on the results of the VWSG long term study programme will be produced.

Meanwhile many thanks to everyone who has contributed in so many different ways to the success and enjoyment of VWSG activities.

Clive Minton



Numbers of Waders "Processed" by VWSG in Victoria in Each Month to December, 1990

"Processing" includes measuring wing length, bill length and/or total head length (as appropriate) and weight; also recording full details of primary feather moult (if any). Additional wing moult has been gathered on some birds which were not fully processed. The table below is used to plan fieldwork, with the object of obtaining usable samples (preferably on at least 50 birds) of data for each month of the year for all the main study species.

	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
Pied Oystercatcher	68	64	84	72	143	164	119	45	4	6	9	20	798
Sooty Oystercatcher	2	-	3	2	-	24	43	14	-	-	-	-	88
Masked Lapwing	4	3	77	-	-	13	-	-	-	3	18	11	129
Grey Plover	1	14	4	3	-	2	-	-	2	35	16	-	77
Lesser Golden Plover	9	26	30	1	-	-	-	-	-	28	47	39	180
Red-kneed Dotterel	-	10	-	20	-	44	11	16	12	8	22	-	143
Hooded Plover	-	-	-	-	-	15	-	-	-	-	-	-	15
Mongolian Plover	46	1	6	7	1	2	2	-	-	-	1	-	66
Double-banded Plover	-	1	134	257	676	750	903	870	1	-	-	-	3592
Large Sand Plover	14	-	-	-	-	1	1	-	-	-	1	-	17
Red-capped Plover	11	66	48	111	192	74	61	14	8	11	10	5	611
Black-fronted Plover	-	7	-	-	11	16	6	9	2	-	4	7	62
Black-winged Stilt	-	6	-	-	-	-	-	-	-	4	2	1	13
Red-necked Avocet	39	-	-	-	-	-	-	10	2	41	46	36	174
Ruddy Turnstone	17	1	76	27	1	7	-	1	12	7	209	16	374
Eastern Curlew	15	-	1	-	22	15	-	43	78	73	59	5	311
Whimbrel	-	-	-	-	-	1	-	-	-	-	-	-	1
Grey-tailed Tattler	28	-	-	3	-	3	-	-	-	-	-	-	34
Greenshank	1	-	76	-	-	-	-	-	-	-	36	-	113
Terek Sandpiper	8	1	-	1	2	-	-	1	-	1	-	10	24
Latham's Snipe	29	44	-	-	-	-	-	-	-	1	4	8	86
Bar-tailed Godwit	95	8	31	1	-	157	-	-	34	52	191	267	836
Red Knot	125	65	56	34	2	44	73	-	8	420	255	174	1256
Great Knot	96	1	3	-	-	4	-	-	15	53	40	129	341
Sharp-tailed Sandpiper	1050	499	93	2	-	-	-	9	519	332	271	910	3685
Little Stint	-	-	-	-	-	-	-	-	-	-	1	-	1
Red-necked Stint	1328	685	3400	1860	331	223	436	317	463	986	2296	1890	14215
Long-toed Stint	-	-	-	-	-	-	-	-	-	1	-	-	1
Curlew Sandpiper	471	771	923	144	205	33	141	308	168	826	555	789	5334
Sanderling	11	-	-	-	-	-	-	-	-	1	6	2	20
Broad-billed Sandpiper	-	1	-	-	-	-	-	-	-	-	-	-	1
													32598

The majority of the birds caught when the VWSG visited other States were also processed including 1327 birds caught in Tasmania (Nov. 1979), 820 birds caught in South Australia (Feb. 1980), 921 birds in New South Wales (Mar. 1981) and 24956 in Western Australia (Aug/Sept. 1981), Aug/Sept/Nov. 1982, Oct/Nov. 1983, Mar/April. 1985, Aug/Sept. 1986 Mar/April. 1988 and Mar/Apr 1990.

AWSG REGULAR COUNTS PROJECT PROGRESS REPORT

Richard Alcorn, Mike Fleming

Counting for the AWSG Regular Counts Project (Lane 1985) finished at the end of 1990. Since that time the last count sheets have been gathered, the data validated and the analysis begun. This report outlines progress to date, and uses some results for the Bar-tailed Godwit to illustrate the type of information that can be extracted from the database.

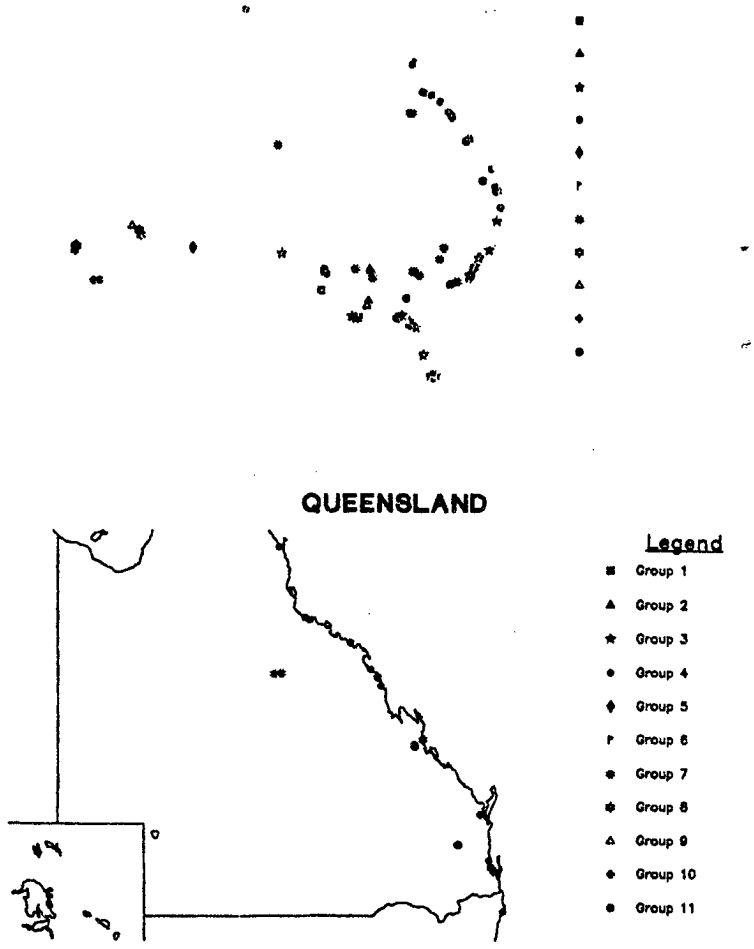
The database

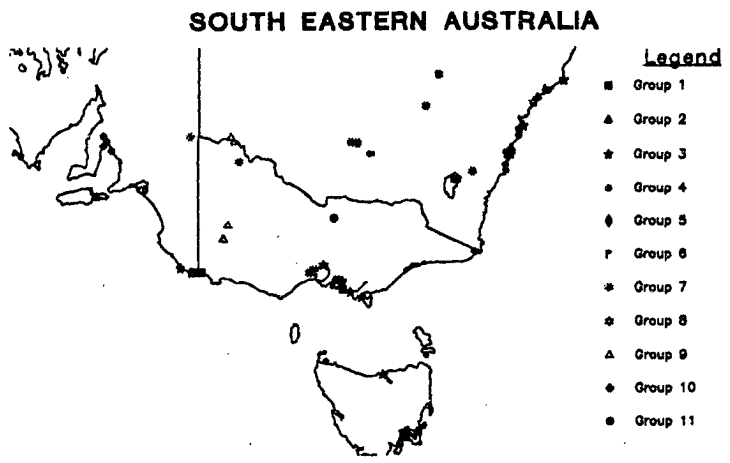
Combining the data from the Regular Counts Project (1986-1990) and the RAOU Wader Studies Project (1981-1985) has identified 105 sites that have been counted for at least twelve months. These sites produced a database of 36,804 observations received on 56 species of wader entailing 7,680 hours of observation. Sites were located in all states and territories of Australia but there was a strong bias to the coast with only 22 sites being located well inland.

Site groups

An earlier report described a statistical method for grouping sites according to the wader species present (Alcorn 1990). This method was refined by taking species abundance into account and was applied to the database. This resulted in the recognition of eleven site groups (see Table 1, Figure 1). These site groups will form the basis of much of the data analysis.

FIGURE 1: Site associations





Groups 1 to 6 are marine sites.

Group 1 sites are sandy marine sites, some rocky, occurring on oceans and bays of the southern coasts of South Australia and Victoria, and at Mortimer Bay in Tasmania. A moderate range of wader species are found in relatively small numbers. Sooty and Pied Oystercatchers and Hooded Plovers characterise this group.

Group 2 is composed of three ocean sites on the New South Wales coast, with a substrate of sand, mud and rock, similar in species composition to Group 1, but lacking Pied Oystercatchers and Hooded Plovers.

Groups 3 and 4 are generally well surveyed and have the full suite of beach-utilising species. They are tidal sites of bays, inlets and estuaries, with a sand and mud substrate, and some rock.

Group 3 with 24 members lacks the birds that are typical of inland waters and so is more purely "beach" in its species. The birds with the highest average counts at these sites include Red-necked Stint, Curlew Sandpiper and Red-capped Plover. Again this group is confined to south-eastern Australia.

The 28 sites that make up Group 4 achieve the greatest levels of diversity by having both "beach" and "inland" species present with the most abundant being Bar-tailed Godwit, Red-necked Stint, Red-capped Plover and Eastern Curlew. The sites of this group had the largest geographical range occurring along all coastlines surveyed during this study.

Group 5 is formed by two sandy marine sites from Western Australia (Kanidal Beach, Woodsman Point) which share "beach" and "inland" birds but lack the ubiquitous Masked Lapwing. These two sites plus one other in Group 4 (Oyster Harbour) are the only sites in Western Australia classified as coastal.

Group 6 consists of a single rocky, sandy site (Green Island) characterised by its low species diversity. The most abundant species are Ruddy Turnstone, Whimbrel and Grey-tailed Tattler.

The remaining five groups are characterised by the presence of birds of inland waters but not necessarily fresh water.

Group 7 consists of 18 sites that are mostly well away from the coast and have the full suite of "inland" species (eg Alice Springs Sewage Ponds). Most sites are freshwater swamps and lakes, but also included are a number of coastal sites that are important for "inland" species (eg Avalon Saltworks, Fitzroy St). Group 7 is characterised by the Sharp-tailed Sandpiper, Black-winged Stilt and Black-fronted Plover. Most sites have a muddy substrate.

Groups 8 and 9 lack almost completely any coastal species but share a large number of inland species particularly large numbers of the Red-necked Avocet.

Group 8 is a uniquely West Australian group of seven freshwater and brackish wetlands that are split between the Goldfields and the Swan Plain. The substrate is always mud, frequently with sand and rock. The principal species are Black-winged Stilt, Black-fronted Plover, Red-necked Avocet and Wood Sandpiper, but largely absent are Masked Lapwings, Red-kneed Dotterels and Banded Stilts.

Group 9 contains six muddy ephemeral wetlands from inland Victoria, Sunraysia and one at Roules Lagoon near Kalgoorlie in Western Australia. High numbers of a moderate range of species occur at these sites, which are characterised by the presence of Banded Stilt, Red-necked Avocet and Masked Lapwing. Wood Sandpipers are absent.

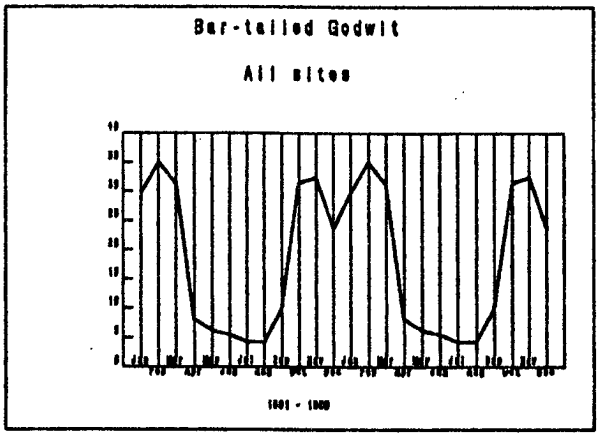
Group 10 is also uniquely West Australian with four sandy, muddy sites on tidal estuaries. They share a mixture of coastal species and inland forms. While these sites were classified with the other "inland" groups, their habitat descriptions placed them as being coastal tidal sites.

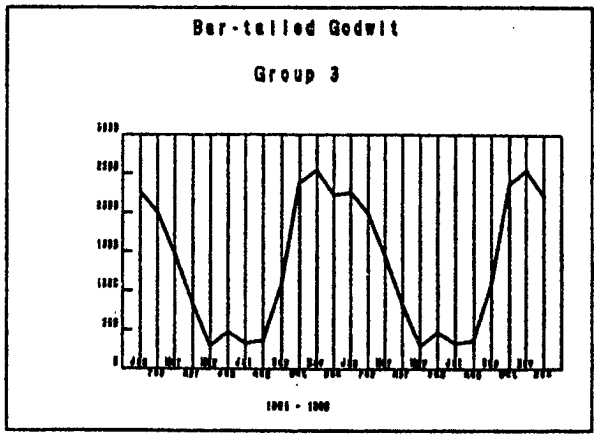
Group 11 sites are freshwater, muddy marshes from inland Victoria, NSW and Queensland. They have a low species diversity lacking most of the ubiquitous species except Masked Lapwing. The other two most abundant waders are Black-winged Stilt and Black-fronted Plover.

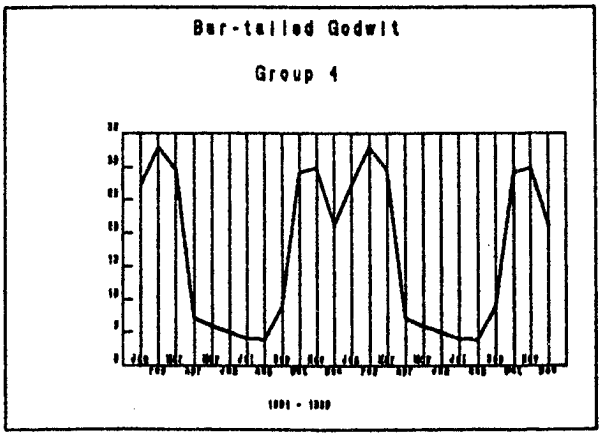
An example

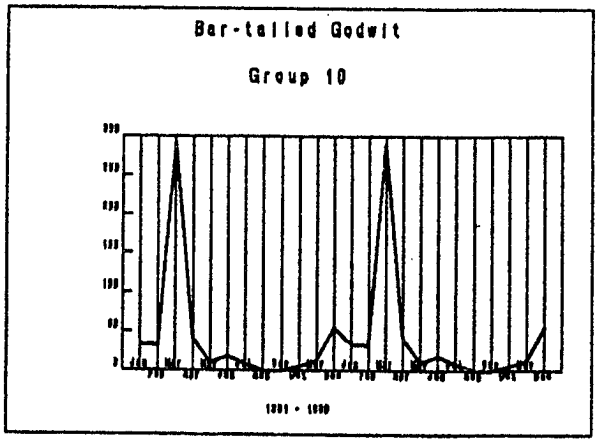
In order to plot the timing of arrival and departure of a migratory species the average monthly count for each site in a group was summed to give the average monthly count for the group. Each month was then summed over the period 1981-1990 to obtain a "ten-year" average month-by-month pattern. Figure 2 shows the resultant graphs for the Bar-tailed Godwit. Each graph is drawn with two periods for clarity.

FIGURE 2: Bar-tailed Godwit - ten-year average monthly counts









A number of interesting observations and questions arise from Figure 2:

- In both Groups 3 and 4, BTGs arrive from late August to mid October.
- A small number of BTGs arrive at Group 10 sites from mid October to mid December, but the major influx does not occur until late February to mid March just before northward migration.
- Numbers in Group 3 decline steadily from mid-January to May. Are these birds drifting back northwards during this period, or are they moving on to somewhere else?
- Group 4 shows a significant departure and subsequent return of BTG in the period mid November to mid February. Where do these birds go (to New Zealand?) and do the same birds return?
- The northward migration period in Group 4 sites is contained within the few weeks from early March to mid April.
- Northward migration in Group 10 sites occurs in the period mid March to late April, about the same as Group 4.
- The proportion of overwintering birds is about the same in Group 3 and Group 4 at about 17% of the summer (November-February) population. Group 10 is more difficult to interpret on this point given the wide range in the summer count.

The next step

These notes are just an indication of the observations and ideas that we expect to distil from the database. We are working towards a final report which treats each species in depth. This is being done as quickly as possible, but given that we are all volunteers confronted with a task that requires a fair amount of time, please be patient.

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TABLE 1: SITES BY GROUP

Group 1			
A 1	Glenelg River Carpark (E)	38°04'S	141°00'E
A 2	Millers Blow - McEacherns	38°04'S	141°05'E
A 9	Powlett River	38°35'S	145°32'E
E 7	Green Point	38°03'S	140°52'E
E 8	Danger Point	38°03'S	140°48'E
F 7	Pelican Lagoon	35°48'S	137°46'E
I 3	Mortimer Bay	42°58'S	147°28'E
Group 2			
N10	North East Lake	34°29'S	150°55'E
N13	Bellambi	34°23'S	151°55'E
N14	Shellharbour	34°35'S	150°52'E
Group 3			
A 3	Shallow Inlet	38°49'S	146°09'E
A 8	Stockyard Point	38°21'S	145°31'E
A11	Andersons Inlet	38°40'S	145°47'E
A16	North & South Spit	38°03'S	144°31'E
A26	Williamstown Rifle Range	37°52'S	144°54'E
E 4	Pt Gibson flats/Tidal Ck	32°43'S	134°11'E
E 9	Stoney Point	38°04'S	140°46'E
F 1	French Point	38°03'S	140°45'E
F 2	Pelican Point	37°56'S	140°25'E
I 1	Pipeclay Lagoon	42°58'S	147°32'E
I 2	Lauderdale	42°55'S	147°29'E
I 4	Clear Lagoon	42°56'S	147°31'E
I 5	Orielton Lagoon	42°48'S	147°32'E
I 6	Sorell - Iron Creek	42°48'S	147°35'E
I 7	Barilla Bay	42°49'S	147°29'E
I 8	Marion Bay	42°49'S	147°52'E
I10	George Town	41°06'S	146°48'E
N 4	Long Reef	33°45'S	151°19'E
N 9	North West Lake	34°29'S	150°50'E
N11	Haywards & Koona Bays	34°33'S	150°48'E
N12	Entrance Channel	34°33'S	150°52'E
N18	Swansea	33°04'S	151°38'E
N25	Red Rock Estuary	29°59'S	153°15'E
N29	Pelican Island south end	32°25'S	152°54'E
Group 4			
A15	Point Kirk	38°03'S	144°31'E
E 2	Price saltfields	34°17'S	138°00'E
E 3	Clinton Conservation Park	34°09'S	138°06'E
F11	Port Parham	34°25'S	138°15'E
F12	Port Prime	34°00'S	138°00'E
N 1	Prospect Estate	28°51'S	153°34'E
N 2	Shoalhaven River	34°52'S	150°44'E
N 3	Kooragang Is	32°55'S	151°47'E
N 5	Botany Bay	34°00'S	151°10'E
N 8	Paramatta River	33°50'S	151°10'E
R 1	Alva Beach	19°27'S	147°29'E
R 4	Cairns mudflats	16°55'S	145°46'E
R 8	Town Beach Mackay	21°09'S	149°11'E
R11	Finlayson Point	20°53'S	148°57'E
R17	Ross River mouth	19°16'S	146°51'E
R18	Bushland Beach Mt Low	19°12'S	146°41'E
R20	Deception Bay	27°10'S	153°05'E
R22	Bakers Creek / Far Beach	21°08'S	149°12'E
R23	Armstrongs Beach	21°26'S	149°18'E
R27	Thorneside site 1	27°29'S	153°12'E
R28	Thorneside site 2	27°29'S	153°12'E
S 3	Bowen Salt works	20°00'S	148°15'E
S 5	Moreton Bay (Lytton - 1)	27°25'S	153°10'E
S 8	Kinka Beach & creek	23°25'S	150°08'E
S10	Thorneside site 3	27°29'S	153°12'E
S12	Boonooroo	25°40'S	152°46'E
U 1	Lee Point Beach	12°22'S	130°54'E
X29	Oyster Harbour	34°58'S	117°57'E
Group 5			
X 1	Kanidal Beach (west)	32°15'S	126°13'E
X 9	Woodmans Point	32°08'S	115°44'E
Group 6			
R12	Green Island	16°45'S	145°59'E
Group 7			
A 6	Hattah Lakes	34°45'S	142°15'E
A12	Avalon saltworks	38°05'S	144°27'E
A13	Austin Road Lagoons	38°02'S	144°31'E
A14	Beach road (east of)	37°59'S	144°36'E
A17	Werribee (summary)	38°03'S	144°31'E
F 8	Lake Merreti	34°01'S	140°45'E
N 6	Parkes Sewage Farm	33°10'S	148°12'E
N15	Lake Bathurst	35°03'S	149°42'E
N17	Barrenbox	34°12'S	145°49'E
N24	Five Bough Swamp	34°32'S	146°26'E
N30	Dubbo Sewage Ponds	32°14'S	148°36'E
O 1	Nericon Swamp	34°13'S	146°02'E
R24	Toomba Lake	21°01'S	145°35'E
R26	Young Ave, Kinka Beach	23°25'S	150°08'E
R29	Fitzroy St	27°32'S	153°16'E
S 4	Blakeys Crossing	27°25'S	153°10'E
S 9	Reeves Lake	21°01'S	145°35'E
U 2	Alice Springs Sewage Farm	23°44'S	133°50'E
Group 8			
X 2	Lake Forrestdale	32°09'S	115°56'E
X 3	Lake Yangebup	32°07'S	115°50'E
X 4	Banjup Swamp	32°08'S	115°52'E
X12	Boulder Sewage Works	30°48'S	121°30'E
X13	Kalgoorlie Sewage Ponds	30°46'S	121°26'E
X14	Karribalda Sewage Ponds	31°13'S	121°38'E
X32	Kogolup Lake	32°09'S	115°50'E
Group 9			
A 7	Lake Wyn Wyn	36°40'S	141°54'E
A18	Lake Ranfurley	34°11'S	142°06'E
A20	Bitter Swamp	37°05'S	141°46'E
A21	White Lake	37°04'S	141°45'E
N 7	Fletchers Lake	34°03'S	142°00'E
X21	Roules Lagoon	30°26'S	120°51'E
Group 10			
X 6	Como foreshore	31°59'S	115°51'E
X 8	Lake Cooloongup	32°17'S	115°46'E
X16	Peel Inlet Coodamp-Naime	32°34'S	115°44'E
X18	Wilson Inlet	35°00'S	117°24'E
Group 11			
A19	Mosquito Depression	36°28'S	145°15'E
N22	Jerrabomberra wetlands	35°18'S	149°07'E
R30	Woolwash (Serpentine Lag)	23°26'S	150°31'E
S 1	Murray Lagoon	23°24'S	150°29'E
S 6	Nanango Sewage Ponds	26°40'S	152°00'E

A POTENTIAL METHODOLOGICAL PROBLEM WITH DETERMINING THE REPRODUCTIVE SUCCESS OF PALEARCTIC WADERS FROM THE PROPORTION OF JUVENILES IN CANNON-NETTED SAMPLES.

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"Nets and snares have long been used to catch birds for the pot or the head-dress. Only recently have they been used to help study birds." (Peterson *et al.* 1968.)

There is little doubt that the banding of wading birds, and the data such activities generate, is an important and worthwhile pursuit. Howes and Bakewell (1989) state that one of the main aims of banding shorebirds is to determine the population breeding success from juvenile/adult ratios (for a summary of other information cannon-netting provides, see Lane 1987). There may however be a methodological problem when considering the proportion of young birds in a cannon-netted sample, and subsequently using this result to infer the seasonal breeding success in migratory species. One underlying assumption in this extrapolation is that the proportion of juveniles in the netted sample is the same, or at least systematically biased to, the proportion of juveniles in the wintering population at the time of catching. This paper explores the efficacy of this assumption by using several simple models of target flocks, and exploring any problems the sampling technique may entail.

Model A

Consider a hypothetical, single species flock of wading birds, all of whom aggregate inside the catching area and make no attempt to fly as the net is fired. The net thus captures all birds where they stand. The potential problem regarding this sample is that there may be a degree of segregation between flocks, with some having a considerably higher proportion of juveniles than others. Paton and Wykes (1978) found that cannon or rocket-netted samples were variable from one day to the next because in non-breeding aggregations waders tend to occur in flocks according to age and moult. If this is the case then the sample may not be representative of the population, and when considered in isolation may be misleading. If however many such flocks are sampled (provided the choice of flocks is appropriate), then a good estimate of the proportion of juveniles in a population could be obtained. This situation is simplistic however, and therefore a more complex model should be examined.

Model B

In this model the assumptions of the previous model are made and it is also assumed that only a portion of the flock is within the catching area. For the sake of clarity it is also assumed that all flocks contain an equal proportion of juveniles. The spatial distribution of juveniles within the flock must now be considered, rather than the distribution between flocks examined in Model A. If it is assumed that this sample is representative of the population then it is also assumed that the juveniles are evenly distributed throughout the flock. This assumption may be dubious due to potential behavioural influences that may affect the spatial distribution of different age classes. There are various possible ways that a non-uniform spatial distribution of juveniles may manifest itself. Pienkowski and Dick (1976) suggest that cannon-netted samples may be biased toward juveniles because of a non-uniform distribution of age classes. Specifically they speculate that adults may tend to roost nearer the water and thus furthest from the net. A lower proportion of adults are therefore captured. The percentage of juveniles in this case would depend on the distance of the net from the water at the time of firing, and the size of the flock. More complicated spatial distributions may be occurring. Two further non-uniform distributions will be considered. Juveniles are often the least dominant individuals in a flock and thus may be unable to freely associate with adults. Firstly, juveniles may be forced to the extremities of a flock, areas the dominants may avoid due to increased predation risk or lack of shelter from inclement weather. Alternatively, and not necessarily mutually exclusive from the first spatial distribution, juveniles may aggregate in patches in the flock. These patches may be irregularly distributed within the flock due to their size and membership. These spacing mechanisms may alter with proximity to migration, and even may depend on factors as diverse as the geography of the roost site. Sampling from these flocks is unlikely to give values representative of the population parameters because the proportion of juveniles caught depends on the section of the flock sampled and flock size. Worse still, because different sections of flocks are cannon-netted opportunistically, and given that the position of the flock relative to the catching area might highly influence the results obtained, a degree of randomness is inherent in the sampling regime. If this is the case, the probability of sampling certain sections of the flock must be examined.

Other Considerations

Neither model adequately represents the complexity of the catching operation. Instead they are intended to highlight potential methodological problems associated with cannon-netting as a sampling technique. The spatial considerations seem to have been given least attention and thus have been presented in some detail. Other, better known, biases are also likely to have an effect. A far from exhaustive list is presented below.

Variation between locations could result from a variety of causes. Different locations offer different feeding and roosting opportunities. For instance, some roosts offer shelter from prevailing winds and may be disproportionally used by lighter birds. Other factors such as disturbance and predation often vary between locations. Indeed different age classes may display differential dispersiveness and site fidelity. Different localities also form links in the chain of sites used in local and migratory movements. Thus any differences in the movements of adults and juveniles will influence the proportion of juveniles using each site. The carrying capacity of sites varies and this should be taken into account when

estimating the population parameters. Specifically, if a site holds approximately 10% of a particular species the estimated adult/juvenile ratio only truly applies to the site at which measurements were made. In addition the adult/juvenile ratio should be weighted to only represent 10% of the population.

The learning capacity of wading birds is little known, but may be different for various age classes. When cannon-netting in the one location on subsequent days a higher proportion of juveniles are captured on the second day (C.D.T. Minton pers. comm.) suggesting that adult wading birds are more effective at learning to avoid being captured. If this learning is relatively long term then it may even effect whether experienced birds can perceive the catching area before firing. The inexperienced juveniles may thus be over-represented in the catch.

When catching with cannon-nets it is sometimes necessary to disturb roosting birds in order to move them to within range of the nets. If during this process birds take to the wing the more experienced adults may be more reluctant than juveniles to return to the catching site.

Young birds may be less efficient foragers and thus join a roost later than adults. Juvenile foraging efficiency may also improve markedly over the course of a season. Any biases may thus fluctuate with the time of catching and the time of year. Mortality of young birds may also be different to that of their older counterparts.

Birds with a full set of primaries (not in partial moult) are known to be more capable of avoiding capture in both cannon and mist nets (Pienkowski and Dick 1976, Haukioja 1971). Juveniles and adults are often in different stages of moult and consequently may have differing abilities to escape as this fluctuates with the stage of moult. These, and many other unexplored confounding co-variables would be compounded when examining a mixed species flock.

Direction of future research

A complete understanding of the behavioural ecology of wading birds is unlikely to be realised in the near future. It would be worthwhile to examine the biases arising from using cannon-netting as a sampling technique because it is the most efficient method of capturing large numbers of birds (Gerstenberg and Harris 1976). The most obvious path is to compare the proportion of juveniles in a cannon-netted sample with proportions obtained by other methods of capture, for example, mist netting. Pienkowski and Dick (1976) found mist netting less variable than cannon netting and consider it to be superior because it samples from several flocks.

Another method to assess age related biases would be to determine the proportion of *"age-flagged"* juveniles in a flock before firing, and comparing this with the sample caught. This would involve age specific marking of many birds. The cost and labour efficiency of this option would require investigation. Waders that can be aged from plumage or other field characteristics (such as Pied Oystercatchers *Haematopus longirostris*) may be used to examine general patterns of bias. Breeding plumage could be used as a possible yardstick.

Other useful data that could be easily recorded include the proportion of birds that escape the net, the net orientation relative to the flock and beach, the activity state of the flock (percentage resting or alert), and weather conditions. In appropriate conditions (mild weather and small catches) the birds could be aged as they are extracted from the net and their position of capture plotted on a grid. The pattern of capture would be useful.

Such methods should yield a good idea of the age related spatial distribution within flocks of various sizes, compositions and at different times of the year. These methods would also increase the understanding of the other biases of the cannon-netting sampling technique which overlie complex assymetries in the natural population. Ultimately each species, and multi-species combination should be examined. The data already accumulated could be used to examine between-year, between-month, between-site, between-catch-conditions and between-weather-status. Trends that are picked up by this data could be compared with those trends detected by other methodologies. If nothing else this paper serves to remind us to treat our data cautiously. Ongoing netting, combined with examination of its idiosyncrasies, will contribute greatly to our knowledge of wading birds.

Acknowledgments

Hugo Phillipps made comprehensive, thoughtful, and constructive comments on a draught of this manuscript. I thank him for his substantial effort. I would also like to thank the members of the VSWG and AWSG for their time and energy; this paper is not intended to belittle their important work. Thanks to Mark Barter for setting up the computer and to Megan Rush for her support.

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ASCIDIAN PREDATION BY THE SOOTY OYSTERCATCHER *HAEMATOPUS FULIGINOSUS:* FURTHER OBSERVATIONS.

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Introduction

Schulz (1989) commented with surprise that he had observed a Sooty Oystercatcher *Haematopus fuliginosus* foraging on a beach-cast ascidian *Pyura* spp. It was with equal surprise that I recently read of this account, and this has led me to forward the following note on some further observations of ascidian predation by the Sooty Oystercatcher.

In the Illawarra region of New South Wales, the Sooty Oystercatcher is an uncommon breeding resident with a current population of 30-35 birds (Chafer 1989, Gibson 1989). It is typically restricted to the numerous rocky headlands and their associated tidal rock-shelves, only rarely frequenting adjacent sandy beaches or tidal estuaries. I have often observed it foraging on beach cast ascidians and consider it, at least in this region, to be a normal part of the species diet. Birds that frequent the area around Red Point, 34° 30'S, 150° 57'E, are particularly adept at foraging on these Urochordates. In light of Schultz's suggestion that Australian Ravens *Corvus coronoides* had initiated the ascidians depredation, I felt the following observations may offer an alternate hypothesis to the scenario he suggested.

Methods and Results

Direct observations were made with 10x30 binoculars from an elevated position above a sandy rock-flat adjacent to the northern extremity of Red Point, Port Kembla, New South Wales. On 28 October 1991, three Sooty Oystercatchers were observed foraging amongst beach-cast debris during an ebb tide. A large detached ascidian *Herdmania momus* was washed ashore as I observed the birds. As soon as the swash receded one bird approached the ascidian and appeared to manipulate the organism into a more favourable position. It then hammered at a singular point on the upper part of the ascidian near the atrial (exhalant) siphon, and took only four or five strikes to gain entry through the tough test into the internal cavity of the animal. The oystercatcher then removed some of the fleshy internal organs, dispersed them on the sand and then walked a few paces to the waters edge and washed its bill, possibly to remove irritant calcareous spicules which are present within the ascidians bodywall (Kott 1985). The positioning of the fleshy material on the sand apparently attracted polychaete annelids (beach worms) to the surface, and the oystercatcher quickly ran back to the material and plunged its bill full length into the sandy substrate, pivoting around some 90 degrees in the process. This behaviour was observed twice, however on both occasions the bird was unsuccessful in securing a worm. The oystercatcher then consumed the remaining organs discarded on the sand and returned to the ascidian, hammering again at the one spot as though enlarging the hole. It then proceeded to devour more of the fleshy internal organs. This behaviour continued for approximately 15 minutes before a large swell washed the ascidian back off the beach into the surf and all three birds departed.

While the presumed dominant bird proceeded to consume the ascidians internal organs, the other two oystercatchers were vigorously chased off they approached within approximately 1.5 metres of the ascidian, and they either stood nearby apparently watching the dominant bird or continued searching through the other beach-cast debris. I am unaware if they consumed any prey as my attention was focused on the dominant bird.

At the same location on 9 December 1991, I again observed three oystercatchers foraging on the sandy rock-shelf. On this occasion there were several beach-cast "clumps" of solitary ascidians *Pyura stolonifera* (cunjevoi). A juvenile bird was watched this time as it circled a large clump and began to continuously hammer at one particular portion of the tunic until it had reached full bill length. It then extracted a small quantity of whitish tissue from the animal, however I was unable to determine whether the tissue was from the ascidian or an invertebrate using the ascidian as a refuge. Once the tissue had been extracted from the organism by the juvenile oystercatcher, it was chased away by an adult bird, which then continued to forage on the ascidian. I later collected the "clump" and noted that several of the individual ascidians had been cut off, presumably by fishermen who use the fleshy parts of the ascidian as bait. Other sites within the "clump" had 15-20 mm holes punched through the tunic and individual ascidian removed; some of these may have been made by foraging oystercatchers.

At the tidal rock-shelf surrounding Wollongong Continental Baths, some 10km north of the Red Point site, Sooty Oystercatcher have been observed foraging on living *P. stolonifera* at low tide (A. Davis, pers. comm.). Further studies are currently underway on the general foraging ecology and population dynamics of the Sooty Oystercatcher in the Illawarra region.

Discussion

It would seem reasonable from these observations of foraging behaviour in the Illawarra, to suggest that ascidians, particularly beach-cast individuals, are regularly incorporated into the diet of the Sooty Oystercatcher. I would also speculate, based on my own experience with the species, that the oystercatcher and not the ravens initiated the extraction of the internal tissue from the ascidians observed by Schultz (1989), and that the ravens then scavenged the remains while the oystercatcher was otherwise occupied.

Considine (1979), in her detailed study on Sooty Oystercatcher foraging in Victoria, only incidentally mentions ascidians in their dietary composition, and Pringle (1987) only gives a brief anecdotal account of ascidian predation at Long Reef near Sydney. It would thus be of great interest to discover if ascidian predation is confined to the south-eastern portion of Australia or if it occurs in other parts of the Sooty Oystercatchers' Australia-wide range.

Whether the behaviour of attracting the polychaetes to the substrate surface by using ascidian tissue as a bait was a learnt method, or simply an accident of dropping the flesh while momentarily distracted by the presence of irritant spicules, is of course debatable and needs further investigation of the methodology employed. If however the former is the case it has interesting connotations regarding tool-use by a bird, a rare event in avian ethology. This hypothesis is likely to be testable in the field.

Conclusion

Preliminary studies on the foraging ecology of Sooty Oystercatcher in the Illawarra indicate that differences occur in its dietary composition when compared to Victorian data (cf Considine 1979). The contribution of ascidians and absence of dogwelks *Thais orbita* are not noticeable differences. The smaller local (N.S.W.) populations, in contrast to the comparatively larger Victorian and Tasmania populations, also indicates that there may be a disparity in prey abundance which is a controlling influence on the population biology of this species outside the influence of shores associated with Bass Strait, its obvious stronghold (Blakers *et al.* 1984, Hewish 1990).

The Sooty Oystercatcher is a large, normally approachable species and general observations on its foraging ecology can be easily undertaken. I would be most interested to hear from anyone who has observed ascidian predation from other parts of the country.

Acknowledgements

I thank Dr Andy Davis for assistance in correctly identifying the marine organisms mentioned above and useful discussion on the general foraging ecology of the Sooty Oystercatcher.

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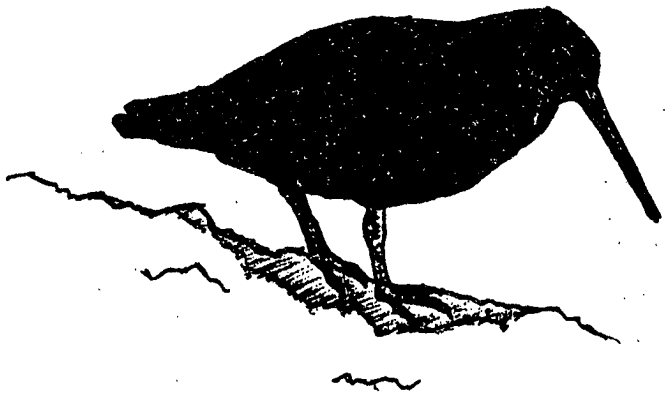

EGG LAYING INTERVAL: PIED OYSTERCATCHER AND HOODED PLOVER

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Pricilla Park, 36 Merindah Street, Howrah, Tasmania, 7018.

A review of our own nest record data and some of the early R.A.O.U. Nest Record Scheme information failed to reveal the exact laying interval of the Pied Oystercatcher *Haematopus longirostris*. However, one observation suggested that the interval might be greater than 24 hours.

Consequently, an objective of our 1991/92 season observations was to obtain information on egg laying. This is not an easily accomplished task, because Oystercatchers make their nest scrapes sometimes up to one month before eggs are laid. As the median clutch size is two, it is important to get an accurate measurement of the time at which the first egg is laid. This required at least daily observation on empty nests with appropriate follow-up observation. Using this approach, we obtained useful information on three Pied Oystercatcher clutches and on one Hooded Plover *Charadrius rubricolis* clutch. Details are provided below.

Table 1
Timing of Laying of Pied Oystercatcher Eggs
(Record of Key Observations)

LOCATION 1 MORTIMER BAY, SANDFORD		
Date	Time	No. of Eggs
22.10.91	1100	0
23.10.91	2000	1
25.10.91	0730	1
25.10.91	1945	2
26.10.91	1025	2
26.10.91	1945	2
27.10.91	1100	2
27.10.91	1945	2
LOCATION 2 RACECOURSE FLATS, LAUDERDALE		
Date	Time	No. of Eggs
07.11.91	1100	0
07.11.91	2000	1
09.11.91	0915	0
10.11.91	1130	1
11.11.91	1725	0

From the above observations, the range of the interval between the laying of eggs is:

Location	Time Interval Range (hours)
1	30.5 ⟶ 80.75
2	37.25 ⟶ 72.5

At Location 1, there was no evidence that the eggs were incubated until well after the second egg was laid. For instance, at 0730 hours on 25 October 1991, the egg was heavily covered with dew. On four visits subsequent to the laying of the second egg, the eggs were cold, and on only one occasion, 1945 hours on 26 October 1991, was an adult near the nest. Incubation was first noted at 1945 hours on 27 October 1991, at least 48 hours after the second egg was laid, when the male was on the nest.

A further observation of interest at Location 1 was the larger size of the second egg laid in the clutch.

	Length (mm)	Width (mm)	Weight (g)
First egg laid	54.4	40.2	48.5
Second egg laid	58.7	40.6	52.5

At Location 2, the first egg was predated before the second egg was laid. Despite this, a bird was seen sitting on the empty scrape at 0915 hours on 9 November 1991, suggesting that a second egg would be laid. This subsequently occurred, but as indicated by the observations in Table 1, the egg was soon predated. Location 2 is a samphire flat adjacent to the Lauderdale Tip, which attracts Forest Ravens *Corvus tasmanicus* and Kelp Gulls *Larus dominicanus*, both of which are likely predators. Interestingly, a second pair of oystercatchers nesting in a similar situation some 50 m away were not predated. Presumably they were more adept at nest protection.

At a third location at Lauderdale spit, the interval between laying the first and second eggs was greater than 37.5 hours, and again incubation was only noted after the second egg was laid.

Observations for the Hooded Plover are given in Table 2. From this information, it can be deduced that the interval between the laying of the second and third eggs was greater than 41.5 hours and that the interval between laying the first and third eggs was greater than 94 hours. In each case the eggs were cold when the nest was inspected prior to the completion of the clutch.

Table 2

Time of Laying of Hooded Plover Eggs

Date	Time	No. of Eggs
26.10.91	1200	1
27.10.91	1015	1
28.10.91	1630	2
29.10.91	2000	2
30.10.91	1000	2
03.11.91	0950	3
13.11.91	1915	3

From the observations presented, it is concluded that for both the Pied Oystercatcher and the Hooded Plover the interval between laying eggs is greater than one day. In the case of the Hooded Plover, the evidence suggested that the interval is at least two days. For both species the observations suggest that incubation does not commence until the clutch is complete. This strategy is not unexpected in the view of the long laying interval and the need to synchronise the hatching of eggs as the young leave the nest shortly after hatching.

Johnsgard (1981) gives no information of the egg laying interval for either species. Cramp and Simmons (1983) gives 24-26 hours for the European Oystercatcher *Haematopus ostralegus*. Thus, the present information suggests that the larger Australian Pied Oystercatcher has a significantly longer laying interval than its European counterpart. Newman (in press) established that the incubation period and interval from hatching to flying were also longer for the Australian species.

Very little is known about the breeding behaviour of the Hooded Plover, although previous observations at Mortimer Bay have shown that the species has a long incubation period of 31 days (Newman, 1986).

In publishing this short note on rather unsatisfactory information, we wish to highlight how little basic information is known about Australian waders, and encourage a commitment to detailed breeding studies of our resident waders.

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LEG-FLAGGING WADERS IN AUSTRALIA - WHY AND HOW?

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1. Introduction

Knowledge of migration routes is essential in order to develop effective plans for the conservation and management of migratory waders and their habitats. Such information is especially required in the East Asian-Australasian flyway where habitat destruction is widespread (Howes and Parish 1989), stageing sites are being destroyed and adequate protection of the remaining sites is particularly important.

During the last fifteen years approximately 100,000 waders have been banded in Australia but only 222 bands have been recovered overseas up to the end of 1991. This dividend represents a microscopic 0.2%. Banding activity elsewhere in the flyway is not so intensive, although the level of activity is now increasing, and 20 foreign-banded birds have been recovered in Australia to date (Pook 1992).

It is interesting to compare these results with those obtained in the UK where, on average, three birds in 100 caught will provide information on international movements. One of these will be wearing a foreign band when captured, whilst the other two will be recovered later overseas (Clive Minton, pers. comm.).

The difference in band recovery rates between the East Asian-Australasian and East Atlantic Flyways is due to the less intensive banding activity and lower population density in the former Flyway. Additionally, a lack of understanding of the significance of recovered bands in most of the countries comprising the East Asian-Australasian Flyway means that many do not get returned to the relevant banding office.

Recently, the Victorian Wader Study Group (VWSG) has commenced attaching leg-flags to migratory waders in an attempt to quickly increase our knowledge of migration routes. The advantage of using leg-flags is that they can be easily seen with the aid of binoculars or a telescope, thus providing additional information on migratory movements to that obtained from recovered bands. This greatly increases the opportunity to gain information on movements, as many more sites can be covered.

During two years of leg-flagging (1991-92), the VWSG has been able to:

(a) identify a suitable leg-flag material,
(b) develop satisfactory leg-flag manufacturing and attachment techniques, and
(c) confirm satisfactory performance of the leg-flags with respect to visibility, colour-fastness and durability.

It is hoped that leg-flagging will be adopted by other countries in the flyway and a draft leg-flagging protocol has been developed by the Australasian Wader Studies Group and the Asian Wetland Bureau, which comprises a list of target species by country and leg-flag colour (Barter and Parish, unpub.). It is essential that the final protocol be rigorously followed otherwise the resulting confusion will seriously invalidate the results. Similarly, other flagging schemes must take into account the requirements of this scheme in order to avoid confusion.

Although leg-flags have been widely used in Europe and the Americas, little published information is available on manufacturing and attachment methods. The purpose of this paper is to describe the techniques developed by the VWSG and the flag-performance to date, so that the information is readily available to other groups interested in leg-flagging.

2. Leg-Flag Manufacture

2.1 Material

The material used for flag manufacture is 0.5mm thick un-plasticized PVC sheet, made by Imperial Chemical Industries in the UK under the tradename of "Darvic".

Darvic has been used before for the manufacture of both colour bands and flags. The dyes are colour-fast and serious fading does not occur.

The VWSG purchased Darvic from:

VT Plastics
49 Wates Way
Willow Lane Industrial Estate
Mitcham, Surrey CR4 4HR
UK
Tel: (081) 685 9545
Fax: (081) 640 4018

The plastic is supplied by ICI in 6ft x 4ft (1.83m x 1.22m) sheets and VT Plastics will cut sheets up into 24 x 1ft x 1ft (30cm x 30cm) squares upon request. The smaller size is more easily transportable and very convenient to handle.

2.2 Manufacture

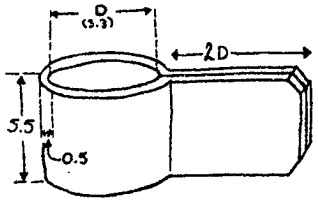
Flags are made to the same internal diameter (D) and height (h) as the equivalent Australian metal band, eg. size 04, suitable for Curlew Sandpipers and Large Sand Plovers, D=3.3mm, h=5.5mm. The basic design is illustrated in Fig 1 (size 04 band), which shows that the flag portion has sides which can be glued to ensure that the leg-flag remains securely attached to the bird's leg.

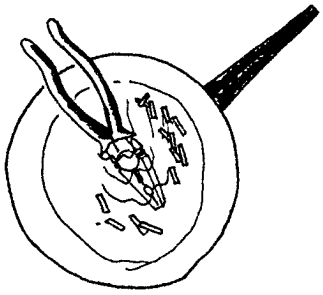
The first stage in the manufacturing process is to cut the plastic squares into strips with a width which is equal to the height of the band to be made, eg. for size 04, width=5.5mm. This can be easily done on a sharp office paper guillotine. The wide strip which is inevitably left over at the end (unless you want to slice the tips of your fingers off!) can be utilised by slicing off the appropiate widths at right angles to the original cutting direction. The yield will be virtually 100% if the wide strip remaining is equal to the flag blank length required. Pre-planning will achieve this.

Flag-blanks are made from the strips by cutting to the desired length. The required blank-length can be calculated by allowing for the circular part of the flag and for a flag-length of approximately twice the flag diameter, ie. blank length = $\pi D + 4D = 7.14D$ (see Fig 1, where blank-length = πx3.3 + 4x3.3 = 7.14 x 3.3 = c.24mm). Following trimming, the resulting flag length will be somewhere between 1.5 and 2 times the internal band diameter.

Flags are formed by using hot water to soften the blanks, and a heated pair of thick-nosed pliers and a metal rod, of the same diameter as the desired internal diameter of the flag, to form the required shape. An electric frying pan is the most suitable equipment for heating both the water and forming implements. It is important that the frying pan be clean and free from oil and grease that could coat the internal surfaces of the flag sides and interfere with the glueing action. The pan should be thoroughly cleaned with hot water and detergent (more than once if necessary). A few drops of detergent should be added to the water used during the flag-forming operation in order to cope with any residual oil.

Figures 1 & 2

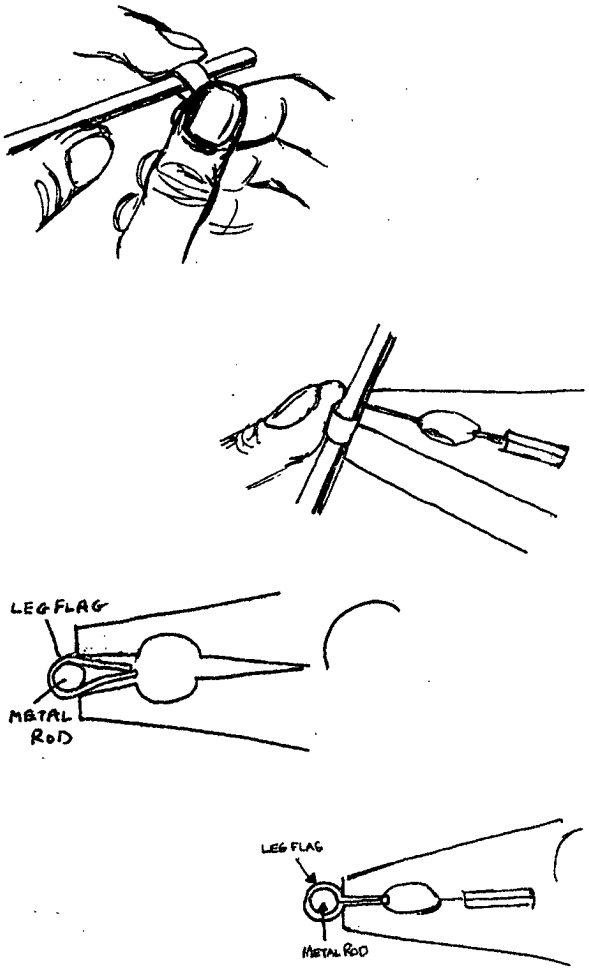




The technique used is to place a number of blanks in about 20-25mm of hot water, which is at approximately 90°C. The thick-nosed pliers are heated by leaning them against the side of the frying-pan with the jaws immersed in the water (see Fig 2). A blank is "fished out" with the metal rod and formed into a "V-shape" around the rod and held with the thumb and index finger (see Fig 3). The heated thick-nosed pliers are used to grip the blank at the metal rod and the jaws are then squeezed toward the flag portion to form the leg flag (see Figs 4, 5 and 6). The clamped leg-flag, whilst still on the forming rod, is re-immersed in the hot water to allow the plastic to soften and take up its final shape. Accurate formation of the flag internal diameter, and achievement of proper contact between the internal surfaces of the flag sides, can be obtained by gently pressing the pliers towards the metal forming rod. The flag is then slid gently off the rod with the pliers and dropped into a container of cold water. The jaws

of the pliers are re-immersed in the hot water to keep them hot, whilst another blank is removed. With a bit of practice, leg flags can be formed quickly with a reasonable degree of accuracy.

Figures 3, 4, 5 & 6



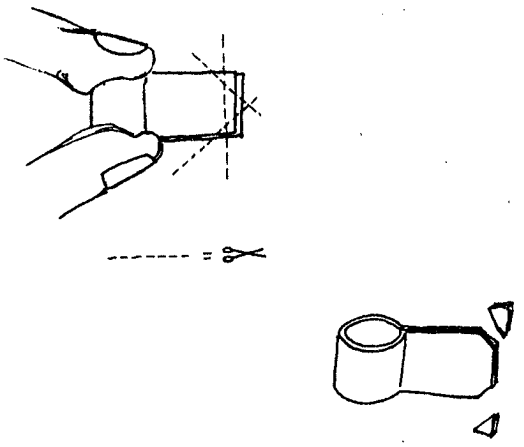
It is very important to get the correct squeezing action so that the inside surfaces of the flag sides are firmly in contact with each other in the finished flag. If the sides are separated to any extent, the "springiness" of the flag tends to work against the glue when the flag is being attached to the bird's leg and satisfactory glueing takes longer. The possibility of subsequent separation of the flag sides, and consequent flag loss, is also greater.

Badly formed leg flags can be re-used by re-immersing them in the hot water which will cause them to return to the un-formed flat state.

Slightly mis-formed flags can be renovated by replacing them on the metal rod, gripping to the correct shape with the pliers and then re-immersing for a short time in hot water. The flag can then be removed, as before, and dropped into cold water.

The formed flags are trimmed with a sharp pair of scissors to make both sides of the flag of equal length and to remove the sharp corners (see Figs 7 and 8).

Figures 7 & 8



The trimmed flags are then air-dried, thoroughly cleaned by agitating in a suitable solvent (eg. methyl ethyl ketone) for 30 seconds and kept in labelled containers. Old 35mm plastic film containers hold a convenient quantity of bands.

3. Leg-Flag Attachment

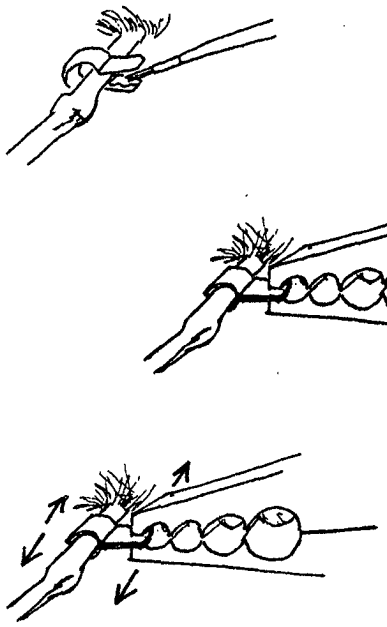
The most suitable adhesive has been found to be the type used by plumbers to glue PVC drainage fittings (UPVC Solvent Cement). This glue, which uses methyl ethyl ketone as a solvent, partially dissolves the plastic and, upon setting, forms an adherent bond. Super Glue is unsuitable as it does not work by solvent action and is not an effective adhesive for the hard, shiny Darvic surface. Additionally, Super Glue is more hazardous to use because of it's propensity to glue "anything" to "anything", including fingers and bird's legs to flags.

The most successful technique for attaching the flag is to, firstly, to open the flag portion just sufficiently to push over the bird's leg and then to place a drop of glue between the flag sides, whilst they are still separated by the leg (see Fig 9). The flag is then pushed completely on to the leg and it should snap shut due to the inherent spring in the plastic. The flag sides are then clamped lightly with a pair of pliers for at least 20 seconds until the glue has set sufficiently to hold the two sides together (see Fig 10). It is important to only use just enough glue to cover the joint surface when the sides are clamped by the pliers. Excess glue will be squeezed out and may cause the flag to adhere to the bird's leg. It is good practice to continuously move the flag relative to the leg whilst the flag is clamped by the pliers. The solvent evaporates rapidly and a flag that is moving freely on the leg after 20 seconds will remain free thereafter (Fig 11).

Birds can then be released after checking that flags are properly glued and moving freely on the leg.

It is very important not to open the flag sides too much during application to the bird's leg or the flag will become permanently distorted and there will be a gap between the sides after the flag has been placed on the leg. This will make glueing more difficult as the flag sides will tend to separate after the glueing operation.

Figures 9, 10 and 11.



People or groups flagging for the first time may find it advantageous to hold the birds for a little longer, in keeping cages or bird bags, in order to check that the flags have remained glued and that they have the correct flag application technique.

4. Performance

The orange leg flags used by the VWSG have been found to be highly visible in the field. In reasonable light conditions, the flags can be easily seen up to 100m with binoculars, and to 200m, or more, with a telescope. VWSG practice has been to attach the flags to the tibia (upper leg) as they can be more easily seen when the birds are feeding in water (eg. Curlew Sandpipers). However, flags on the tarsus are more visible on roosting birds.

Flagging commenced in early 1990 and flags on birds recaptured in late 1991/early 1992 showed no fading, although the gloss on the plastic surface had been partly removed.

The early flags were fixed with Super Glue and some of these had fallen off within the first year. The use of the solvent-based glue commenced in late 1990 and checks of retrapped birds have shown that there has been almost 100% retention of flags during the following 12 months.

5. References

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Pook, J. 1992. Banding Round-up, Complete List Stilt 20: 51-77.

THE DOUBLE-BANDED PLOVER IN THE WESTERN DISTRICT, VICTORIA, 1990-1991

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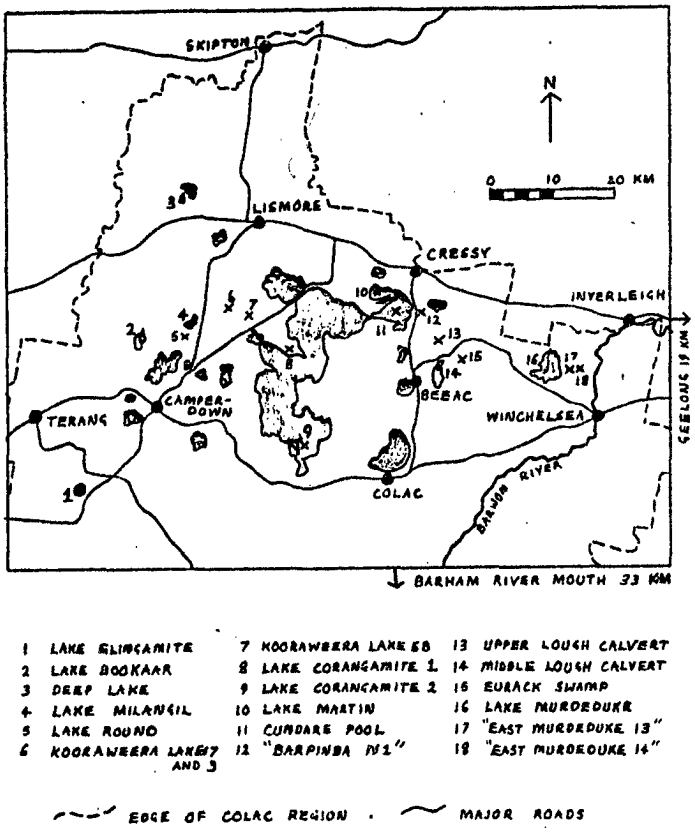
Introduction

The Atlas of Australian Birds (Blakers *et al.* 1984) shows that while wintering Double-banded Plovers are mainly coastal birds, there is an inland concentration of records in the Western District of Victoria. During 1990 and 1991 these plovers occurred at many sites in the Colac region (see Figure 1). There are also records from other wetlands: Kooraweera Lake 7 (north), Deep Lake and Lake Bookaar (Corrick 1990).

Figure 1



Blakers *et al.* (1984) mentions that the largest flock sighted in Australia is approximately 1000. Lane (1987) notes a maximum zone count in Australia of 1400 at Port Phillip Bay and a maximum Australian migrant population of 5600 in June 1985. Some sites in the region have held large numbers of Double-banded Plovers in the past, eg:

200, Lough Calvert, 29 May 1961 (Prescott 1983),
350, Lake Murdeduke, 9 April 1979 (Corrick 1990),
420, Lake Corangamite, 10 April 1979 (Corrick 1990),
100, Lake Milangil, 13 Mar. 1982 (Robinson 1982),
150, Lough Calvert, 13 Mar. 1982 (Robinson 1982)
115, Lake Milangil, 2 June 1988 (P.Du Guesclin pers. comm.)

(see Figure 1 for locations)

In addition, Prescott (1983) mentions that large numbers have visited Lake Murdeduke, and Mr Robert Missen has noted large numbers in most years at Lough Calvert (pers. comm.). During 1990 and 1991, some very large flocks of Double-banded Plovers (up to 3700) were recorded at Middle Lough Calvert.

Results

Table 1 lists the sightings made during 1990-1991 as part of wetland assessments for the Department of Conservation and Environment, Colac Region, Victoria.

Table 2 lists the number and types of habitat used by Double-banded Plovers in the Colac region during 1990 (1991 is not included due to few surveys being made).

Discussion

The sightings made in the Colac region during 1990 and 1991 raise two main points:

1) A large proportion of the total Australian population of Double-banded Plovers (estimated at 12,450 - Lane 1987) occurred in this region during winter, as is evident by the flocks of 2180, 923, 3511 and 3700 sighted at Lough Calvert on 26 April 1990, 27 July 1990, 2 July 1991 and 6 July 1991 respectively.

2. In 1991, there were large numbers of birds at Lough Calvert at the beginning and the end of the species' 1990 winter season in Australia. A possible reason for this is that this site may be a staging point for migration both in and out of Australia as is suggested for some sites in Victoria and New South wales by Lane (1987). The flock of 2180 is consistent with the finding in Lane (1987) of greatest numbers (not necessarily single large flocks) of Double-banded Plovers being found in southern New South Wales, Victoria and Tasmania in April.

   In 1991, however, a flock of up to 3700 occurred at middle Lough Calvert in the middle of the winter season. In this case, it is probable that the plovers (together with an estimated 1500 Curlew Sandpipers and Red-necked Stints) flocked to the site where ideal conditions had been created by heavy rains on the margins of the Lough Calvert wetlands. The type of habitat used was a damp, very low pasture of grasses and small chenopod species: many birds were also found on mudflats with variable amounts of *Wilsonia rotundifolia* (Round-leafed Wilsonia). The wetland pasture and margins were grazed and trampled by sheep. Also, another habitat supporting large numbers of plovers (Kooraweera Lake 5b) was flooded at this time thus forcing substantial numbers of birds to other sites.

TABLE 1:
LIST OF DOUBLE-BANDED PLOVER SIGHTINGS IN THE COLAC REGION: AUTUMN-WINTER 1990 AND AUTUMN 1991

1990			
26 April	2180	Middle Lough Calvert	E
28	850+	Middle Lough Calvert	E
4 May	55	Koorawerra Lake 5b	
8	46	Kooraweera Lake 3	
8	2	Kooraweera Lake 5b	
11	42	Lake Martin	
17	45	Lake Elingamite	
18	18	Lake Milangil	I
21	196	Middle Lough Calvert	I
22	209	Lake Corangamite (1)	
23	80	Lake Corangamite (2)	
25	6	Barham River mouth	*1
27	5	Barham River mouth	*1
4 June	9	Lake Murdeduke	PDG
5	44	Lake Milangil	PDG
5	8	Lake Round	PDG
3 July	1	"Barpinba N1"	*2
10	17	Lake Round	*3
12	4	Lake Murdeduke	
18	31	"East Murdeduke 13"	*4
18	42	"East Murdeduke 14"	*5
27	923	Middle Lough Calvert	*6
7 August	92	Eurack Swamp (Dunn's)	*6
10	'00s	Middle Lough Calvert	*6
22	42	Middle Lough Calvert	
11 September	1	Upper Lough Calvert	*6
1991			
13 March	163	Cundare Pool (Watch Hill)	
15	76	Cundare Pool (north-east)	
20	154	Kooraweera Lake 5b	
21	109	Lake Murdeduke	*7
22	30	Lake Martin	
22	57	Cundare Pool (north-west)	
24	197	Middle Lough Calvert	
1 May	274+	Kooraweera Lake 5b	*8
28	131	Lake Murdeduke	*9
1 July	3511	Middle Lough Calvert	*10
6	3700	Middle Lough Calvert	MB
2 August	2320	Middle Lough Calvert	*11

*1 3 oiled birds, 1 in breeding plumage
*2 single bird on a ploughed paddock adjacent to the wetland
*3 5 birds in partial breeding plumage, 3 birds in eclipse/juvenile plumage, 9 birds: plumage uncertain
*4 5 birds in mostly full breeding plumage
*5 27 birds in mostly full breeding plumage
*6 all birds in full breeding plumage
*7 1 bird moulting from breeding plumage, 2 birds in eclipse plumage
*8 many birds in breeding plumage
*9 approximately half the birds showing varying traces of probably 'old' breeding plumage
*10 approximately 35% of a sample of 253 birds were in nearly complete breeding plumage
*11 several large flocks at site: maximum was 2320 counted

E = estimate I = incidental record
PDG: sightings by Philip Du Guesclin,
MB: count by Mark Barter

TABLE 2:
HABITAT TYPES USED BY DOUBLE-BANDED PLOVERS IN THE COLAC REGION, 1990

Note: salinity and land status of site are shown

Hypersaline wetlands-2 (salinity: greater than 100 ppt*),
Sarcocornia flats

Sites include: Lake Corangamite 1 (LR),
Eurack Swamp (LR)

Saline wetlands-4 (35-100 ppt),
Sarcocornia flats
moist to dry mudflats
rocky outcrops
adjacent pasture

Sites include: Middle Lough Calvert (LR, DT),
Lake Corangamite 2, Lake Round (GRef),
Upper Lough Calvert (LR, DT)

Brackish wetlands-3 (3-35 ppt),
Sarcocornia flats
moist mudflats
dry lake bed
adjacent stubble
adjacent pasture
rocky outcrops
adjacent dry ploughed paddock

Sites include: Kooraweera lake 3 (WR), Lake Martin (LR),
Lake Milangil (GRef), "Barpinba N1" (F),
Lake Murdeduke (GRes), "east Murdeduke 14" (F).

Estuary -1,
sand spit (roosting)

Site Barham River mouth (FR)

Freshwater meadow-1 (0-3 ppt)
pasture
chenopod forb

Site: "east Murdeduke 13" (F)

Freshwater lake-1 (0-3 ppt)
exposed peat beds

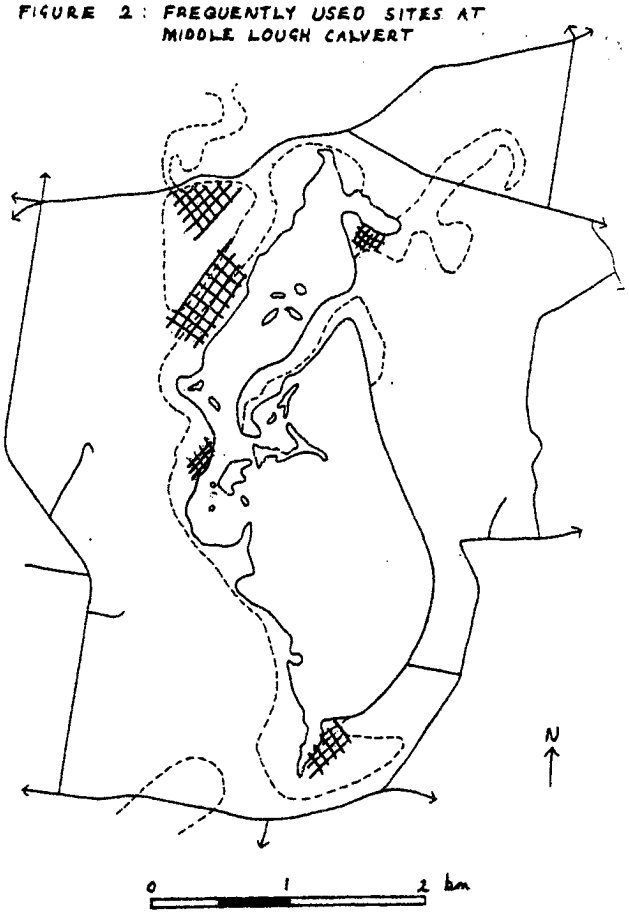
Site: Lake Elingamite (LR)

*ppt = parts per thousand (35 ppt is approximately sea water)

LR Lake Reserve, WR Wildlife Reserve, GRes Game Reserve, GRef Game Refuge, FS Foreshore Reserve, DT Drainage Trust, F freehold

Lough Calvert is a network of wetlands with a historical area of 2750 hectares (Corrick 1990) and currently consists of four distinct areas where the hydrology is controlled by the Lough Calvert Drainage Trust. The four areas are the Upper Lough, Middle Lough, Lower Lough north and Lower Lough south. Salinity varies from up to hypersaline in the Upper Lough and decreases south down the network to fresh or brackish in the Lower Lough south. Apparently suitable habitat for Double-banded Plovers exists in all these sites but only the Middle Lough and the Upper Lough have been used by the birds. Figure 2 shows the main areas used by the plovers at the Middle Lough.

FIGURE 2: FREQUENTLY USED SITES AT MIDDLE LOUGH CALVERT



There are several other interesting points regarding 1) habitat type, 2) the total Double-banded Plover population in the Colac region itself and 3) proportions of breeding plumage in flocks at particular times of the year.

1) The record of 45 plovers at a freshwater lake (Lake Elingamite) is particularly interesting because the habitat used consists of thick emergent peat beds in an extinct volcanic crater; all other habitats in the Colac region are dry or saline sites.

The habitat type used most frequently by the plovers (ie. greatest number of sites) was *Sarcocornia* or *Wilsonia* flats (for feeding and roosting). Much of these habitats are grazed or trampled by sheep and undergo seasonal wetting-drying cycles, so some form of seasonal artificial or natural change creates suitable habitat for the birds.

2. Even with the useful number of records of Double-banded Plovers that have been made, it is impossible to estimate a total population for the Colac region in a single winter season since the birds are nomadic due to habitat changes and less obvious factors. This was especially obvious when a particular site was repeatedly surveyed eg. at middle Lough Calvert, numbers varied from 2180, 850+, 196 to 924 in 1990, and Kooraweera Lake (5b) varied from 154 on 20 March 1991 to 274+ on 1 May 1991 and subsequently to 0 on 13 August 1991 when the site was flooded.

   Some sites such as Lake Corangamite, Cundare Pool (Lake Martin) and the Lough Calvert systems have large areas of apparently suitable habitat so that large numbers of Double-banded Plovers could easily go unnoticed.

3. If the 1990 and 1991 seasons can be compared, it appears that the greatest number of breeding-plumaged birds arrived in very late April to early May while the greatest numbers of juvenile or eclipse birds arrived earlier with a possible second influx **after** the arrival of breeding plumaged birds. This second influx could possibly be of adult or juvenile birds that have moulted elsewhere in Australia.

   It is interesting to note the proportion of birds in breeding plumage to birds in the duller juvenile/eclipse plumage in the second half of the 1990 winter season. There was one bird still in breeding plumage at the Barham River mouth (Apollo Bay) in late May while the first "new" breeding plumage was observed at Lake Round on July 10. The percentages of birds in almost complete breeding plumage then increased from 16% and 64% (in flocks of 31 and 42 birds respectively) on 18 July to 100% on 7 August (see Table 1).

   During 1991, one bird was noted moulting out of breeding plumage on 21 March. "Old" or incomplete "new" breeding plumage was noted on many birds on 1 May (due to difficult counting conditions, an accurate estimate was not possible). On 21 May, about 50% of a flock of 131 showed traces of "old" or incomplete "new" breeding plumage.

   On 1 July 35% of a sample of 253 birds from the flock of 3511 showed almost complete new breeding plumage.

Conclusion

It is obvious that more intensive surveys of likely Double-banded Plover habitats are needed to assess the numbers of overwintering birds, identify important sites and to provide suitable management of these sites. Also, it would be useful to closely monitor favoured sites (such as middle Lough Calvert) to gain an understanding of the timing of migration and the changing proportions of breeding plumage over the season. With at least casual monitoring of other major sites, it could be possible to determine movements of major numbers of birds between their most important habitats. To give the best estimate of the Australian population of these birds, I suggest that known inland sites are visited as part of the Australasian Wader Studies Group winter survey of waders in Australia.

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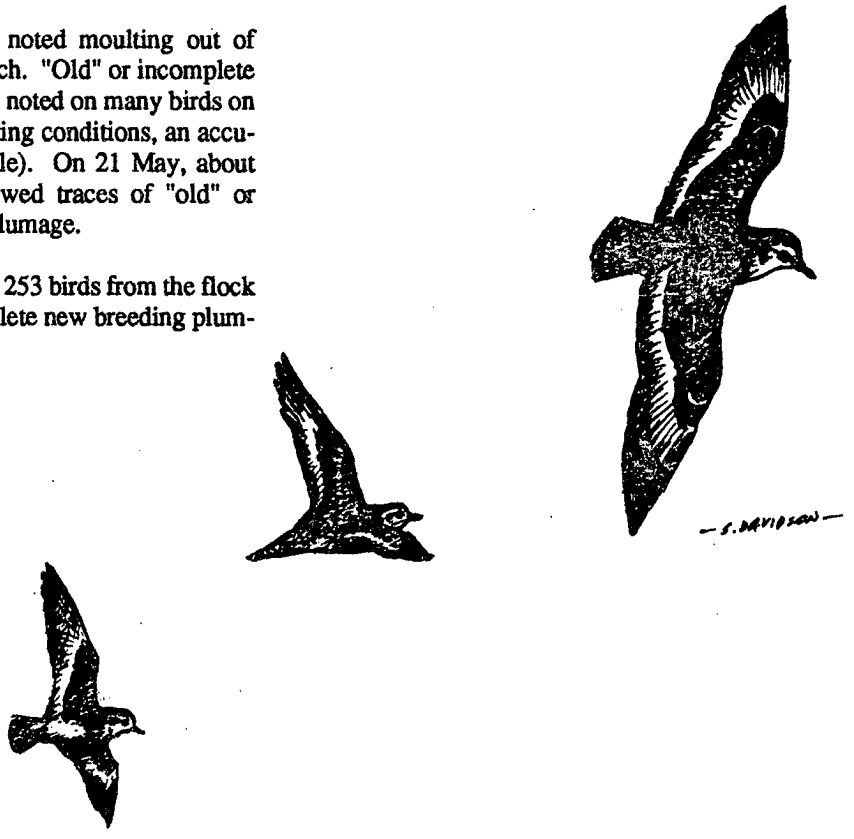


BIOMETRICS AND MOULT OF RED-KNEED DOTTERELS *Erythrogonys cinctus* IN AUSTRALIA

Mark Barter, 21 Chivalry Avenue, Glen Waverley, VIC 3150

1. Summary

Data obtained from 426 birds caught between 1979 and 1991 in Victoria, New South Wales (NSW) and Western Australia (WA) have been analysed for bill, total-head, wing, tarsus and tail lengths, weight and primary moult. Bill-lengths in WA appear to be longer than in Victoria and NSW (21.3 vs. 20.9mm, respectively), but this difference is probably due to greater feather wear in WA, as total-head lengths are very similar in all three regions (WA: 48.5, Victoria and NSW: 48.8mm). Victorian birds are heavier (56.3g), on average, than NSW birds (51.4g) which, in turn, weigh more than those in WA (48.1g). These weight differences are significant ($p<0.005$). Victorian 2+ birds appear to commence moult during the September-October period and complete in March. The limited data available indicates that NSW 1+ and NWA 2+ birds may have similar moult strategies to those of Victorian birds. Moult data for first-year birds are scanty. In WA first-year birds, primary moult is less well advanced than in adults from the same region.

2. Introduction

The Red-kneed Dotterel is an endemic Australian wader found on fresh water wetlands throughout the continent. The species is affected greatly by the ephemeral nature of many Australian wetlands. Red-kneed Dotterels breed consistently in southern Australia, where wetlands are more reliable, and appear to breed prolifically when inland ephemeral wetlands are flooded. There is a regular movement to southern wetlands following breeding and during periods of drought, and to northern regions following a period of prolific breeding activity (Lane 1987).

The estimated Australian population is 26,000 (Watkins, in prep.). However, this could be an underestimate because of the difficulty of comprehensively counting such a thinly and widely spread species.

There is little published biometric data (Pringle 1987) and no primary moult information is available for the species.

This paper contains the results and discussion of analyses of data obtained from 426 birds caught in Victoria, New South Wales (NSW) and Western Australia (WA) during the period 1979-91.

3. Methods

Birds were caught in mist and cannon nets in Victoria (at Werribee and Bendigo Sewage Farms), mist nets in NSW (at Whongalea, near Booligal) and in cannon nets in WA (at Lake Eda, near Broome). Catch details by region were as follows:

Victoria	-	143
NSW	-	182
NWA	-	101

Bill, total-head, wing, tarsus and tail lengths, (all mm), weights (g) and moult data were obtained using the methods described in Rogers (1989).

Birds were aged, by primary moult and plumage, according to the Australian Bird Banding Scheme code, viz:

2+	-	in second year or older
1+	-	in first year or older
1	-	in first year

In all cases, except for wing lengths in WA, measurements for 2+ and 1+ birds, by region, were not significantly different ($p>0.05$). As a result, in most cases, data has been combined for both age groups. Additionally, bill length data has been combined for both Victoria and NSW and total-head length data for all three regions, due to the non-significant differences between the relevant regions for these two measurements.

4. Results and Discussion

Bill, total-head, wing, tarsus and tail lengths, and weight data are given in Tables 1 to 6, respectively. Moult information is presented in Tables 7 to 9.

The average 2+/1+ WA bill length appears to be slightly longer than that in Victoria and NSW (WA 21.3mm, Victoria/NSW 20.9mm), although this is probably due to greater feather wear at the bill-base in WA. This suggestion is borne out by the non-significant difference in total-head lengths (THLs) in 2+/1+ birds in the three regions (WA: 48.5, Victoria and NSW: 48.8mm; $p>0.05$). First-year birds have shorter average bill and total-head lengths than 2+/1+ birds.

Table 1. Bill length measurements (mm)

AGE	REGION	n	x	sd	RANGE
2+/1+	VIC/NSW*	126	20.9	0.90	18.4/22.9
"	WA	51	21.3	1.03	19.3/23.6
1	VIC	9	20.3	0.90	18.8/21.3
"	NSW	42	20.3	0.90	18.8/21.9
"	WA	5	21.1	0.80	19.7/22.6

* = data combined due to non-significant difference between Victoria and NSW ($p>0.05$).

Key for Tables 1 to 7:
n = sample size
x = mean
sd = standard deviation

Total-head length (THL) measurements appear to be dimorphic (Fig 1) and use of the percentage cumulative frequency technique (Griffiths 1968, Rogers, in prep.) gave the following result:

Larger sex: mean = 49.4mm, sd = 0.98mm
Smaller sex: mean = 48.0mm, sd = 0.96mm

The larger sex (unknown!) comprised 57% of the sample. However, the high degree of overlap of the THL distributions for the two groups does not allow useful sexing criteria to be estimated at the 95% confidence level.

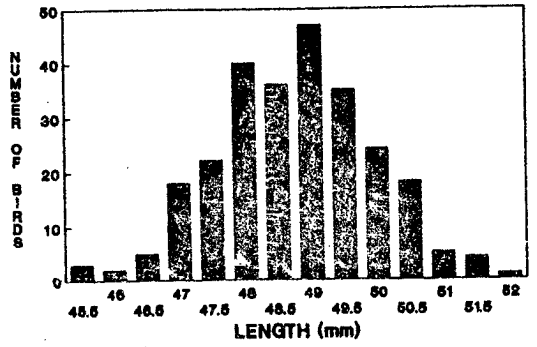
Table 2. Total-head length measurements (mm).

AGE	REGION	n	x	sd	RANGE
2+/1+	VIC/NSW/WA*	259	48.7	1.18	45.7/51.8
1	VIC	13	48.4	1.00	46.2/50.3
"	NSW	57	48.3	1.08	45.5/50.6
"	WA	6	48.2	1.08	47.3/50.3

* = data combined due to non-significant differences between Victoria, NSW and WA (p>0.05).

Average wing lengths of 2+/1+ and 2+ birds in Victoria

FIG 1. TOTAL-HEAD LENGTHS
(2+/1+ birds in Victoria, NSW and WA)



and WA are similar (113.9 and 113.4mm, respectively). WA 1+ birds have shorter wings, on average, (111.7mm), but this could have been caused by the presence of first-year birds in the sample, as this age group has shorter average wings (110.2mm) than 2+ birds. Victorian first-years have longer wings (113.5mm) than their WA counterparts. It is probable that lower feather wear in Victoria is the cause of the difference. All NSW wing lengths were obtained on un-straightened wings and, consequently, are some 3 to 4 mm shorter than those in Victoria and WA.

Table 3. Wing length measurements (mm)

AGE	REGION	n	x	sd	RANGE
2+/1+	VIC	127	113.9	2.66	108/121
1+	NSW*	121	109.5	3.18	100/117
2+	WA	64	113.4	2.51	107/119
1+	WA	20	111.7	2.87	105/115
1	VIC	15	113.5	2.62	111/119
"	NSW*	57	110.0	2.88	103/117
"	WA	13	110.2	1.82	106/114

* NB. NSW measurements obtained on un-straightened wings.

The average tarsus and tail measurements of 2+/1+ birds are significantly longer than those of first-year birds (p<0.005, in both cases).

Table 4. Tarsus length measurements (mm)

AGE	REGION	n	x	sd	RANGE
1+	NSW	48	41.4	1.37	38.9/44.7
2+/1+	WA	33	40.9	2.19	36.8/45.3
1	NSW	42	40.5	1.44	36.7/43.2
"	WA	5	39.5	1.85	38.7/40.9

Table 5. Tail measurements in NSW (mm)

AGE	n	x	sd	RANGE
1+	120	46.6	1.96	42/52
1	56	45.2	2.43	40/51

Average Victorian 2+/1+ weights (56.3g) are greater than those for NSW 1+ birds (51.4g) which, in turn, are greater than those of 2+/1+ birds in WA (48.1g). Differences are significant (p<0.005). The weight differences for the three regions are consistent with those found for palearctic waders in Australia where, without exception, weights are less in northern Western Australia than in Victoria (see, for example, Barter *et al* 1988). The differences between the regions are shown in histogram form in Fig 2.

Both Victorian and NSW first-year birds are lighter than their older counterparts, whilst in WA they are heavier. However, the weight difference is only significant in NSW (p<0.005).

Table 6. Weight measurements (g)

AGE	REGION	n	x	sd	RANGE
2+/1+	VIC	127	56.3	4.89	43/77
1+	NSW	114	51.4	3.85	42/60
2+/1+	WA	88	48.1	4.84	35/63
1	VIC	14	54.7	5.34	47/65
"	NSW	55	47.9	3.37	41/57
"	WA	14	49.1	4.81	38/55

Victorian adult (2+) birds appear to commence moult in September or October and complete in March. Insufficient data is available for first-year birds to allow comment.

In NSW, 1+ birds are at a similar stage of primary moult to Victorian 2+ birds by the end of January. Data for first-year birds is anomalous with the end-January sample containing a group which has a similar moult status to 1+ birds, whilst the remainder have yet to commence moult.

FIG 2. WEIGHTS

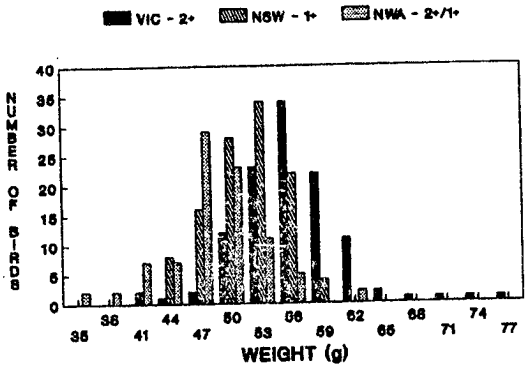


Table 7. Median primary moult scores (MPMS) for Victorian 2+ birds

DATE	SAMPLE SIZE	MPMS
06/09/90	4	0
02/11/85	15	11
05/02/83	10	46
25/04/79	18	50
13/06/82	39	50

Table 8. Median primary moult scores (MPMS) for NSW 1+ and first-year birds

AGE	DATE	SAMPLE SIZE	MPMS
1+	08-10/01/91	65	44
	24-27/01/91	44	45
1	08-10/01/91	9	20
	24-27/01/91	36	42

NWA adult (2+) birds have all completed moult by the end of March, whilst the first-year group are in mid-moult.

Table 10.Median primary moult scores (MPMS) for NWA 2+ and first-year birds caught from 29-31/03/90

AGE	SAMPLE SIZE	MPMS
1+	63	50
1	12	25

There is no evidence that 2+ and 1+ Red-kneed Dotterels have different moult strategies in the three regions, but data is too limited to rule out the possibility.

5. Acknowledgements

I wish to thank the New South Wales and Victorian Wader Study Groups and the Australasian Wader Studies Group for making their data available for analysis. As a result, an Australia-wide, if incomplete, view has been obtained of the biometrics and moult of this little-studied species of wader. Bands were supplied by the Australian Bird Banding Scheme.

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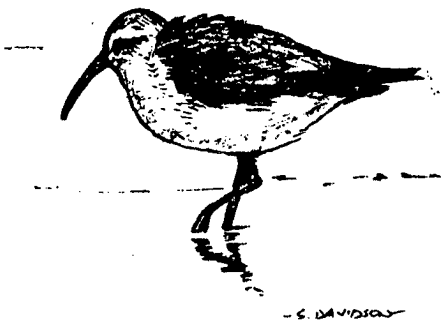

THE 1990 SUMMER AND WINTER POPULATION MONITORING COUNTS

The 1990 Summer and Winter Population Monitoring Counts were held during February and June/July respectively. The summer count results for both species and individual numbers, at the 18 monitores sites, are shown in Table 1.

Totals of 40 species and 154,511 individuals are listed, including 122,390 migratory waders from the northern hemisphere, 29,989 resident waders, 43 Double-banded Plovers and 2,089 unidentified waders.

Results were not available from the Hunter Estuary, NSW; Darwin area, NT; Western Eyre Peninsula, SA; Albany area and Swan Coastal Plain, WA. Even given the lack of count results from these sites this was not the lowest summer count on record (the total count for summer 1988 was some 4,500 lower).

Results from the winter count, from the 15 monitored sites, are shown in Table 2. Totals of 31 species and 15,883 individuals are listed, including 6,496 migratory waders from the northern hemisphere, 6,595 resident waders, 2,757 Double-banded Plovers and 35 unidentified waders.

Results were not available from the Shoalhaven Estuary, NSW; Darwin area, NT; Moreton Bay, Qld; Western Eyre Peninsula and Gulf St. Vincent, SA; Swan Coastal Plain, WA; Marion Bay and Cape Portland, Tas. Because of the lack of count results for so many areas it is hardly surpising that the total numbers from this count were the lowest on record.

The Counts were organised by Marilyn Hewish. Thanks go to the counters throughout Australia and to the various regional organizers.

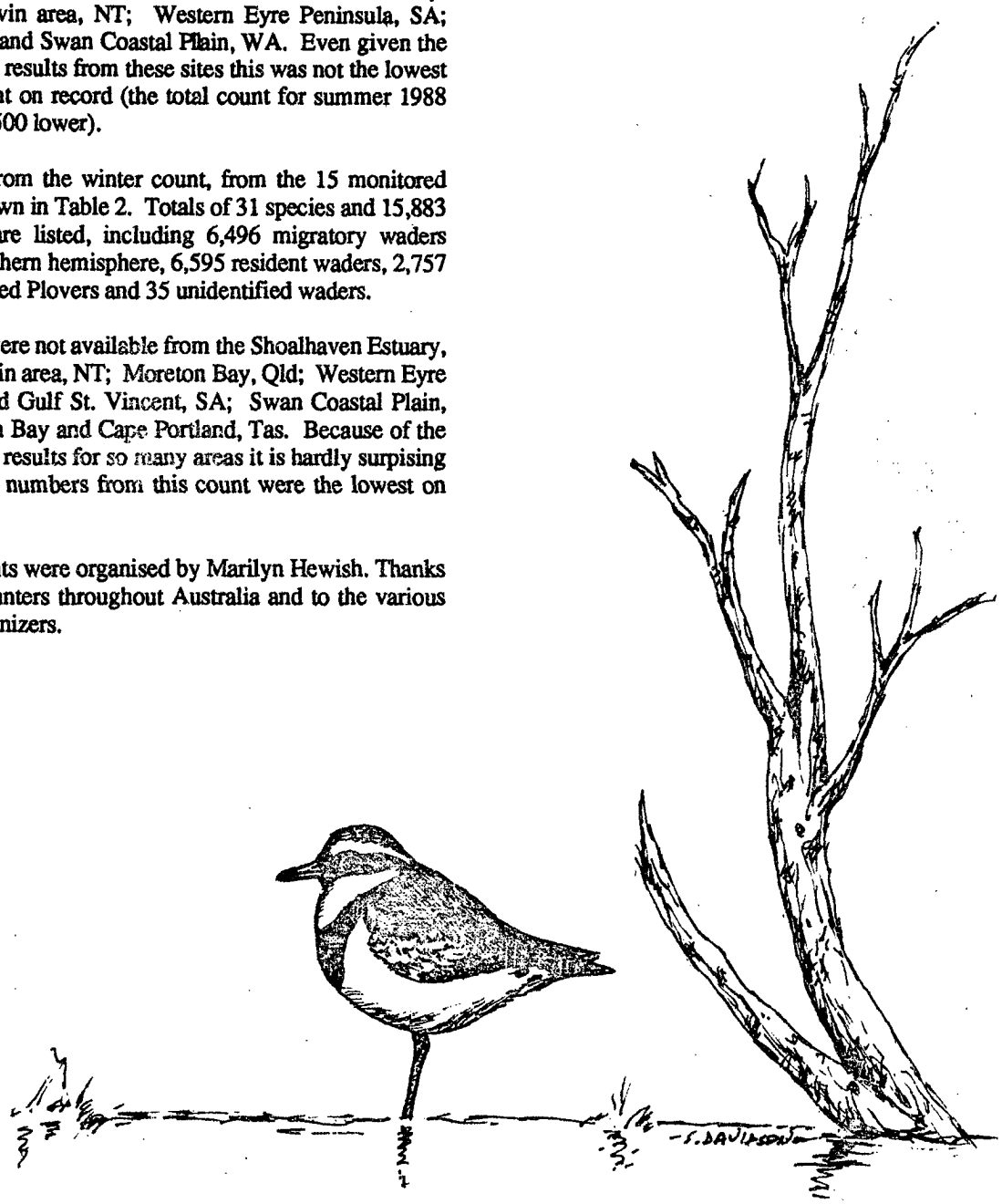

Table 1: Results of the Summer 1990 Wader Count at 21 selected sites

	N.S.W.					VICTORIA						NT
	Clarence/ Richmond	Hunter Estuary	Paramatta River	Botany Bay	Shoalhaven Estuary	Corner/Shallow Inlets	Westernport	East Port Phillip Bay	Altona	Werribee/Avalon	Bellarine Pen/Mud Is.	Darwin Area
Bush Thick-knee												
Beach Thick-knee	2											
Painted Snipe											1	
Pied Oystercatcher	6			24	2	781	197			77	54	
Sooty Oystercatcher	3			1	3	189	1				1	
Masked Lapwing	9		23		28	8	353	155	47	331	423	
Banded Lapwing												
Grey Plover						506					175	
Lesser Golden Plover	17		36	66	225		92			6	131	
Red-kneed Dotterel			8							29	5	
Hooded Plover						13	2					
Mongolian Plover	36			26		15	42			3	33	
Double-banded Plover					4	8	3				1	
Large Sand Plover	44					16					4	
Oriental Plover												
Red-capped Plover			4	44	91	24	117	11	36	60	277	
Black-fronted Plover	1			2				19		16	16	
Black-winged Stilt	15		7	4				48	204	246	509	
Banded Stilt												
Red-necked Avocet									11	34	145	
Ruddy Turnstone	17			52		120	105			12	255	
Eastern Curlew	69			80	225	986	904			10	36	
Whimbrel	53			3		40	8					
Little Curlew												
Wood Sandpiper										3		
Grey-tailed Tattler	47			80		14				1	25	
Wandering Tattler												
Tattler sp.												
Common Sandpiper	1			1				4		2	1	
Greenshank	3					442	356		33	66	376	
Marsh Sandpiper	1					6			21	7	174	
Terek Sandpiper	34			8		2						
Latham's Snipe	4		2					2	9	12	59	
Snipe sp.												
Black-tailed Godwit											14	
Bar-tailed Godwit	433		293	758	997	11838	498			14	636	
Red Knot						3130	62			11	300	
Great Knot	34			1		700	4				124	
Sharp-tailed Sandpiper	10		40	9	1	51	1856	2	713	2242	912	
Pectoral Sandpiper			1							4		
Red-necked Stint	12		2	71	170	9600	3660	2	1527	5684	7204	
Long-toed Stint												
Curlew Sandpiper	51		45	12		2780	6343		2076	2941	1281	
Sanderling	50					140						
Ruff or Reeve			1									
Broad-billed Sandpiper												
Oriental Pratincole												
Australian Pratincole												
Unidentified wader											25	
Unidentified small									100	35	2	
Unidentified medium										5		
Unidentified large												
TOTAL	952		462	1242	1746	31409	14603	243	4777	11851	13199	

Table 1: cont... Results of the Summer 1990 Wader Count at 21 selected sites	QLD			S.A.			W.A.		TAS.			TOTAL
	Cairns Area	Mackay Area	Moreton Bay	Western Eyre Pen	South East Coast	Gulf St. Vincent	Albany Area	Swan Coastal Plain	East Derwent/Pittwater	Marion Bay	Cape Portland	
Bush Thick-knee												
Beach Thick-knee		2										4
Painted Snipe												1
Pied Oystercatcher		63			10	1			513	116	21	1865
Sooty Oystercatcher		8			5				28	7	15	261
Masked Lapwing	20	17			180	145			537	2	86	2364
Banded Lapwing		5										5
Grey Plover		2	17			230						930
Lesser Golden Plover	27	67	765		139	4			212		96	1883
Red-kneed Dotterel						4						46
Hooded Plover									7	21	3	46
Mongolian Plover	120	1251	261			3					1	1791
Double-banded Plover			12		2	10			2		1	43
Large Sand Plover	12	35	3									114
Oriental Plover												
Red-capped Plover	2	167	161		49	981			133	52	99	2308
Black-fronted Plover		1										55
Black-winged Stilt		2	45			240						1320
Banded Stilt						21306						21306
Red-necked Avocet						248						438
Ruddy Turnstone	3	57	37		526	162					34	1380
Eastern Curlew	49	293	683		1	38			136	4	2	3516
Whimbrel	48	286	343						1	1	2	785
Little Curlew												
Wood Sandpiper						1						4
Grey-tailed Tattler	30	10	668		4							879
Wandering Tattler												
Tattler sp.		130										130
Common Sandpiper			2			2						13
Greenshank	49	20	147		19	374			95			1980
Marsh Sandpiper			26			73						308
Terek Sandpiper	60	117	175			6						402
Latham's Snipe												88
Snipe sp.												
Black-tailed Godwit			335			40						389
Bar-tailed Godwit	230	1055	3808		2	720			89	4		21375
Red Knot	1		260			904						4668
Great Knot	270	523	1817			1908						5381
Sharp-tailed Sandpiper	220		136		159	4952			11		2	11316
Pectoral Sandpiper												5
Red-necked Stint	584	1030	189		564	9291			1416	146	278	41430
Long-toed Stint												
Curlew Sandpiper	26		3074		383	3956			420		2	23390
Sanderling												190
Ruff or Reeve												1
Broad-billed Sandpiper	8		4									12
Oriental Pratincole												
Australian Pratincole												
Unidentified wader			1922									1947
Unidentified small												137
Unidentified medium												5
Unidentified large												
TOTAL	1759	5141	14890		2043	45599			3600	353	642	154511

Table 1: Results of the Winter 1990 Wader Count at 21 selected sites

	N.S.W.					VICTORIA						NT
	Clarence/ Richmond	Hunter Estuary	Parramatta River	Botany Bay	Shoalhaven Estuary	Corner/Shallow Inlets	Westernport	East Port Phillip Bay	Altona	Werribee/Avalon	Bellarine Pen/Mud Is.	Darwin Area
Bush Thick-knee												
Beach Thick-knee	4											
Painted Snipe												
Pied Oystercatcher	16			3		975	229		10	50	52	
Sooty Oystercatcher				3		140	1		4		1	
Masked Lapwing	18	8	2				442	99	31	121	542	
Banded Lapwing									2			
Grey Plover											7	
Lesser Golden Plover	15			3								
Red-kneed Dotterel										20	24	
Hooded Plover						15					18	
Mongolian Plover	2											
Double-banded Plover	61			144		202	816		377	278	510	
Large Sand Plover												
Oriental Plover												
Red-capped Plover	16	12		49		61	102	15	224	136	450	
Black-fronted Plover			5					130	22		6	
Black-winged Stilt								47	89	83	427	
Banded Stilt							4		442		6	
Red-necked Avocet									72	88		
Ruddy Turnstone	43										7	
Eastern Curlew	11	114		35		146	141			4	4	
Whimbrel		2		6		6					3	
Little Curlew												
Wood Sandpiper												
Grey-tailed Tattler	32	3		1		23					3	
Wandering Tattler												
Tattler sp.												
Common Sandpiper												
Greenshank									6		3	
Marsh Sandpiper												
Terek Sandpiper				1								
Latham's Snipe												
Snipe sp.												
Black-tailed Godwit	9										3	
Bar-tailed Godwit	292	540	33			2250	158				92	
Red Knot		5		390		590					5	
Great Knot				1		62						
Sharp-tailed Sandpiper												
Pectoral Sandpiper												
Red-necked Stint	2			14		9	63		19	10	98	
Long-toed Stint												
Curlew Sandpiper							2			2	1	
Sanderling						4						
Ruff or Reeve												
Broad-billed Sandpiper												
Oriental Pratincole												
Australian Pratincole												
Unidentified wader	20											
Unidentified small											15	
Unidentified medium												
Unidentified large												
TOTAL	541	684	40	650		4483	1958	291	1298	792	2277	

Table 2: cont... Results of the Winter 1990 Wader Count at 21 selected sites	QLD			S.A.			W.A.		TAS.			TOTAL
	Cairns Area	Mackay Area	Moreton Bay	Western Eyre Pen	South East Coast	Gulf St. Vincent	Albany Area	Swan Coastal Plain	East Derwent/Pittwater	Marion Bay	Cape Portland	
Bush Thick-knee												
Beach Thick-knee												4
Painted Snipe												
Pied Oystercatcher	1	78					51		532			1997
Sooty Oystercatcher					6		4		15			174
Masked Lapwing	31	15			21				192			1522
Banded Lapwing												2
Grey Plover							12					19
Lesser Golden Plover	16											34
Red-kneed Dotterel												44
Hooded Plover									10			43
Mongolian Plover	32											34
Double-banded Plover					1				368			2757
Large Sand Plover												
Oriental Plover												
Red-capped Plover		10			136		12		159			1382
Black-fronted Plover												163
Black-winged Stilt	5											651
Banded Stilt												452
Red-necked Avocet												160
Ruddy Turnstone												50
Eastern Curlew	10	142							16			623
Whimbrel	18	30										65
Little Curlew												
Wood Sandpiper												
Grey-tailed Tattler	56											118
Wandering Tattler												
Tattler sp.							3					3
Common Sandpiper												
Greenshank	3								1			13
Marsh Sandpiper												
Terek Sandpiper	6											7
Latham's Snipe												
Snipe sp.												
Black-tailed Godwit												12
Bar-tailed Godwit	141	262							25			3793
Red Knot	1											991
Great Knot	205	58										326
Sharp-tailed Sandpiper	3											3
Pectoral Sandpiper												
Red-necked Stint	176						1		2			394
Long-toed Stint												
Curlew Sandpiper	3											8
Sanderling												4
Ruff or Reeve												
Broad-billed Sandpiper												
Oriental Pratincole												
Australian Pratincole												
Unidentified wader												20
Unidentified small												15
Unidentified medium												
Unidentified large												
TOTAL	707	595			164		83		1320			15883

THE IMPACT OF PREDATION BY HUMANS UPON WADERS IN THE ASIAN/AUSTRALASIAN FLYWAY: EVIDENCE FROM THE RECOVERY OF BANDS

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Introduction

In parts of Asia, hunting of waterbirds, including waders, is carried out by professional hunters and by boys both for sport and to supplement family incomes. Estimates of the numbers of waterbirds taken annually are in the order of hundreds of thousands (Parish 1985). Annual catches of waders in Pattani Bay, south Thailand, are as high as 5,000 (Ruttanadakul & Ardseungnern 1989), in coastal north Java the annual catch numbers 86,000 (Milton & Marhadi 1989), while in the Shanghai area the catch in August-September 1989 was at least 10,000 (Jaensch 1990). Not surprisingly, doubts have been raised as to the sustainability of such hunting pressure.

Theoretically, the recovery of bands should provide some indication of the level of human predation upon wader populations. Only recently, however, have attempts been made to collect recovered bands from hunters who, in the past, have probably disposed of the bands. While it is unlikely that hunters are presently returning, or ever will return, all bands that they find, the recovery of bands by hunters will provide a minimum estimate of the impact of human predation upon wader populations.

Methods

The banding of waders in Australia has taken place since the 1950's but the greatest numbers have been banded annually since the initiation of banding expeditions to north-western Australia in 1981. To examine the impact of human predation upon wader populations, the numbers of waders banded in three expeditions, August to October 1981, March to April 1982 and August to September 1982, were compared with the numbers of these waders subsequently recovered in Asia up to April 1991. Recovery data were obtained from the Bird and Bat Banding Schemes of the Australian National Parks and Wildlife Service, which provided details of the fate of the recovered bird where available.

Annual adult mortality of the Great Knot (the wader species most often recovered in Asia) was estimated conservatively at 30%, on the basis that the slightly smaller (and therefore shorter-lived?) Red Knot has an average annual adult mortality of 32.4% (Cramp & Simmons 1982). The estimated annual adult mortality was used to estimate the numbers of banded Great Knots remaining in the population

Results

Numbers of waders banded in north-western Australia in 1981 and 1982 and subsequently recovered in Asia, are presented in Table 1. Although Red-necked Stints were banded in the greatest numbers, Great Knots dominated the Asian recoveries. The majority of these were taken for food. Bar-tailed Godwits were also interesting, with four of only 119 birds banded subsequently recovered in Asia.

Details on the recovered Great Knots are presented in Table 2. Of the 25 recoveries, 21 were from China; 20 of these from Shanghai. Fifteen birds were recovered on northward migration and only four or possibly five on southward migration, the remaining birds being recovered on their breeding grounds or not precisely dated.

Table 3 presents the estimated changes in the number of surviving banded Great Knots, assuming an average annual adult mortality of 30%, and relates this to the number of birds recovered each year. Recoveries occurred in all years except 1989 and 1990, probably reflecting the decline in the number of banded birds remaining in the population. Hunting accounted for from 0 to 4.55% of the estimated surviving sample of banded birds each year, with a mean annual mortality of 1.63%.

Recoveries of other species (Table 4) show a similar pattern to that observed with the Great Knot, with all seven recoveries occurring on northward migration and most recoveries occurring in China (although without the Shanghai bias seen with Great Knots).

Discussion

The majority of recoveries of Great Knots were the results of hunting for food and it can probably be assumed that those recovered individuals whose fates were unknown were also taken as food. The high percentage of Great Knots recovered in comparison with most other wader species probably reflects a preference for Great Knots as food, although they may also be easier to catch. Even handling in the markets could affect the chance of a recovery being made.

Table 1: Number of waders banded in north-western Australia in 1981 and 1982 and the fate of subsequent recoveries in Asia to April 1991.

Species	N. banded	N recaptured in Asia				
		Taken for food	Dead, Purpose?	Fate Unknown	Released Alive	Total
Great Knot	758	15	2	5	3	25
Red-necked Stint	1321			1		1
Bar-tailed Godwit	119	1	2	1		4
Ruddy Turnstone	151	1				1
Grey-tailed Tattler	224			1		1

Table 2: Details of Asian recoveries of Great Knots banded in north-western Australia in 1981 and 1982. All recovery sites are in China except Kamchatka, Tugurski Bay and Khabarovsk in what was formerly the USSR.

Banded Number (series 061)	Recaptured		Fate
00276	08/04/'83	Shanghai	Dead, food.
31238	01/04/'83	"	" "
37956	02/04/'83	"	" "
38111	05/04/83	"	Trapped, released alive
38139	July '85	Khabarovsk	Trapped, released alive
38145	30/03/'83	Shanghai	Dead, food
38177	July '87	"	Fate unknown
38231	04/04/'88	"	Dead, Food
38245	Sept. '87	"	" "
38249	16/04/'86	"	Fate unknown
38253	1988	"	Dead, food
38266	29/08/'83	Kamchatka	Dead, purpose unknown
38311	May '85	Shanghai	Fate unknown
38342	08/04/'87	"	Dead, food
38347	Sept. '87	"	Trapped, released alive
38354	01/04/'83	"	Dead, food
38356	1988	"	" "
38418	April '84	"	Dead, purpose unknown
38504	26/03/'86	Fujian Prov.	Fate unknown
38528	08/04/'83	Shanghai	Dead, Food
38571	24/08/'82	Former USSR	" "
39401	Aug. '87	Tugurski Bay	" "
39485	16/04/'86	Shanghai	Fate unknown
39638	1988	"	Dead, food
39743	21/04/'91	"	" "

Table 3: Annual recoveries of Great Knots in relationship with estimated numbers of surviving banded birds in each year. Survivorship based on an estimated annual adult mortality of 30%. The percentage recovered is based on the number of banded birds estimated to be alive at the beginning of the year in which the recovery took place.

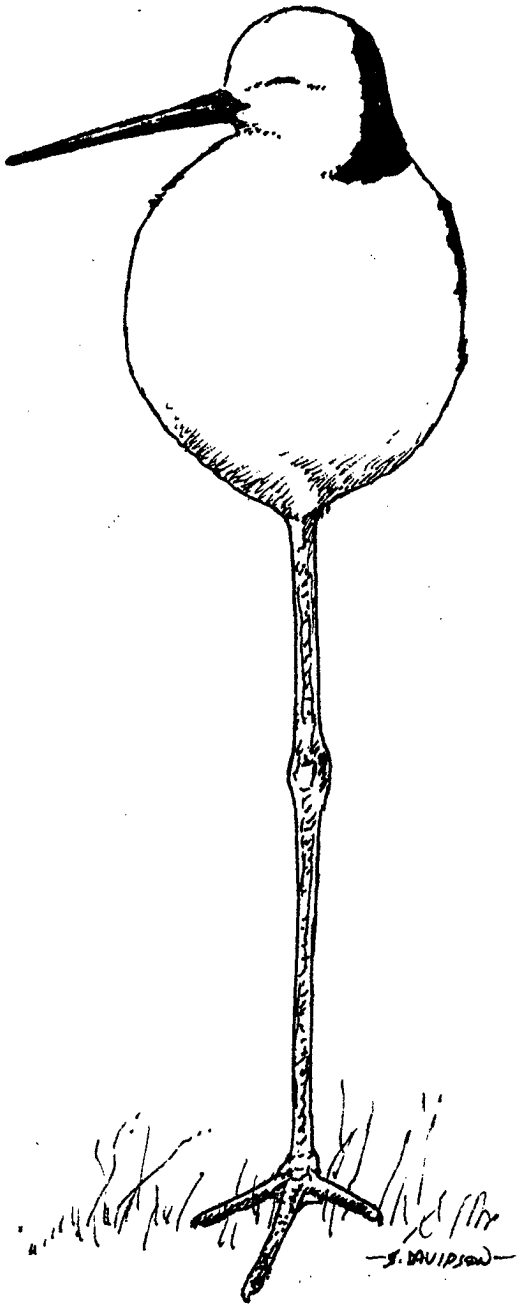
Year	N Banded Birds alive	N Recoveries	Percentage of banded birds recovered
1982	758	1	0.13
1983	531	7	1.32
1984	371	1	0.27
1985	260	3	1.15
1986	182	3	1.65
1987	127	5	3.94
1988	88	4	4.55
1989	62	0	0
1990	44	0	0
1991	30	1	3.33

Table 4: Details of Asian recoveries of other waders banded in north-western Australia in 1981 and 1982

Band number	Recaptured		Fate
Bar-tailed Godwit			
071-53051	24/05/'84	former USSR	Dead, purpose unknown
082-43465	04/06/'83	" "	" " "
082-43509	May'85	Shanghai	Fate unknown
082-43511	12/04/88	"	Dead, food
Grey-tailed Tattler			
051-00412	21/05/'82	Guang Dong	Dead, aviculture
Red-necked Stint			
032-37294	15/06/'86	Taugu	Fate unknown
Ruddy Turnstone			
051-01905	12/05/'90	Shanghai	Dead, food

Although 25 out of 758 birds probably being taken as food over a nine year period does not sound high, the annual analysis (Table 3), which assumes a conservative average annual adult mortality of 30%, indicates that the annual mortality from hunting is up to 4.55% with an average of 1.63%. It is not known what proportion of Great Knots caught by hunters in Asia are caught in China, nor what proportion of bands found by hunters are returned, but almost certainly more birds were taken than is indicated by these data. For example, if it is assumed that the recoveries represent 25% of the actual number of banded birds taken throughout Asia, then hunting may account for an average of 6.5% or up to 18.2% of the Great Knot population annually. This second value is over half of the annual average adult mortality which could be expected for this species; a large contribution from a single source of mortality.

These calculations make many assumptions and do not allow for complications such as the age composition of Great Knots taken by hunters (first year birds almost certainly have a higher annual mortality than adults). Nevertheless, they provide a conservative estimate of the predation pressure of humans upon the Great Knot. Although only for this species, it is probable that similar figures apply to other medium-sized waders that are known to be hunted in Asia. As discussed by Jaensch (1991), there is clearly a pressing need for sustainable levels of hunting upon waders to be achieved in Asia.



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ASIAN SECTION

ASIAN WETLAND BUREAU NEWS

Taej Mundkur and Brett Lane
AWB, Malaysia.

Waterbird Ringing and Colour-marking in Asia

There is growing interest and activity in the field of waterbird ringing (banding) in the Asia-Pacific Region. A waterbird ringing workshop was held on 17 December 1991 during the Conference on "Wetland and Waterfowl Conservation in South and West Asia" held in Karachi, Pakistan to discuss ringing activities in the region. In order to provide a suitable forum for coordinating waterbird ringing it was proposed that an Asia-Pacific Waterbird Ringing Research Group (APWRRG) be established with members from all countries in the region (Saudi Arabia eastwards to Japan, and Russia southwards to New Zealand) which have ringing schemes. The group will liaise closely with other regional ringing groups. The AWB has offered to act as initial coordinator for this group.

An urgent need to coordinate colour marking programmes for migratory waterbirds was recognised. It was decided to establish a data base of all current and past colour marking schemes, and that this be maintained and updated by a coordinating agency. Initially, it was agreed that AWB set this up. It was proposed that researchers intending to undertake colour marking studies in future should forward a request to their national ringing authority. The national ringing authority would determine whether the proposed project was technically and scientifically sound, it being noted by participants that some colour marking techniques may place additional stress on birds and should only be permitted when a clear benefit for conservation could be demonstrated. The national ringing authority would then refer the project to AWB (initially) to determine whether the proposed study would conflict with any other known study. AWB may have to contact other agencies before replying to the national scheme and it was suggested that two months should be allowed for final clearing of an application by AWB.

To promote information exchange the need for a regional newsletter was recognised. It was proposed that the Newsletter should be produced twice yearly. It was suggested that a regional group could act to promote data analysis, especially through information exchange in the Newsletter.

Training Activities

The AWB has continued to play a key role in planning, coordinating and running waterbird study and wetland management training courses in different Asian countries. In these course, waterbirds identification methods have been an important part of the class and field training. During the last year, five training courses have been organised in west Java in Indonesia, Rantambe and Yala National Park in Sri Lanka, Yancheng Nature Reserve on the east coast of China, and Haleji Lake in Pakistan in collaboration with various national and international agencies. Participants for these course were drawn from national parks and forestry services, government and non-government agencies, universities and conservation organisations in the region.

Shorebird Monitoring and the Asian Waterfowl Census

The AWB and the International Waterfowl and Wetland Research Bureau, UK have been coordinating the annual (January) waterfowl counts in wetlands throughout Asia since 1987. The region covered by the counts includes over 30 countries from Saudi Arabia to Japan and south to Papua New Guinea. In future, it proposes to focus some of the effort within these counts on achieving consistent annual coverage of a selection of key waterbird sites in order to generate long-term data on trends in waterbird populations. This work will complement that being undertaken by members of the Australasian Wader Studies Group (AWSG) as part of the group's Population Monitoring Project. This effort should provide useful data on species which either do not occur in Australia in large numbers or which only occur in inaccessible parts of the northern Australian coast and are not covered by the AWSG project.

WADER STUDY AT A MALAYSIAN POWER STATION

A power station may not seem like the average shorebird's area of good habitat. However, on the coast of Malaysia, about an hour west of Kuala Lumpur, waders that feed on the intertidal mudflats around the Klang Islands roost at high tide on the ash settling ponds of the Sultan Salahuddin Abdul Aziz Power Station at Kapar. These ponds have slowly filled over the years and now form an area of non-tidal shallow water and wet ash of about 10 hectares. The area is surrounded by a high security fence and in this way it offers a quiet, undisturbed haven over the high tide period.

Coastal reclamation and development in this region has been rapid over the last 15 years or so and it is likely that most other suitable roosting sites along this stretch of Selangor coast have been destroyed or are now highly disturbed. The ash settling ponds offer one of the only safe roost sites. A count at high tide on 27 October 1991 revealed the following species and totals.

Pacific Golden Plover	*Pluvialis fulva*	400
Little Ringed Plover	*Charadrius dubius*	1
Kentish Plover	*C. alexandrinus*	10
Mongolian Plover	*C. mongolus*	1
Large Sand Plover	*C. leschenaultii*	50
Bar-tailed Godwit	*Limosa lapponica*	650
Whimbrel	*Numenius phaeopus*	1,120
Eurasian Curlew	*N. arquata*	990
Common Redshank	*Tringa totanus*	1,420
Marsh Sandpiper	*T. stagnatilis*	525
Common Greenshank	*T. nebularia*	500
Nordmann's Greenshank	*T. guttifer*	1
Asian Dowitcher	*Limnodromus semipalmatus*	6
Great Knot	*Calidris tenuirostris*	350
Red-necked Stint	*C. ruficollis*	1
Curlew Sandpiper	*C. feruginea*	2,290
Broad-billed Sandpiper	*Limicola falcinella*	1
TOTAL		8,316

Counts on other occasions have also recorded Red Knots *Calidris canutus*, Grey Plover *Pluvialis squatarola*, Black-tailed Godwit *Limosa limosa*, Eastern Curlew *Numenius madagascariensis* and Terek Sandpiper *Tringa terek*. In addition to shorebirds, large number of White-winged Terns *Chlidonias leucopterus*, Gull-billed Terns *Geochelidon nilotica*, Common Terns *Sterna hirundo* and Little Terns *Sterna albifrons* have been observed. Small numbers of the rare Caspian Tern *Hydroprogne caspia* also use the area.

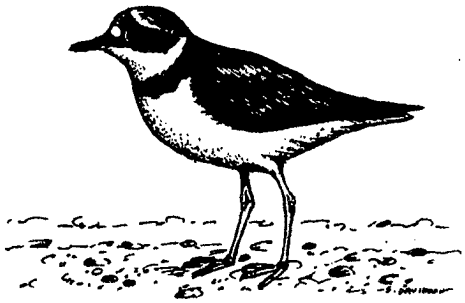
On 4 February 1992, a small group of bird-banders based at Asian Wetland Bureau trialed night time mist netting over high tide at this site, since the ponds are ideally suited to this technique. The tide was only high during darkness for about two hours on this particular occasion. Despite this, 33 birds were caught in five nets. Species included many Common Redshank and smaller numbers of Terek, Marsh and Curlew Sandpipers. Much was learnt about catching here and it is expected that the catch rate and catch period can be increased by choosing later tide times and siting nets in better places.

Based on the success of this exercise, it has been decided to continue catching on a regular basis to answer some of the questions about wader usage of this part of the coast of south-east Asia. There questions include:

- When and by how much does each species fatten during the migration periods?
- How heavy are birds when they first arrive?
- When do the birds moult, and how long does it take them?
- What are local and intercontinental movement patterns?
- To which races and breeding populations do their morphometrics indicate they belong?

These and many other questions will be answered after several years of regular catching and counting. Data on weight, mould and morphometrics will be collected and, if possible, leg-flagging may be initiated to generate information about local and intercontinental movements.

Brett Lane and Taej Mundkur.



A GLOBALLY IMPORTANT SHOREBIRD STOPOVER IN CHINA?

Wang Tian Hou and a team of people from the East China Waterbird Ecology Study Group at the East China Normal University in Shanghai undertook the first ever survey of shorebirds in coastal wetlands in the Yellow River delta in north-eastern China in July and September 1991. This vast area, long suspected of holding large numbers of shorebirds on migration had not been surveyed before. Funding for these expeditions came from the Australian National Parks and Wildlife Service through an Asian Wetland Bureau project.

The Yellow River is one of the largest rivers in Asia, draining a large part of northern China. The rivers carries a very heavy silt load and an extensive muddy delta has formed where it reaches the Bohai Sea. This delta is accreting at the rate of 27 square kilometres per year. Historical changes in the course of the river have created a series of sub-deltas that together form over 350 kilometres of low, muddy coastline, backed by freshwater reed swamps. In many places, evaporative saltworks have been constructed immediately behind the coast and these are important supplementary habitats. Tidal range is only about 2 metres but the flat terrain means that at low tide, up to 10 kilometres of intertidal mudflat are exposed.

Only a small proportion of the total area could be surveyed by the team. Five sites were visited, usually for several days, and counts of shorebirds observed were undertaken. These five sites represented about 2 percent of the total area of potentially suitable shorebird habitat on the delta.

From the results of the survey, Wang Tian Hou estimated that over 20,000 shorebirds were using the site at the time of the surveys. Although the distribution of shorebirds would be expected to be uneven along the delta coastline, as many as 800,000 to 1,000,000 shorebirds could use the area during southward migration. More extensive surveys would be required to confirm this however. The preliminary results indicate that this area may be of global importance, comparable to the Wadden Sea of north-western Europe, Delaware and San Francisco Bays in North America, and the north-west coast of Australia.

The most abundant species of shorebird in the area during the surveys were Kentish Plover *Charadrius alexandrinus*, Black-tailed Godwit *Limosa limosa*, Eurasian Curlew *Numenius arquata*, Marsh Sandpiper *Tringa stagnatilis* and Terek Sandpiper *Tringa terek*. Difficulties in approaching feeding flocks made identification of all birds present impossible. Thousands of small to medium sized shorebirds were observed at a distance although the species composition of these flocks could not be determined.

Of great interest was the observation of over 2000 Eastern Curlews *Numenius madagascariensis* in the comparatively limited area surveyed. This is one of the largest concentrations of this species yet found in Asia during migration. Small numbers of Nordmann's Greenshanks *Tringa guttifer* were found and, incidentally, a flock of three Chinese Crested Terns *Thalasseus zimmermanni* were seen, the first sightings for some time of this highly endangered species.

A fuller report of the survey will be produced once the results of an additional survey, planned for April 1992, during the northward migration, are available.

Brett Lane

OLANGO ISLAND, PHILIPPINES - UPDATE

The importance of Olango Island was discovered in 1986 and Asian Wetland Bureau Philippines has been studying shorebirds and other waterbirds there since 1987. After many years of research and liaison with government officials, the papers gazetting this important shorebird site as a reserve will be forwarded for presidential decree in the coming month or so, before the national presidential elections.

In the meantime, Asian Wetland Bureau participated in a workshop in January 1991 with officials from local and national government agencies with an interest in the island to formulate a management plan for the proposed reserve. The protection of endangered species, including Chinese Egret *Egretta eulophotes* and Asian Dowitcher *Limnodromus semipalmatus*, was identified as a priority task for management of the reserve once it is declared.

Shorebird banding activities continue regularly at Olango Island and in March 1991, a Red-necked Stint *Caliris ruficollis* banded in Taiwan was recovered there. Stints still dominate catches during northward migration but recent experimentation with siting mist nets has yielded worthwhile catches of Whimbrels *Numenius phaeopus*.

Brett Lane.

SUMMARY OF 1989/90 BANDING RESULTS IN TAIWAN

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Abstract

Four divisions of banding centres (Taipei, Taichung, Tainan and Nantou) and nine work stations (Taipei Tamsui, Taipei Kuanto, Hsinchu Kuliao, Taichung Ta-tu-hsi, Nantou Puli, Tainan Tseng-we-hsi, Tainan Szutsao, Tainan Wuchi and Kaoshiung Chuhu) were established in the fourth year of banding project (1990). Shorebirds were the major subject of Taipei, Taichung and Tainan divisions, while migratory landbirds and resident birds were the major concern of the Nantou division. 6724 birds (total 88 species) were banded including 286 recaptures, 227 returns, 5 overseas-banded Taiwan-recaptures, 3 Taiwan-banded overseas-recaptures and 1 recapture at a different locality within Taiwan.

Introduction

The banding project in Taiwan is executed by the Wild Bird Society of the Republic of China (R.O.C.) and sponsored by the Council of Agriculture. 86 volunteer banders and one full time director are actively mist-netting every night at weekends. A total of nine work stations are divided into four geographic zones or divisions. Taipei division is in charge of northern stations including Tamsui, Kuanto and Kuliao. Taichung division is in charge of midwest Ta-tu-hsi station. Tainan division is in charge of southern stations including Tseng-we-hsi, Szutsao, Wuchi and Chuhu. Nantou division is in charge of Puli station, which is in central Taiwan. (see Table 1 and Figure 1)

Figure 1 - Location of Banding Stations

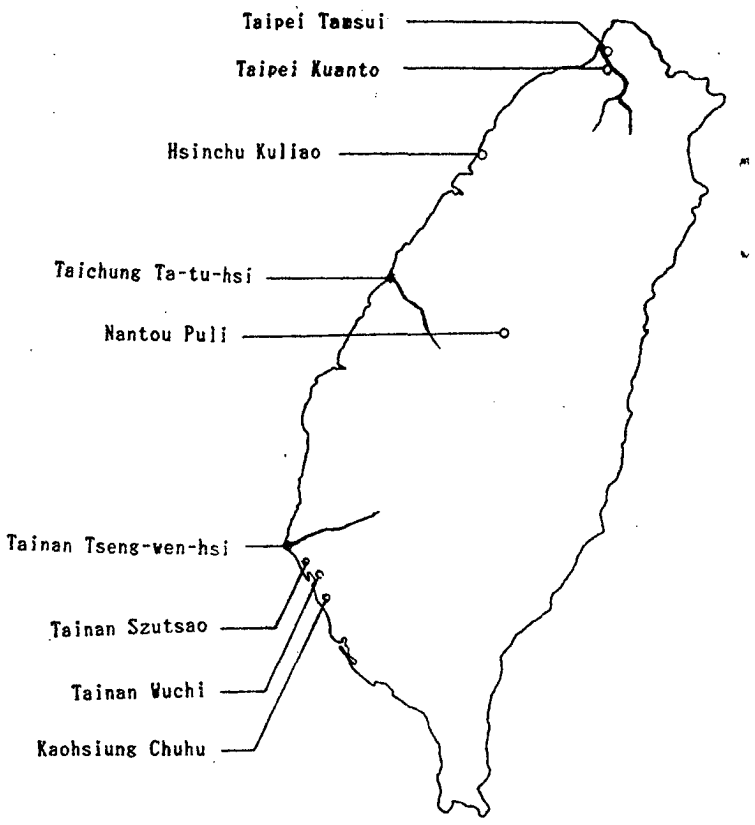


Table 1 - Location of Banding Stations

No.	Banding	Longit.	Latit.	Environment
1	Taipei Tamsui	121° 27'	25° 11'	garden
2	Taipei Kuanto	121° 27'	25° 07'	intertidal zone cultivated land
3.	Hsinchu Kuliao	120° 54'	24° 48'	estuary, intertidal zone, cultivated land
4.	Taichung Ta-tu-hsi	120° 29'	24° 11'	estuary, intertidal zone, fish pond
5.	Nantou Puli	121° 57'	24° 58'	cultivated land
6.	Tainan Tseng-wen-hsi	120° 03'	23° 03'	estuary, intertidal zone
7.	Tainan Szutsao	120° 07'	23° 01'	salt pond
8.	Tainan Wuchi	120° 10'	22° 57'	salt pond
9.	Kaohsiung Chuhu	120° 12'	22° 53'	salt pond

Result and Discussion

From 1 July, 1989 to 30 June, 1990, a total of 6724 birds of 88 species were caught including 286 recaptures, 227 returns, 5 overseas-banded Taiwan-recaptures, 3 Taiwan-banded overseas-recaptures and 1 recapture at a different locality within Taiwan (See Table 2). 85% of these birds belong to the order Charadriiformes, 14% of the order Passeriformes, and the remaining 1% to other orders.

The majority of the wintering species banded were Dunlin and Kentish Plover (30.1% of total banded), of the transitory species Red-necked Stint, Large Sand Plover, Red-necked Phalarope, Grey-tailed Tattler and Curlew Sandpiper (33.7%), and of landbirds African Sand Martin (2.9% only). The African Sand Martin has been recorded as a resident bird in Taiwan. In the migratory season, we found large populations of African Sand Martin, mixed with Barn Swallow and Yellow Wagtail, in Nantou Puli, Ilan Litsechien and Taipei Kuanto. It deserves further investigation.

Table 2 - Total number of birds banded in Taiwan in 1989/90

Species	Geographic Zones				
	North	Mid west	Cent	South	Total
Striated Heron			1		1
Little Egret	5			1	6
Cinnamon Bittern				4	4
Yellow Bittern	2				2
Black-crowned Night Heron	7			4	11
Common Teal	10			4	14
Marsh Harrier				1	1
Ruddy-breasted Crake	1				1
Painted Snipe	29	1	2		32
Kentish Plover	84	666		182	932
Little Ringed Plover	9	15		65	89
Large Sand Plover	42	489		2	533
Mongolian Plover	55	43		12	110
Pacific Golden Plover	14	8		31	53
Grey Plover	4	12		1	17
Ruddy Turnstone	1	19		15	35
Sharp-tailed Sandpiper	11	8		45	64
Dunlin	197	741		154	1092
Red Knot		10			10
Curlew Sandpiper	5	106		113	224
Red-necked Stint	33	411		322	766
Long-toed Stint	32	14		60	106
Temminck's Stint	1	1			2
Great Knot	2	25			27
Sanderling		3		1	4
Common Snipe	34	1		10	45
Swinhoe's Snipe	4			1	5
Pintail Snipe	3			1	4
Broad-billed Sandpiper	12	65		1	78
Eurasian Curlew		5			5
Little Curlew		1			1
Whimbrel		9			9
Grey-tailed Tattler	99	195		1	295
Wood Sandpiper	128	15		34	177
Common Sandpiper	57	63	4	53	177
Greenshank	8	21		16	45
Marsh Sandpiper	1	2		35	38
Redshank	4	30		52	86
Terek Sandpiper	48	112		21	181
Red-necked Phalarope	4	4		438	446
Black-headed Gull				1	1
Little Tern		15		5	20
White-winged Tern	1	1			1
Emerald Dove					1
Spotted Dove			2		2

Table 2 - cont....

Species	Geographic Zones				
	North	Mid west	Cent	South	Total
Common Kingfisher	1				1
Black-browed Barbet	1				1
Barn Swallow	60	9	24	1	94
Greater Striated Swallow			9		9
Pacific Swallow	1		4	2	7
African Sand Martin	3		193		196
Black Drongo	1		6		7
Eurasian Nutcracker			1		1
Vinous-throated Parrotbill	9		13		22
Brown-capped Fulvetta			4		4
Grey-cheeked Fulvetta			5		5
Steere's Liocichla			2		2
Streak-breasted Scimitar Babbler	7				7
Rufous-capped Babbler	11		3		14
Black Bulbul	1		2		3
Light-vented Bulbul	36		93		129
Collared Finchbill			1		1
Siberian Rubythroat	1		31		32
Blue Rock Thrush		2	2		4
Daurian Redstart	1		4		5
Brown-headed Thrush			2		2
Dusky Thrush	1				1
Eye-browed Thrush	1				1
Pale Thrush	14		2		16
Great Reed Warbler			5		5
Japanese Bush Warbler	11		34		45
Zitting Cisticola	1				1
Arctic Warbler	2				2
Yellow-bellied Prinia	5		3		8
Tawny Flanked Prinia	9		3		12
Black-napped Blue Monarch			1		1
Richard's Pipit	3				3
White Wagtail			37		37
Yellow Wagtail	2		54	3	59
Brown Shrike	1	3	5	1	10
Japanese White Eye	35		27		62
Black-headed Mannikin			1		1
Nutmeg Mannikin	18		63		81
White-rumped Munia	5		1		6
Yellow-headed Bunting	2				2
Black-faced Bunting	3		43		46
Japanese Yellow Bunting			1		1
Tree Sparrow	6		19		25
TOTAL	1199	3125	707	1693	6724

Birds were banded in all months however the spring and autumn migrating seasons account for more than 90% of the total, and of these, 79.7% were shorebirds.

The percentage of recaptured birds was 7.8%. Of these 54.9% were birds recaptured in the first year after banding and a further 43.4% were of birds banded in earlier years; 1.7% were controls at other locations. (See Table 3).

The birds recaptured at different localities are further divided into three categories below: (see Table 4)

1. Different site in Taiwan: one Dulin only.
2. Taiwan -banded overseas-recaptures : three birds
3. Overseas-banded Taiwan recaptures : five birds.

Table 3 - Recapture Details

Species	RP	RT	RC	TOTAL
Black-crowned Night-Heron		1		1
Common Teal		1		1
Painted Snipe	4	1		5
Kentish Plover	66	67		133
Little Ringed Plover	1	2		3
Large Sand Plover	36	12	1	49
Mongolian Plover	1			1
Pacific Golden Plover		1		1
Ruddy Turnstone	2		2	4
Sharp-tailed Sandpiper		1		1
Dunlin	51	67	2	120
Curlew Sandpiper	9	2	1	12
Red-necked Stint	15	6	1	22
Long-toed Stint	1	1		2
Temminck's Stint	1			1
Common Snipe	3	2		5
Broad-billed Sandpiper	1	2		3
Grey-tailed Tattler	11	19	3	33
Wood Sandpiper	6	1		7
Common Sandpiper	8	11		19
Redshank	2	2		4
Terek Sandpiper	10	2		12
Red-necked Phalarope	20	22		42
Barn Swallow	1			1
African Sand Martin		1		1
Vinous-throated Parrotbill	1			1
Streak-breastedScimitar Babbler	2	1		3
Rufous-capped Babbler	1			1
Light-vented Bulbul	2			2
Siberian Rubythroat	6			6
Pale Thrush	5			5
Japanese Bush-Warbler	8			8
Richard's Pipit	1			1
Brown Shrike		1		1
Japanese White-eye	4			4
Nutmeg Mannikin	1	1		2
White-backed Munia	1			1
Black-faced Bunting	5			5
TOTAL	286	227	9	522

RP - Recaptured in first year after banding
RT - Recaptured more than one year after banding
RC - Recaptured at other locations

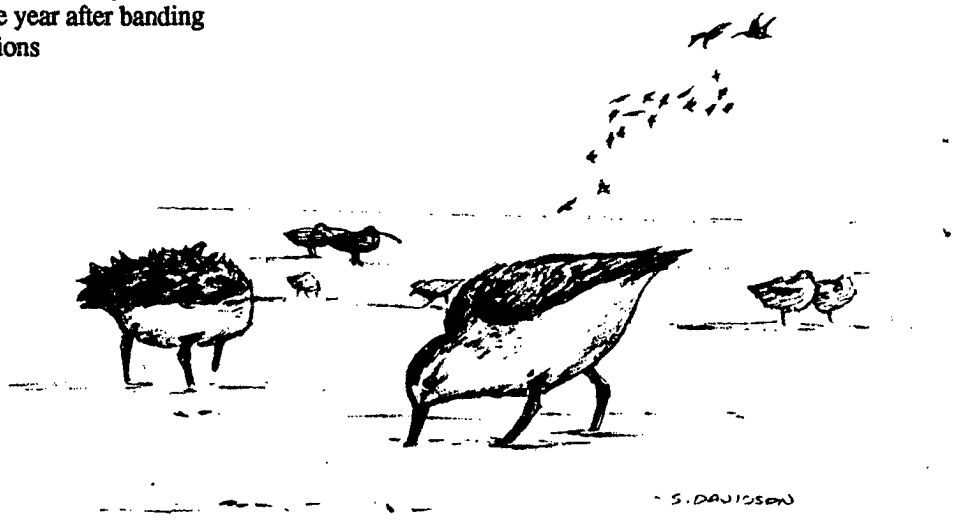


Table 4 - Recapture Details

1. Different localities within Taiwan

Dunlin B06470

15/05/89	Ta-tu-hsi	24° 12'N	120° 28'E
28/10/89	Szo-tsao	22° 58'N	120° 10'E

2. Taiwan-banded/overseas-recapture

Grey-tailed Tattler DO1827

21/08/89	Ta-tu-hsi, Taiwan	24° 12'N	120° 28'E
12/04/90	Broome, Aus	18° 00'S	122° 22'E

Large Sand Plover C03831

02/09/89	Ta-tu-hsi, Taiwan	24° 12'N	120° 28'E
08/04/90	Broome, Aus	18° 00'S	122° 22'E

Red-necked Stint A00675

15/10/88	Szo-tsao Taiwan	22° 58'N	120° 10'E
Dec 89	Polangui Albay, Philippines		

3. Overseas-banded/Taiwan Recapture

Grey-tailed Tattler 061-72179

12/04/90	Broome, Aus	18° 00'S	122° 22'E
05/05/90	Kuanto, Taiwan	25° 07'N	121° 27'E

Ruddy Turnstone 051-29700

18/11/89	Swan Island Queencliff	38° 15'S	144° 22'E
29/04/90	Szo-tsao Taiwan	22° 58'N	120° 10'E

Curlew Sandpiper 041-17708

17/04/85	Broome, Aus	18° 00'S	122° 22'E
29/04/90	Szo-tsao Taiwan	22° 58'N	120° 10'E

Dunlin 031-41077

25/10/85	Hokkaido, Japan	43° 17'N	145° 26'E
19/08/89	Ta-tu-hsi, Taiwan	24° 12'N	120° 28'E

Grey-tailed Tattler 061-70870

07/04/88	Broome, Aus	18° 00'S	122° 22'E
03/09/89	Ta-tu-hsi, Taiwan	24° 12'N	120° 28'E

Table 5 - Checklist of banded birds, Scientific and English Names.

Scientific Name	English Name
Butorides striatus	Striated Heron
Egretta garzetta	Little Egret
Ixobrychus cinnamomeus	Cinnamon Bittern
Ixobrychus sinensis	Yellow Bittern
Nycticorax nycticorax	Black-crowned Night-Heron
Anas crecca	Common Teal
Circus aeruginosus	Marsh Harrier
Porzana fusca	Ruddy-breasted Crake
Rostratula benghalensis	Painted Snipe
Charadrius alexandrinus	Kentish Plover
Charadrius dubius	Little Ringed Plover
Charadrius leschenaultii	Large Sand Plover
Charadrius mongolus	Mongolian Plover
Pluvialis fulva	Pacific Golden Plover
Pluvialis squatarola	Grey Plover
Arenaria interpres	Ruddy Turnstone
Calidris acuminata	Sharp-tailed Sandpiper
Calidris alpina	Dunlin
Caladris canutus	Red Knot
Calidris ferruginea	Curlew Sandpiper
Calidris ruficollis	Red-necked Stint
Calidris subminuta	Long-toed Stint
Calidris temminckii	Temminck's Stint
Calidris tenuirostris	Great Knot
Calidris alba	Sanderling
Gallinago gallinago	Common Snipe
Gallinago megala	Swinhoe's Snipe
Gallinago stenura	Pintail Snipe
Limicola falcinellus	Broad-billed Sandpiper
Numenius arquata	Eurasian Curlew
Numenius minutus	Little Curlew
Numenius phaeopus	Whimbrel
Heteroscelus brevipes	Grey-rumped Tattler
Tringa glareola	Wood Sandpiper
Actitis hypoleucos	Common Sandpiper
Tringa nebularia	Greenshank
Tringa stagnatilis	Marsh Sandpiper
Tringa totanus	Redshank
Xenus cinereus	Terek Sandpiper
Phalaropus lobatus	Red-necked Phalarope
Larus ridibundus	Black-headed Gull
Sterna albifrons	Little Tern
Chlidonias leucopterus	White-winged Tern
Chalcophaps indica	Emerald Dove
Streptopelia chinensis	Spotted Dove
Alcedo atthis	Common Kingfisher
Megalaima oorti	Black-browed Barbet
Hirundo rustica	Barn Swallow
Hirundo striolata	Striated Swallow
Hirundo tahitica	Pacific Swallow
Riparia paludicola	African Sand Martin
Dicrurus macrocercus	Black Drongo
Nucifraga caryocatactes	Eurasian Nutcracker
Paradoxornis webbianus	Vinous-throated Parrotbill
Alcippe brunnea	Brown-capped Fulvetta
Alcippe morrisonia	Grey-cheeked Fulvetta
Liocichla steerii	Steere's Liocichla
Pomatorhinus ruficollis	Streak-breasted Scimitar Babbler
Stachyris ruficeps	Rufous-capped Babbler
Hypsipetes madagascariensis	Black Bulbul
Pycnonotus sinensis	Light-vented Bulbul
Spizixos semitorques	Collared Finchbill
Erithacus calliope	Siberian Rubythroat
Monticola solitarius	Blue Rock-Thrush
Phoenicurus auroreus	Daurian Redstart
Turdus chrysolaus	Brown-headed Thrush
Turdus naumanni	Dusky Thrush
Turdus obscurus	Eye-browed Thrush
Turdus pallidus	Pale Thrush
Acrocephalus arundinaceus	Great Reed-Warbler
Cettia diphone	Japanese Bush-Warbler
Cisticola juncidis	Zitting Cisticola
Phylloscopus borealis	Arctic Warbler
Prinia flaviventris	Yellow-bellied Prinia
Prinia subflava	Tawny-flanked Prinia
Hypothymis azurea	Black-naped Monarch
Anthus novaeseelandiae	Richard's Pipit
Motacilla alba	White Wagtail
Motacilla flava	Yellow Wagtain
Lanius cristatus	Brown Shrike
Zosterops japonica	Japanese White-eye
Lonchura malacca	Black-headed Mannikin
Lonchura punctulata	*Nutmeg Mannikin*
Lonchura striata	White-rumped Munia
Emberiza elegans	Yellow-headed Bunting
Emberiza spodocephala	Black-faced Bunting
Emberiza sulphurata	Japanese Yellow Bunting
Passer montanus	Tree Sparrow

RED-NECKED PHALAROPES IN BRUNEI DARUSSALAM

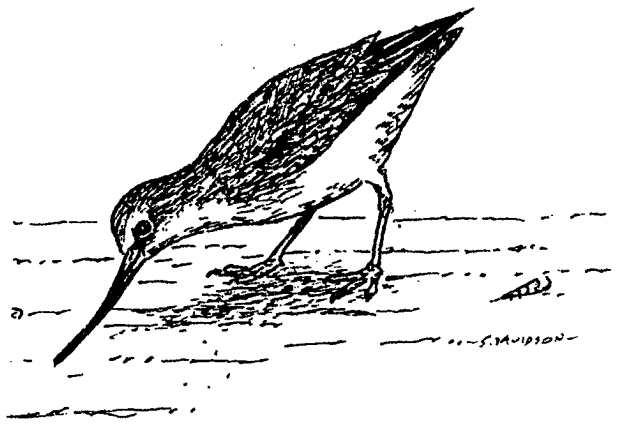
Jennifer Elkin
C/o PTR/3 BSP, Seria, Brunei Darussalam

The Red-necked Phalarope *Phalaropus lobatus* is not a common migrant in Brunei Darussalam, a few occasionally turn up during the autumn passage, usually in an area of rice fields close to the capital, Bandar Seri Begawan. In the Seria area, I have only previously seen one bird in ten years of wader watching.

On the evening of 26 September, 1991, flocks of Red-necked Phalaropes were seen flying over the tennis courts of the Panaga Club at Seria, apparently attracted by the bright lights. There were a few casualties as birds hit the lights and surrounding buildings.

On five successive evenings, waves of birds came through, mostly in flocks of around 20 to 30. Many that touched down seemed tired (or maybe confused) and could easily be approached and picked up. Those which came down on a different court to the main flock flew into the nets and surrounding fences in at attempt to rejoin them. On one evening there were about 200 birds milling about on the ground, constantly calling. The stronger birds took off and rejoined new flocks as they came over, flying off into the night. By morning, most of the birds had gone, leaving a few bodies and casualties.

The birds were also seen at sea on Sunday 29 September by divers on their way to a dive site 15nm from shore. Many birds were seen dotted on the calm water - mostly in ones and twos, but occasionally in a small flock.



SURVEYS OF MIGRATORY SHOREBIRDS AT SHEYANG SALTWORKS, JIANGSU PROVINCE, CHINA, AUTUMN 1991

Wang Hui, Management Division of Yancheng Nature Reserve, Yancheng 224333. Jiangsu Province, Peoples Republic of China

Summary

A total of 32458 waders of 41 species passed through Sheyang Saltworks in Autumn 1991. Included amongst these were a number of rare species. The highest numbers of birds and species, occurred during ten days in the middle of August and in the beginning of September.

Introduction

Previous surveys of the Sheyang Saltworks have indicated that the area is one of the most important sites for migratory waders on the east coast of Jiangsu Province. Many species, including Nordmann's Greenshank *Tringa guttifer* and Asian Dowitcher *Limnodromus semipalmatus* use the saltworks as a refuelling site during southward migration (Bakewell 1989, Wang H. 1992).

The Sheyand Saltworks (33° 40'N, 120° 22'E) are part of a buffer zone for the Yancheng Nature Reserve and contain 19631 ha of wetlands. Habitats in the saltworks fall into eight categories: tidal mudlfats, salt pans, salt lakes, prawn ponds, salt marshes, reed beds and grasslands, sea walls and dykes. (See Fig. 1)

The mudflats outside the eastern seawall, drainage channels, initial salt pans and salt lakes with shallow water levels are the richest habitats in numbers of birds and diversity of species. These areas also contain a high diversity and abundance of tidal fauna, especially mudskippers *Periophthalmus cantonansis*, crabs *Phityra pisum* and *Hemigrapsus* sp., fishes *Hemirampirus* and *Tridentiger* spp., Nereis and snails *Batillaria* sp., *Assiminea latericea* and *Certhidea* sp. and shrimps *Macrobuchium* and *Acites* spp. which provide ideal food sources for waders (Lew Young pers. comm., pers. obs.)

Results and Discussion

Nine counts of waders at the Sheyang Saltworks were undertaken during August and September 1991 and a total of 32458 waders of 41 species was counted. The most common species were Dunlin, Red-necked Stint, Kentish Plover, Marsh Sandpiper, Little Ringed Plover and Great Knot. Smaller numbers of Little Stint, Nordmann's Greenshank, Asian Dowitcher, Far Eastern Curlew, Oriental Plover, Broad-billed Sandpiper and Terek Sandpiper were also noted amongst the waders present.

There was some noticeable variation in the species composition in various areas of the saltworks due to the variation in habitats and differences in levels of disturbance.

During the autumn migration waders begin arriving at the saltworks during the beginning of August. The highest numbers, in terms of both birds and species diversity, were present in the middle ten days of August and in early September (Figs 1 & 2). Due to a lack of funds and personnel complete coverage of the saltworks was impossible, this was especially so for the intertidal mudflats - the most important areas for roosting waders, due to transport problems and a lack of sufficient time.

Acknowledgements

I would like to thank members of the East China Waterbird Ecology Study Group and staff of the Yancheng Nature Reserve for their assistance. In addition thanks to Mr Lew Young of Hong Kong, and Mr Wang Hou and Mr Tang Sixian of East China Normal University. Dr. Taej Mundkur of AWB assisted with references and information and Mr Chen Hao and Mr Du Jin Jin assisted with two of the counts.

References

Bakewell, D. & L. Young. 1989. Report on Ornithological Observations from Hang Zhou Bay and Yancheng Nature Reserve, East China. AWB publication No. 58. Kuala Lumpur.

Wang, H. 1992. Field study of spring migratory population of Nordmann's Greenshank *Tringa guttifer* in Yancheng Nature Reserve. Zoological Research 13: 36-58.

Fig 1. Number of shorebirds by date

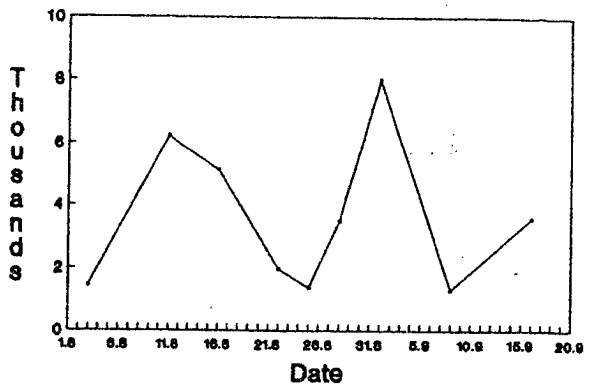
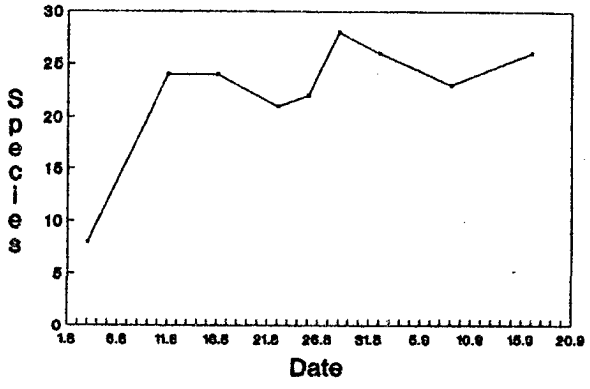
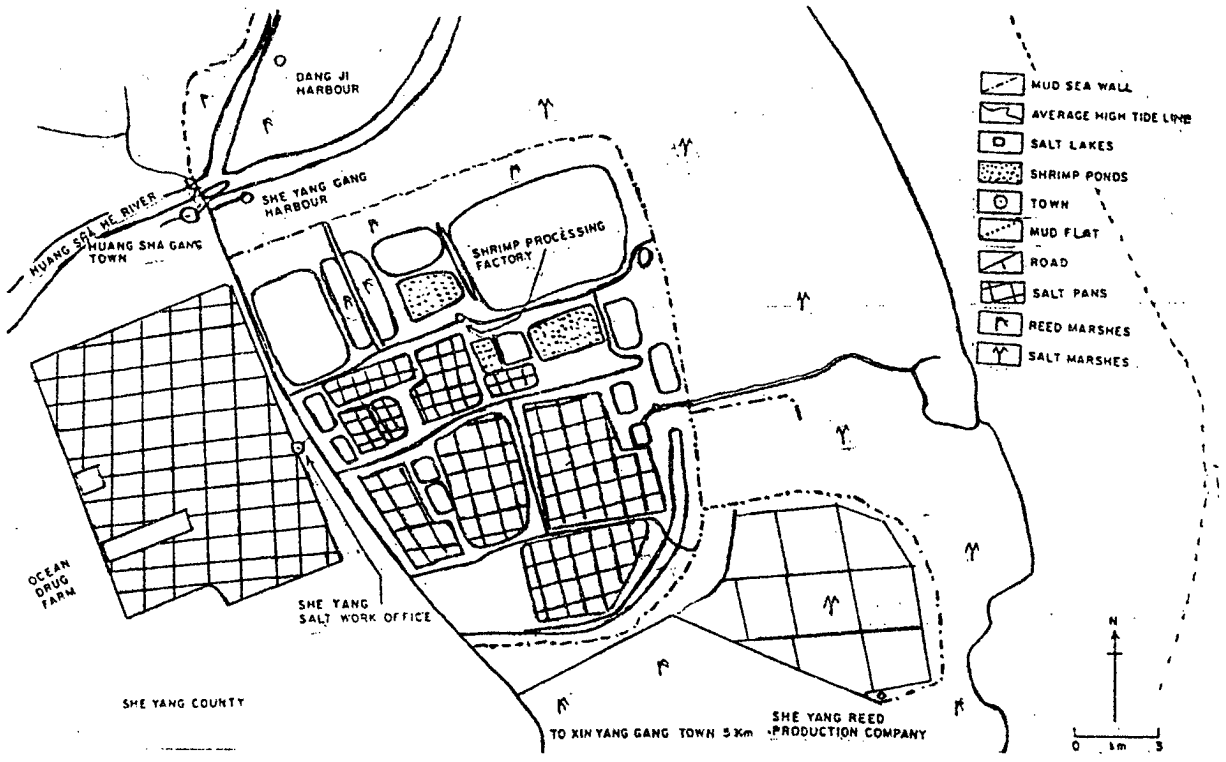


Fig 2. Number of species by date





Map 1. Sheyang Salt Works showing habitat types.

Table 1 - COUNT DATA, SHEYANG SALTWORKS, AUTUMN 1991

Species	3 Aug	11 Aug	16 Aug	22 Aug	25 Aug	28 Aug	1 Sept	8 Sept	16 Sept	TOTAL
Black-winged Stilt		47	114	34	28	19	14	10	42	308
Oriental Pratincole				2	9	18	6	5		40
Grey-headed Lapwing	1	4			3	3	2	5		18
Lesser Golden Plover					4	4	4	1		13
Grey Plover		9	17	7	4	14	14	20	1	86
Ringed Plover		1			5			1		7
Long-billed Plover						1			4	5
Little Ringed Plover	6	20	436	90	114	148	67	203	222	1306
Kentish Plover	8	1956	512	87	12	37	232	73	408	3325
Mongolian Plover		284	164	19	9	175	171	4	69	895
Greater Sand Plover		2	2			8	49		3	64
Oriental Plover		63	18	4	2	8	3	1	4	103
Black-tailed Godwit		37	109	93		123	12	18	17	411
Bar-tailed Godwit		4	2			25	158	42	32	263
Whimbrel				1				1	1	3
Far Eastern Curlew					3					3
Eurasian Curlew							2			2
Spotted Redshank		120	170	14	156	75	50	185	24	794
Common Redshank	4	34	33	20	32	12	1 4	33	35	217
Marsh Sandpiper	5	866	269	477	284	71	126	70	360	2518
Common Greenshank		110	385	12	32	51	223	6	123	944
Nordmann's Greenshank			12			7	4		4	27
Green Sandpiper		23	35	9		9	2			78
Wood Sandpiper				2						2
Terek Sandpiper			2					4		6
Common Sandpiper						7	7	3	14	31
Grey-tailed Tattler							1			1
Ruddy Turnstone			72				47	7	18	204
Red-necked Phalarope		60				9				9
EurasianWoodcock									1	1
Asian Dowitcher			44			25			2	137
Red Knot		60	22	6	1	4				30
Great Knot		3	194		42	28	342	130	113	1123
Sanderling		233		41			1			1
Red-necked Stint	2		928		387	185	642	241	647	3748
Little Stint		592		124	7					7
Temminck's Stint			1		177	34	24	9	4	376
Long-toed Stint			4	127	7	3	4		154	175
Sharp-tailed Sandpiper		1	16	2			486	29	91	622
Dunlin	2		1544		16	1999	1740	184	785	8217
Broad-billed Sandpiper	4	1476	8	471	33	35		1	8	119
Unidentified	1430	26		4		341	3550	8	370	6209
		190		320						
TOTAL	1462	6411	5113	1908	1367	3478	7997	1294	3558	32458

BANDING ROUND-UP
COMPLETE LIST

Compiled by Jamie Pook, Australian Bird and Bat Banding Schemes, Australian National Parks and Wildlife Service, GPO Box 8, Canberra, ACT 2601.

The following are complete lists of international wader recoveries recieved by the Scheme up to January 1992. It is a compilation of all recoveries previously published in *Stilt*.

Layout of Data:

Line 1 - band number; banding place; co-ordinates; date of banding; age; sex; bander
Line 2 - recovery method; recovery status; recovery place; co-ordinates; recovery date; age; sex; finder
Line 3 - distance and direction between banding and recovery places; time elapsed between banding and recovery

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;
02 =probably trapped but the device is unknown to the banding office;
03 = trapped in a mistnet;
04 = trapped with a cage trap;
05 = trapped with a cannon net;
25 = bird sick or injured;
31 = collided with a moving road vehicle;
40 = band found on bird, no further data on how encountered;
41 = band returned, not reported if on a bird;
46 = colour marking sighted in field, bird one of a cohort colour marked in this manner;
48 = colour marking sighted in field;
54 = beachwashed;
61 = shot - reason unknown;
63 = taken for scientific study;
67 = taken for food or feathers;
68 = shot for food or sport;
99 = found dead, cause unknown.

Status of encounter:

00 = status of bird and band is unknown;
01 = status of bird unknown, band left on bird;
02 = status of bird unknown, band removed from bird;
03 = bird is dead, status of band is unknown;
04 = bird is dead, band left on bird;
05 = bird is dead, band removed from bird;
09 = rehabilitation attempted but bird died, status of and unknown;
13 = bird was released alive with band;
14 = bird was released alive and the band was removed;
26 = bird was alive in the wild with the band;
29 = bird partially decomposed and band was removed;

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129       RUDDY TURNSTONE                          ARENARIA INTERPRES
--------- ---------------------------------------- ----------------------------------------------

051-01905 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820822   2    U  WA WADER STUDY GROUP
67 05     6FFENGXIAN COAST OF SHANGHAI CHINA       30d50m N 121d45mE 900512   U    U  SHIQUAN
Distance: 5568 km         Direction: 0 degs.                Time elapsed:   7 yrs 8 mnths 20 days

051-26822 01BEACHES CRAB CK RD ROEBUCK BAY BROO    18d0m  S 122d22mE 850325   +2   U  AUSTRALASIAN WADER STUDY GROUP
99 05     20ULAKHAN-KYUYOL VERKHOYANSKY YAKUT USSR 68d33m N 136d32mE 860607   U    U  SOVIET BANDING SCHEME
Distance: 9666 km         Direction: 5 degs.                Time elapsed:   1 yrs 2 mnths 13 days

051-29700 04SWAN ISLAND QUEENSCLIFFVIC             38d15m S 144d40mE 891118   2    U  VICTORIAN WADER STUDY GROUP
03 13     03SZO-TSAO TAIWAN                        22d58m N 120d10mE 900429   U    U  TAIWAN BIRD BANDING CENTRE
Distance: 7244 km         Direction: 335 degs.              Time elapsed:   0 yrs 5 mnths 11 days

051-29700 04SWAN ISLAND QUEENSCLIFFVIC             38d15m S 144d40mE 891118   2    U  VICTORIAN WADER STUDY GROUP
05 13     04SWAN ISLAND QUEENSCLIFFVIC             38d15m S 144d40mE 901118   +2   U  VICTORIAN WADER STUDY GROUP
Distance: 7244 km         Direction: 0 degs.                Time elapsed:   1 yrs 0 mnths 0 days

060-01718 01KOORAGANG ISLANDNSW                    32d52m S 151d46mE 740112   +1   U  VAN GESSEL
61 00     06BARABASHEVKA PRIMORJE USSR             43d6m  N 131d33mE 750815   U    U  SOVIET BANDING SCHEME

Distance: 8661 km         Direction: 344 degs.              Time elapsed:   1 yrs 7 mnths 3 days
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A total of five international recoveries including one bird that was banded at Queenscliff, then recovered in Taiwan five months later and then retrapped back at Queenscliff exactly one year after banding.

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137       LESSER GOLDEN PLOVER                     PLUVIALIS DOMINICA
--------- ---------------------------------------- ----------------------------------------------

U63-99641 03ST GEORGE IS PRIBILOF ISLANDS ALASKA U 56d31m N 169d31mW 660824   +1   U  BIRD BANDING LABORATORY (USA)
85 03     3FURUNGANSW                              30d30m S 153d0m E 700327   U    U  UNKNOWN
Distance: 10271 k         Direction: 211 degs.              Time elapsed:   3 yrs 7 mnths 3 days

139       MONGOLIAN PLOVER                         CHARADRIUS MONGOLUS
--------- ---------------------------------------- ----------------------------------------------

051-01796 16KOORAGANG ISLANDNSW                    32d52m S 151d46mE 761228   +2   U  LANE
67 05     6FRECLAIMED LAND NR MANILA HBR PHILIPPIN 14d37m N 120d58mE 860419   U    U  DE PANO JR
Distance: 6196 km         Direction: 323 degs.              Time elapsed:   9 yrs 3 mnths 22 days

051-18038 07OFF MANNS BEACH CORNER INLETVIC        38d41m S 146d50mE 820102   +2   U  VICTORIAN WADER STUDY GROUP
67 03     3FCHONGMING ISLAND SHANGHAI CHINA        31d27m N 121d53mE 000000   U    U  ZHOU SHI-E
Distance: 8184 km         Direction: 337 degs.
```

140	DOUBLE-BANDED PLOVER	CHARADRIUS BICINCTUS				
040-92778	16KOORAGANG ISLANDNSW	32d52m S	151d46mE	800412	+1	U LANE
04 13	4FMcCAULEY RIVER NEW ZEALAND	43d43m S	170d34mE	841119	+2	U PIERCE
Distance: 2030 km	Direction: 131 degs.	Time elapsed: 4 yrs 7 mnths 7 days				
040-96019	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE	790617	1	U VICTORIAN WADER STUDY GROUP
04 13	10HAKATARAMEA RIVER NEW ZEALAND	44d44m S	170d29mE	851109	+2	F NEW ZEALAND BANDING SCHEME
Distance: 2282 km	Direction: 117 degs.	Time elapsed: 6 yrs 4 mnths 22 days				
040-99247	X2RAILWAY POINT BARILLA BAYTAS	42d49m S	148d29mE	810531	J	U SHOREBIRD STUDY GROUP (BOAT)
04 14	04ASHBURTON RIVER NEW ZEALAND	43d50m S	171d40mE	861116	+2	F NEW ZEALAND BANDING SCHEME
Distance: 1878 km	Direction: 101 degs.	Time elapsed: 5 yrs 5 mnths 16 days				
041-01280	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE	810523	+2	U VICTORIAN WADER STUDY GROUP
04 13	01CASS RIVER NEW ZEALAND	43d53m S	170d30mE	861121	+2	M NEW ZEALAND BANDING SCHEME
Distance: 2269 km	Direction: 114 degs.	Time elapsed: 5 yrs 5 mnths 29 days				
041-01361	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE	810531	+2	U VICTORIAN WADER STUDY GROUP
04 13	06ALEXANDRA, NEW ZEALAND	45d15m S	169d23mE	851027	U	U NEW ZEALAND BANDING SCHEME
Distance: 2208 km	Direction: 119 degs.	Time elapsed: 4 yrs 4 mnths 27 days				
041-01444	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE	810801	+2	U VICTORIAN WADER STUDY GROUP
04 13	3FTEKAPO RIVER, NEW ZEALAND	44d9m S	170d25mE	850924	+1	F PIERCE & MALONEY
Distance: 2267 km	Direction: 115 degs.	Time elapsed: 4 yrs 1 mnths 23 days				
041-05050	08STOCKYARD PT, LANG LANG, WESTERNPORTVI	38d22m S	145d32mE	830724	+2	U VICTORIAN WADER STUDY GROUP
04 13	6FTEKAPO RIVER, NEW ZEALAND	44d18m S	170d15mE	851009	+1	F PIERCE & MALONEY
Distance: 2162 km	Direction: 115 degs.	Time elapsed: 2 yrs 2 mnths 16 days				
041-06811	08STOCKYARD PT, LANG LANG, WESTERNPORTVI	38d22m S	145d32mE	820424	+2	U VICTORIAN WADER STUDY GROUP
04 13	4FPOTTS RIVER, SOUTH ISLAND, NEW ZEALAND	43d35m S	170d55mE	851006	+1	M PIERCE & MALONEY
Distance: 2204 km	Direction: 113 degs.	Time elapsed: 3 yrs 5 mnths 12 days				
041-09885	04SWAN ISLAND QUEENSCLIFFVIC	38d15m S	144d40mE	840630	J	U VICTORIAN WADER STUDY GROUP
04 13	06ALEXANDRA, NEW ZEALAND	45d15m S	169d23mE	851020	U	U NEW ZEALAND BANDING SCHEME
Distance: 2187 km	Direction: 118 degs.	Time elapsed: 1 yrs 3 mnths 20 days				
041-13109	03LAUDERDALETAS	42d55m S	147d29mE	830403	+1	U SHOREBIRD STUDY GROUP (BOAT)
04 13	5FEDWARD'S STREAM, NEW ZEALAND	44d3m S	170d32mE	851008	+1	F PIERCE & MALONEY
Distance: 1863 km	Direction: 101 degs.	Time elapsed: 2 yrs 6 mnths 5 days				
041-15432	04SWAN ISLAND QUEENSCLIFFVIC	38d15m S	144d40mE	850720	1	U VICTORIAN WADER STUDY GROUP
04 13	01CASS RIVER NEW ZEALAND	43d53m S	170d30mE	861117	+2	F NEW ZEALAND BANDING SCHEME
Distance: 2249 km	Direction: 114 degs.	Time elapsed: 1 yrs 3 mnths 28 days				
041-16439	04SWAN ISLAND QUEENSCLIFFVIC	38d15m S	144d40mE	860328	+2	U VICTORIAN WADER STUDY GROUP
04 13	12ASHLEY RIVER NEW ZEALAND	43d17m S	172d20mE	861115	+2	F NEW ZEALAND BANDING SCHEME
Distance: 2390 km	Direction: 112 degs.	Time elapsed: 0 yrs 7 mnths 18 days				

041-17992 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 860628 1 U VICTORIAN WADER STUDY GROUP
04 13 11LAKE TEKAPO NEW ZEALAND 43d55m S 170d30mE 861031 +2 F NEW ZEALAND BANDING SCHEME
Distance: 2188 km Direction: 114 degs. Time elapsed: 0 yrs 4 mnths 3 days

041-18268 02POINT COOK, ALTONAVIC 37d55m S 144d46mE 860803 +2 M VICTORIAN WADER STUDY GROUP
54 04 6FTIHAKA BCH COLAC BAY STHLAND NEW ZEALA 46d23m S 167d54mE 881114 U U WOODHAMS
Distance: 2120 km Direction: 123 degs. Time elapsed: 2 yrs 3 mnths 11 days

041-18276 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 860809 1 M VICTORIAN WADER STUDY GROUP
99 05 1FLOWER OHAU RIVER NEAR TWIZEL NEW ZEALA 44d0m S 170d11mE 880909 U U MURRAY
Distance: 2123 km Direction: 114 degs. Time elapsed: 2 yrs 1 mnths 0 days

041-31245 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 870426 1 U VICTORIAN WADER STUDY GROUP
99 29 2FNEAR TWIZEL NEW ZEALAND 44d15m S 170d6m E 871217 U U REED
Distance: 2162 km Direction: 115 degs. Time elapsed: 0 yrs 7 mnths 21 days

NB5-2910 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 841029 +2 F NEW ZEALAND BANDING SCHEME
05 13 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 850817 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2187 km Direction: 278 degs. Time elapsed: 0 yrs 9 mnths 19 days

NB5-2921 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 841103 J U NEW ZEALAND BANDING SCHEME
48 26 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 850615 +1 M VICTORIAN WADER STUDY GROUP
Distance: 2187 km Direction: 278 degs. Time elapsed: 0 yrs 7 mnths 12 days

NB5-2921 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 841103 J U NEW ZEALAND BANDING SCHEME
48 26 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 860614 +1 M VICTORIAN WADER STUDY GROUP
Distance: 2187 km Direction: 278 degs. Time elapsed: 1 yrs 7 mnths 11 days

NB5-2921 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 841103 J U NEW ZEALAND BANDING SCHEME
05 13 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 860628 +1 M VICTORIAN WADER STUDY GROUP
Distance: 2187 km Direction: 278 degs. Time elapsed: 1 yrs 7 mnths 25 days

NB5-2977 22TWIZEL NEW ZEALAND 44d20m S 170d11mE 841113 +2 M NEW ZEALAND BANDING SCHEME
05 13 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 880529 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2251 km Direction: 279 degs. Time elapsed: 3 yrs 6 mnths 16 days

NB5-2977 22TWIZEL NEW ZEALAND 44d20m S 170d11mE 841113 +2 M NEW ZEALAND BANDING SCHEME
05 13 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 880529 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2251 km Direction: 279 degs. Time elapsed: 3 yrs 6 mnths 16 days

NB5-3566 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 841224 J U NEW ZEALAND BANDING SCHEME
05 13 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 850518 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2269 km Direction: 277 degs. Time elapsed: 0 yrs 4 mnths 25 days

NB5-3566 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 841224 J U NEW ZEALAND BANDING SCHEME
05 13 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 870531 U U VICTORIAN WADER STUDY GROUP
Distance: 2269 km Direction: 277 degs. Time elapsed: 2 yrs 5 mnths 7 days

NB5-3670 04ASHBURTON RIVER NEW ZEALAND 43d50m S 171d40mE 851123 J U NEW ZEALAND BANDING SCHEME
05 13 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 860809 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2239 km Direction: 276 degs. Time elapsed: 0 yrs 8 mnths 16 days

NB5-3690 12ASHLEY RIVER NEW ZEALAND 43d17m S 172d20mE 851212 +1 F NEW ZEALAND BANDING SCHEME
48 26 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870606 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2390 km Direction: 274 degs. Time elapsed: 1 yrs 5 mnths 25 days

NB5-3690 12ASHLEY RIVER NEW ZEALAND 43d17m S 172d20mE 851212 +1 F NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870712 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2390 km Direction: 274 degs. Time elapsed: 1 yrs 7 mnths 0 days

NB5-3690 12ASHLEY RIVER NEW ZEALAND 43d17m S 172d20mE 851212 +1 F NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 880731 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2390 km Direction: 274 degs. Time elapsed: 2 yrs 7 mnths 19 days

NB5-4138 05ORETI RIVER NEW ZEALAND 46d10m S 168d17mE 851002 +2 F NEW ZEALAND BANDING SCHEME
48 26 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 860727 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2027 km Direction: 286 degs. Time elapsed: 0 yrs 9 mnths 25 days

NB5-4138 05ORETI RIVER NEW ZEALAND 46d10m S 168d17mE 851002 +2 F NEW ZEALAND BANDING SCHEME
05 13 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 860810 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2027 km Direction: 286 degs. Time elapsed: 0 yrs 10 mnths 8 days

NB5-4203 08MATUKITUKI RIVER NEW ZEALAND 44d31m S 168d43mE 850922 +2 M NEW ZEALAND BANDING SCHEME
48 26 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 860712 U U VICTORIAN WADER STUDY GROUP
Distance: 2119 km Direction: 280 degs. Time elapsed: 0 yrs 9 mnths 20 days

NB5-4203 08MATUKITUKI RIVER NEW ZEALAND 44d31m S 168d43mE 850922 +2 M NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 860720 +2 M VICTORIAN WADER STUDY GROUP
Distance: 2119 km Direction: 280 degs. Time elapsed: 0 yrs 9 mnths 28 days

NB5-4203 08MATUKITUKI RIVER NEW ZEALAND 44d31m S 168d43mE 850922 +2 M NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870712 +2 M VICTORIAN WADER STUDY GROUP
Distance: 2119 km Direction: 280 degs. Time elapsed: 1 yrs 9 mnths 20 days

NB5-4241 06ALEXANDRA, NEW ZEALAND 45d15m S 169d23mE 851028 +1 F NEW ZEALAND BANDING SCHEME
48 26 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 860727 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2085 km Direction: 282 degs. Time elapsed: 0 yrs 8 mnths 30 days

NB5-4241 06ALEXANDRA, NEW ZEALAND 45d15m S 169d23mE 851028 +1 F NEW ZEALAND BANDING SCHEME
48 26 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 870517 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2085 km Direction: 282 degs. Time elapsed: 1 yrs 6 mnths 20 days

NB5-4241 06ALEXANDRA, NEW ZEALAND 45d15m S 169d23mE 851028 +1 F NEW ZEALAND BANDING SCHEME
05 13 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 870613 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2085 km Direction: 282 degs. Time elapsed: 1 yrs 7 mnths 16 days

NB5-4259 09REES RIVER NEW ZEALAND 44d46m S 168d26mE 851101 +2 F NEW ZEALAND BANDING SCHEME
05 13 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 860628 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2043 km Direction: 282 degs. Time elapsed: 0 yrs 7 mnths 27 days

NB5-4259 09REES RIVER NEW ZEALAND 44d46m S 168d26mE 851101 +2 F NEW ZEALAND BANDING SCHEME
05 13 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 860816 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2043 km Direction: 282 degs. Time elapsed: 0 yrs 9 mnths 15 days

NB5-4289 16OLD MAN RANGE NEW ZEALAND 45d24m S 169d12mE 851221 +2 F NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870516 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2177 km Direction: 282 degs. Time elapsed: 1 yrs 4 mnths 26 days

NB5-4759 27LAKE WAINONO NEW ZEALAND 44d42m S 171d9m E 850929 +1 F NEW ZEALAND BANDING SCHEME
05 13 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 880514 +2 M VICTORIAN WADER STUDY GROUP
Distance: 2210 km Direction: 278 degs. Time elapsed: 2 yrs 7 mnths 15 days

NC3-5687 12ASHLEY RIVER NEW ZEALAND 43d17m S 172d20mE 861102 +1 F NEW ZEALAND BANDING SCHEME
48 26 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870606 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2390 km Direction: 274 degs. Time elapsed: 0 yrs 7 mnths 4 days

NC3-5687 12ASHLEY RIVER NEW ZEALAND 43d17m S 172d20mE 861102 +1 F NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870712 +2 F VICTORIAN WADER STUDY GROUP
Distance: 2390 km Direction: 274 degs. Time elapsed: 0 yrs 8 mnths 10 days

NC4-1607 06ALEXANDRA, NEW ZEALAND 45d15m S 169d23mE 861021 +1 F NEW ZEALAND BANDING SCHEME
99 05 5FLAKE MUNDIVIC 37d33m S 141d4m E 870400 U U McKINNON
Distance: 2502 km Direction: 279 degs. Time elapsed: 0 yrs 5 mnths 10 days

NC4-2164 17TEKAPO RIVER NEW ZEALAND 44d7m S 170d19mE 861106 +2 F NEW ZEALAND BANDING SCHEME
05 13 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 870531 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2258 km Direction: 278 degs. Time elapsed: 0 yrs 6 mnths 25 days

NC4-2270 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 861129 J U NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870516 1 U VICTORIAN WADER STUDY GROUP
Distance: 2249 km Direction: 277 degs. Time elapsed: 0 yrs 5 mnths 17 days

NC4-2270 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 861129 J U NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 880731 +2 M VICTORIAN WADER STUDY GROUP
Distance: 2249 km Direction: 277 degs. Time elapsed: 1 yrs 8 mnths 2 days

NC4-2270 01CASS RIVER NEW ZEALAND 43d53m S 170d30mE 861129 J U NEW ZEALAND BANDING SCHEME
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 900805 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2244 km Direction: 277 degs. Time elapsed: 3 yrs 8 mnths 7 days

NC4-3212 30UPPER ORETI RIVER NEW ZEALAND 45d50m S 168d20mE 871024 +2 F NEW ZEALAND BANDING SCHEME
05 13 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 880613 +2 U VICTORIAN WADER STUDY GROUP
Distance: 2065 km Direction: 286 degs. Time elapsed: 0 yrs 7 mnths 20 days

UNK-00001 02POINT COOK, ALTONAVIC 37d55m S 144d46mE 860000 U U VICTORIAN WADER STUDY GROUP
46 26 15COAL RIVER CANTERBURY PROV NEW ZEALAND 43d47m S 170d34mE 861222 U U NEW ZEALAND BANDING SCHEME
Distance: 2260 km Direction: 114 degs. Time elapsed: 0 yrs 0 mnths 0 days

UNK-00010 29TASMAN RIVER MACKENZIE BASIN NEW ZEALA 43d50m S 170d12mE 851114 +1 U NEW ZEALAND BANDING SCHEME
46 26 3FCLONTARFQLD 27d15m S 153d5m E 870704 U U COOMBS
Distance: 2397 km Direction: 314 degs. Time elapsed: 1 yrs 7 mnths 20 days

UNK-00031 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 000000 +1 U VICTORIAN WADER STUDY GROUP
46 26 20WESTERN BAY LAKE TEKAPO NEW ZEALAND 43d56m S 170d28mE 880125 U U NEW ZEALAND BANDING SCHEME
Distance: 2247 km Direction: 114 degs.

UNK-00032 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 000000 +1 U VICTORIAN WADER STUDY GROUP
46 26 21LAKE POAKA NEAR TWIZEL NEW ZEALAND 44d11m S 170d7m E 880124 U U NEW ZEALAND BANDING SCHEME
Distance: 2223 km Direction: 115 degs.

UNK-00036 GRGODLEY RIVER AREA NEW ZEALAND 43d30m S 170d34mE 000000 U F NEW ZEALAND BANDING SCHEME
46 26 X2LONG REEF NEAR DEE WHYNSW 33d45m S 151d19mE 880406 U U MORRIS
Distance: 1988 km Direction: 296 degs.

UNK-00040 22TWIZEL NEW ZEALAND 44d20m S 170d11mE 000000 U U NEW ZEALAND BANDING SCHEME
46 26 X5AIRPORT RUNWAY NORTH BOTANY BAYNSW 33d57m S 151d11mE 880619 U U MORRIS
Distance: 1996 km Direction: 299 degs.

UNK-00041 25UPPER RAKAIA RIVER AREA NEW ZEALAND 43d20m S 171d20mE 000000 U U NEW ZEALAND BANDING SCHEME
46 26 X3BOAT HARBOUR KURNELLNSW 34d1m S 151d13mE 880602 U U MORRIS
Distance: 2022 km Direction: 294 degs.

UNK-00042 24GODLEY/MACAULY AREA NEW ZEALAND 43d40m S 170d36mE 000000 U U NEW ZEALAND BANDING SCHEME
46 26 X2LONG REEF NEAR DEE WHYNSW 33d45m S 151d19mE 880610 U U MORRIS
Distance: 1999 km Direction: 296 degs.

UNK-00043 23MAYFIELD/VALETTA AREA NEW ZEALAND 43d45m S 171d30mE 000000 U U NEW ZEALAND BANDING SCHEME
46 26 6FBOTANY BAY NORTH SHORENSW 33d58m S 151d12mE 880501 U U GLADWIN
Distance: 2061 km Direction: 294 degs.

UNK-00044 23MAYFIELD/VALETTA AREA NEW ZEALAND 43d45m S 171d30mE 000000 U U NEW ZEALAND BANDING SCHEME
46 26 X4FORESHORE ROAD BEACH NORTH BOTANY BAYN 33d58m S 151d12mE 880501 U U MORRIS
Distance: 2061 km Direction: 294 degs.

A total of 58 recoveries; 20 moving from Australia to New Zealand and 38 moving from New Zealand to Australia. A number of birds banded in New Zealand have been recovered at the same location in Australia in a number of subsequent years.

141 LARGE SAND PLOVER CHARADRIUS LESCHENAULTII

051-15876 08ROEBUCK BAYWA 18d4m S 122d19mE 810902 +2 U WA WADER STUDY GROUP
15 05 2FMARKET BEIHAI GRANGXI PROVINCE CHINA 21d29m N 109d10mE 820812 U U JMG GUANG
Distance: 4604 km Direction: 341 degs. Time elapsed: 0 yrs 11 mnths 10 days

051-24631 0480 MILE BEACH 7 KM SOUTH ANNA PLAINS 19d15m S 121d25mE 831103 +2 U WA WADER STUDY GROUP
01 02 8FBEIHAI KWANG-SI CHINA 21d29m N 109d5m E 850804 U U WU KAI-YUNG
Distance: 4702 km Direction: 342 degs. Time elapsed: 1 yrs 9 mnths 1 days

HC0-3831 01TA TU HSI TAIWAN 24d12m N 120d28mE 890902 1 U TAIWAN BIRD BANDING CENTRE
05 13 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 900408 1 U AUSTRALASIAN WADER STUDY GROUP
Distance: 4673 km Direction: 177 degs. Time elapsed: 0 yrs 7 mnths 6 days

149 EASTERN CURLEW NUMENIUS MADAGASCARIENSIS

090-19229 X1KURNELL BOTANY BAYNSW 34d0m S 151d13mE 630213 +2 U BATTAM
99 03 1FKYODONG-DO BONG SO HI SOUTH KOREA 37d45m N 126d16mE 650000 U U WAN JAI
Distance: 8353 km Direction: 339 degs. Time elapsed: 1 yrs 9 mnths 15 days

091-06118 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 841125 +2 U VICTORIAN WADER STUDY GROUP
67 05 16ORQOHAN NEIMENG CHINA 49d30m N 121d18mE 890504 U U NATIONAL BIRD BANDING CENTER
Distance: 10086 k Direction: 344 degs. Time elapsed: 4 yrs 5 mnths 9 days

100-39163 01KOORAGANG ISLANDNSW 32d52m S 151d46mE 770129 +1 U VAN GESSEL
99 03 0FMARSHALL LAGOON CENTRAL PROVINCE PNG 10d5m S 148d11mE 770418 U U PEPENA
Distance: 2550 km Direction: 350 degs. Time elapsed: 0 yrs 2 mnths 20 days

150 WHIMBREL NUMENIUS PHAEOPUS

081-15346 08PELICAN ISLAND PORT MACQUARIENSW 31d26m S 152d54mE 830327 +2 U CLANCY
61 03 5FKARAGINSKI ISLAND NE KAMCHATKA USSR 58d50m N 164d0m E 830820 U U TOMKOVICH
Distance: 10056 k Direction: 5 degs. Time elapsed: 0 yrs 4 mnths 24 days

153 BAR-TAILED GODWIT LIMOSA LAPPONICA

071-53004 13MOUTH OF THE PRESTON RIVERWA 33d19m S 115d40mE 811031 U U WA WADER STUDY GROUP
61 05 18ARGAKHTAH SREDNEKOLYMSK YAKUT ASSR USS 68d23m N 153d14mE 850605 U U SOVIET BANDING SCHEME
Distance: 11698 k Direction: 13 degs. Time elapsed: 3 yrs 7 mnths 5 days

071-53007 14BASIN BAY GARDEN ISLANDWA 32d14m S 115d41mE 811213 U U WA WADER STUDY GROUP
61 05 16ABIY LAKE ABIYSKY REGION YAKUT ASSR US 68d23m N 145d3m E 850603 U U SOVIET BANDING SCHEME
Distance: 11419 k Direction: 10 degs. Time elapsed: 3 yrs 5 mnths 21 days

071-53051 03SALTWORKS, PORT HEDLANDWA 20d11m S 118d54mE 821118 +2 F WA WADER STUDY GROUP
61 05 14VERHNEKOLYMSK REGION YAKUT ASSR USSR 65d46m N 150d56mE 840524 U U SOVIET BANDING SCHEME
Distance: 9906 km Direction: 12 degs. Time elapsed: 1 yrs 6 mnths 6 days

071-63253 08ROEBUCK BAYWA 18d4m S 122d19mE 831022 +3 U WA WADER STUDY GROUP
67 03 3FCHONGMING ISLAND SHANGHAI CHINA 31d27m N 121d53mE 840500 U U ZHOU SHI-E
Distance: 5479 km Direction: 359 degs.

071-63298 0480 MILE BEACH 7 KM SOUTH ANNA PLAINS 19d15m S 121d25mE 831031 +3 U WA WADER STUDY GROUP
67 05 8FHANGZHOU BAY SHANGHAI CHINA 30d51m N 121d32mE 880412 U U TIANHOU
Distance: 5544 km Direction: 0 degs. Time elapsed: 4 yrs 5 mnths 12 days

071-63333 0480 MILE BEACH 7 KM SOUTH ANNA PLAINS 19d15m S 121d25mE 831031 +3 U WA WADER STUDY GROUP
67 03 0FHANGZHOU BAY SHANGHAI CHINA 30d51m N 121d32mE 840407 U U SIQUAN , ECWESG
Distance: 5544 km Direction: 0 degs. Time elapsed: 0 yrs 5 mnths 7 days

071-84701 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880323 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 07EAST END OF CHONGMING ISLAND CHINA 31d30m N 121d52mE 890300 U U EAST CHINA WATERBIRD GROUP
Distance: 5503 km Direction: 359 degs.

071-85037 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880326 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 6FFENGXIAN COAST OF SHANGHAI CHINA 30d50m N 121d45mE 910416 U U SHIQUAN
Distance: 5429 km Direction: 359 degs. Time elapsed: 3 yrs 0 mnths 21 days

071-85176 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 880401 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 07EAST END OF CHONGMING ISLAND CHINA 31d30m N 121d52mE 890400 U U EAST CHINA WATERBIRD GROUP
Distance: 5642 km Direction: 1 degs.

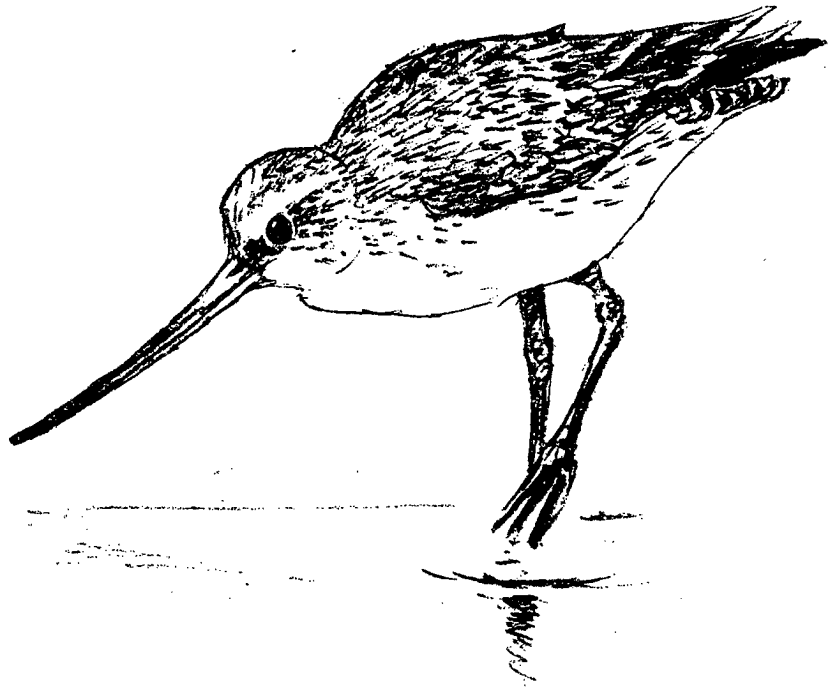
071-86531 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 900404 +2 F AUSTRALASIAN WADER STUDY GROUP
67 03 01EAST CHONGMING ISLAND SHANGHAI CHINA 31d30m N 121d52mE 900415 U U EAST CHINA WATERBIRD GROUP
Distance: 5642 km Direction: 1 degs. Time elapsed: 0 yrs 0 mnths 11 days

071-86536 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 900404 +2 M AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900416 U U EAST CHINA WATERBIRD GROUP
Distance: 5564 km Direction: 0 degs. Time elapsed: 0 yrs 0 mnths 12 days

081-35529 KOKOORAGANG ISLAND NATURE RESERVENSW 32d52m S 151d46mE 881204 +1 U HARDY
05 14 8FMIRANDA FIRTH OF THAMES NEW ZEALAND 37d10m S 175d19mE 901103 U U BANDERS
Distance: 2191 km Direction: 109 degs. Time elapsed: 1 yrs 10 mnths 30 days

082-43465	X1ROEBUCK BAY NORTHWA	17d59m	S	122d18mE	810902	+2	U WA WADER STUDY GROUP
61 03	24UST YANSKIY YAKUT ASSR USSR	69d13m	N	139d54mE	830604	U	U SOVIET BANDING SCHEME
Distance: 9781 km	Direction: 6 degs.			Time elapsed:		1 yrs 9 mnths 2 days	
082-43509	08ROEBUCK BAYWA	18d4m	S	122d19mE	810902	2	M WA WADER STUDY GROUP
01 00	05SHANGHAI SHI CHONGMING DAO CHINA	31d38m	N	121d27mE	850501	U	U NATIONAL BIRD BANDING CENTER
Distance: 5500 km	Direction: 359 degs.			Time elapsed:		3 yrs 7 mnths 29 days	
082-43511	08ROEBUCK BAYWA	18d4m	S	122d19mE	810902	U	U WA WADER STUDY GROUP
67 05	0FHANGZHOU BAY SHANGHAI CHINA	30d49m	N	121d28mE	880412	U	U TIANHOU
Distance: 5410 km	Direction: 359 degs.			Time elapsed:		6 yrs 7 mnths 10 days	
082-43963	77BOTANY BAYNSW	33d57m	S	151d11mE	810320	+2	F LANE
54 29	6FBEACH NEAR MOKPO CITY SOUTH KOREA	34d47m	N	126d23mE	820510	U	U SUH
Distance: 8065 km	Direction: 339 degs.			Time elapsed:		1 yrs 1 mnths 20 days	
082-44002	77BOTANY BAYNSW	33d57m	S	151d11mE	810320	J	M LANE
61 03	14VERHNEKOLYMSK REGION YAKUT ASSR USSR	65d46m	N	150d56mE	830000	U	U SOVIET BANDING SCHEME
Distance: 11085 k	Direction: 360 degs.						
GDR-53416	03MAI PO MARSHES HONG KONG	22d29m	N	114d2m	E 870912	1	U MELVILLE
05 13	01BEACHES CRAB CK RD ROEBUCK BAY BROO	18d0m	S	122d22mE	880324	U	U AUSTRALASIAN WADER STUDY GROUP
Distance: 4569 km	Direction: 167 degs.			Time elapsed:		0 yrs 6 mnths 12 days	

A total of eighteen recoveries the shortest of which is 4500 km, from Hong Kong to Broome, Western Australia. One bird was banded near Broome, WA and was recovered 5642 km away in China only 11 days later. These recoveries give an indication that the birds may fly non-stop from Australia to China.



155	GREY-TAILED TATTLER	TRINGA BREVIPES			
051-00412	08ROEBUCK BAYWA	18d4m S 122d19mE 810830	2	U	WA WADER STUDY GROUP
15 05	9FBEACH TSANKIANG GUANG DONG CHINA	21d10m N 110d20mE 820521	U	U	PENG
Distance: 4532 km	Direction: 342 degs.	Time elapsed: 0 yrs 8 mnths 22 days			
051-04613	X1BONNA POINT BOTANY BAYNSW	34d0m S 151d10mE 780421	+1	U	DALE
03 13	07OBITSU ESTUARY JAPAN	35d25m N 139d54mE 790523	U	U	YAMASHINA INST FOR ORNITHOLOGY
Distance: 7805 km	Direction: 350 degs.	Time elapsed: 1 yrs 1 mnths 2 days			
051-24764	0480 MILE BEACH 7 KM SOUTH ANNA PLAINS	19d15m S 121d25mE 831105	+3	U	WA WADER STUDY GROUP
67 03	14KANG XI HA QINZHOU CITY CHINA	21d57m N 108d36mE 840513	U	U	NATIONAL BIRD BANDING CENTER
Distance: 4787 km	Direction: 342 degs.	Time elapsed: 0 yrs 6 mnths 8 days			
060-01758	01KOORAGANG ISLANDNSW	32d52m S 151d46mE 740427	+1	U	VAN GESSEL
61 00	05KHATYRKA RIVER BERINGOVSKII MAGADAN US	62d37m N 174d58mE 760720	U	U	SOVIET BANDING SCHEME
Distance: 10785 k	Direction: 10 degs.	Time elapsed: 2 yrs 2 mnths 23 days			
061-31094	16KOORAGANG ISLANDNSW	32d52m S 151d46mE 771112	+1	U	LANE
05 13	01OBITSU ESTUARY JAPAN	35d25m N 139d54mE 850829	+1	U	INSTITUTE FOR ORNITHOLOGY
Distance: 7660 km	Direction: 349 degs.	Time elapsed: 7 yrs 9 mnths 17 days			
061-70054	03SHORES OF THE 80 MILE BEACHWA	19d15m S 121d20mE 880329	+2	U	AUSTRALASIAN WADER STUDY GROUP
03 13	03MAI PO MARSHES HONG KONG	22d29m N 114d2m E 890902	U	U	MELVILLE
Distance: 4684 km	Direction: 349 degs.	Time elapsed: 1 yrs 5 mnths 4 days			
061-70864	01BEACHES CRAB CK RD ROEBUCK BAY BROO	18d0m S 122d22mE 880407	+2	U	AUSTRALASIAN WADER STUDY GROUP
03 13	5FKUANTO TAIWAN	25d7m N 121d0m E 880515	+2	U	HONG CHUANG
Distance: 4772 km	Direction: 358 degs.	Time elapsed: 0 yrs 1 mnths 8 days			
061-70870	01BEACHES CRAB CK RD ROEBUCK BAY BROO	18d0m S 122d22mE 880407	+2	U	AUSTRALASIAN WADER STUDY GROUP
03 13	01TA TU HSI TAIWAN	24d12m N 120d28mE 890902	+2	U	TAIWAN BIRD BANDING CENTRE
Distance: 4673 km	Direction: 357 degs.	Time elapsed: 1 yrs 4 mnths 25 days			
061-71734	01BEACHES CRAB CK RD ROEBUCK BAY BROO	18d0m S 122d22mE 900409	+2	U	AUSTRALASIAN WADER STUDY GROUP
67 05	17JINHE OF XUWEN COUNTY GUANGDONG CHINA	20d30m N 110d24mE 910505	U	U	NATIONAL BIRD BANDING CENTER
Distance: 4474 km	Direction: 343 degs.	Time elapsed: 1 yrs 0 mnths 26 days			
061-72179	01BEACHES CRAB CK RD ROEBUCK BAY BROO	18d0m S 122d22mE 900412	+2	U	AUSTRALASIAN WADER STUDY GROUP
03 13	02KUANTO TAIWAN	25d7m N 121d27mE 900505	U	U	TAIWAN BIRD BANDING CENTRE
Distance: 4771 km	Direction: 358 degs.	Time elapsed: 0 yrs 0 mnths 23 days			
HD0-1827	01TA TU HSI TAIWAN	24d12m N 120d28mE 890821	+2	U	TAIWAN BIRD BANDING CENTRE
05 13	01BEACHES CRAB CK RD ROEBUCK BAY BROO	18d0m S 122d22mE 900412	+2	U	AUSTRALASIAN WADER STUDY GROUP
Distance: 4673 km	Direction: 177 degs.	Time elapsed: 0 yrs 7 mnths 22 days			
J50-00374	02MOUTH OF HANAMI RIVER CHIBA JAPAN	35d39m N 140d4m E 750520	+2	U	YAMASHINA INST FOR ORNITHOLOGY
99 05	5FDELUGE INLET HINCHINBROOK ISLANDQLD	18d25m S 146d13mE 760126	U	U	MARKWELL
Distance: 6019 km	Direction: 172 degs.	Time elapsed: 0 yrs 8 mnths 6 days			
J50-10345	01OBITSU ESTUARY JAPAN	35d25m N 139d54mE 770903	+2	U	YAMASHINA INST FOR ORNITHOLOGY
61 05	4FPOSSESSION ISLANDQLD	10d44m S 142d24mE 800510	U	U	C/- ROBERT DRAFFAN
Distance: 5115 km	Direction: 176 degs.	Time elapsed: 2 yrs 8 mnths 7 days			
X50-05166	01ICHIKAWA CHIBA JAPAN	35d30m N 139d57mE 650829	+1	U	MIGRATORY ANIMAL PATH. SURV
99 03	2FMANLYQLD	27d0m S 153d15mE 660911	U	U	
Distance: 7058 km	Direction: 166 degs.	Time elapsed: 1 yrs 0 mnths 13 days			

A total of 14 long distance recoveries five of which involve Japan.

160 TEREK SANDPIPER TRINGA TEREK

051-01176 01KOORAGANG ISLANDNSW 32d52m S 151d46mE 760426 +1 U VAN GESSEL
43 02 8FUNKNOWN AREA (?SHANGHAI) CHINA 31d38m N 121d27mE 790000 U U JIANZHONG
Distance: 7818 km Direction: 332 degs.

051-25308 17KOORAGANG ISLAND HUNTER RIVERNSW 32d52m S 151d46mE 880327 +2 U TYNAN
03 14 1FTAICHUNG TADU RIV MOUTH CENTRAL W TAIW 24d12m N 120d28mE 890407 U U CHEN-DE
Distance: 7136 km Direction: 328 degs. Time elapsed: 1 yrs 0 mnths 11 days

051-25346 N4BUFFALO CREEK DARWINNT 12d20m S 130d54mE 890918 +1 U GEERING
67 05 07EAST END OF CHONGMING ISLAND CHINA 31d30m N 121d52mE 890000 U U EAST CHINA WATERBIRD GROUP
Distance: 4967 km Direction: 349 degs.

051-32635 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880324 +2 U AUSTRALASIAN WADER STUDY GROUP
68 02 3FYAKUTSKAYA SSR NR SREDNEKOLYMSK USSR 67d27m N 153d41mE 910602 U U C/- MR EDDIE FRITZE
Distance: 9838 km Direction: 12 degs. Time elapsed: 3 yrs 2 mnths 9 days

051-38600 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 880331 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 05MIAO-GANG YANGTZE RIVER ESTUARY CHINA 30d52m N 121d52mE 910430 U U EAST CHINA WATERBIRD GROUP
Distance: 5572 km Direction: 1 degs. Time elapsed: 3 yrs 0 mnths 30 days

051-39174 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880406 +2 U AUSTRALASIAN WADER STUDY GROUP
68 05 30YAKUT ASSR OLEKMINSKY REG SANYAHTAT US 60d35m N 124d3m E 890515 U U SOVIET BANDING SCHEME
Distance: 8737 km Direction: 1 degs. Time elapsed: 1 yrs 1 mnths 9 days

051-39257 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880406 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 19XIANGSHAN COUNTY ZHEJIANG CHINA 29d24m N 121d48mE 890901 U U NATIONAL BIRD BANDING CENTER
Distance: 5270 km Direction: 359 degs. Time elapsed: 1 yrs 4 mnths 26 days

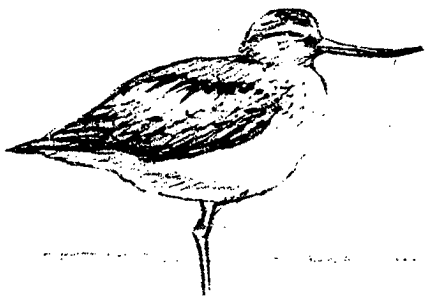
GNV-04265 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 880831 1 U MELVILLE
05 13 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 900329 +2 U AUSTRALASIAN WADER STUDY GROUP
Distance: 4569 km Direction: 167 degs. Time elapsed: 1 yrs 6 mnths 29 days

J40-10895 010BITSU ESTUARY JAPAN 35d25m N 139d54mE 780901 +2 U YAMASHINA INST FOR ORNITHOLOGY
02 13 01KOORAGANG ISLANDNSW 32d52m S 151d46mE 801122 U U VAN GESSEL
Distance: 7660 km Direction: 169 degs. Time elapsed: 2 yrs 2 mnths 21 days

J40-15?26 03YAMATO KANTUKU FUKOKA NORTH KYUSHU JAP 33d5m N 130d24mE 790800 U U YAMASHINA INST FOR ORNITHOLOGY
02 14 X1LYTTON BRISBANEQLD 27d24m S 153d10mE 830424 +2 U WOODALL
Distance: 7114 km Direction: 157 degs. Time elapsed: 3 yrs 8 mnths 24 days

J50-18682 16SONEZAKI-SHINDEN KITAKYUSHU-SHI JAPAN 33d49m N 130d58mE 830518 +2 U YAMASHINA INST FOR ORNITHOLOGY
05 13 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880324 +2 U AUSTRALASIAN WADER STUDY GROUP
Distance: 5807 km Direction: 190 degs. Time elapsed: 4 yrs 10 mnths 6 days

Eleven international recoveries all greater than 4900 km.



161	CURLEW SANDPIPER	CALIDRIS FERRUGINEA				
040-71148	01KOORAGANG ISLANDNSW	32d52m S	151d46mE 770129	+1	U	VAN GESSEL
40 05	4FCHUNGSHAN COUNTY CHINA	22d31m N	113d22mE 780514	U	U	GUI-GHAN SHOU
Distance: 7363 km	Direction: 321 degs.	Time elapsed:	1 yrs 3 mnths 16 days			
040-92431	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d3m S	144d32mE 761120	+1	U	ROBERTSON
02 14	01POINT CALIMERE TAMIL NADU INDIA	10d18m N	79d51m E 800829	U	U	BOMBAY NATURAL HISTORY SOCIETY
Distance: 8580 km	Direction: 294 degs.	Time elapsed:	3 yrs 9 mnths 9 days			
040-92807	16KOORAGANG ISLANDNSW	32d52m S	151d46mE 810103	+2	U	LANE
15 13	05SHANGHAI SHI CHONGMING DAO CHINA	31d38m N	121d27mE 810514	U	U	NATIONAL BIRD BANDING CENTER
Distance: 7822 km	Direction: 332 degs.	Time elapsed:	0 yrs 4 mnths 11 days			
040-93897	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 781125	J	U	VICTORIAN WADER STUDY GROUP
68 05	29YAKUT ASSR ALEKSEEVSKY REG USSR	62d23m N	133d32mE 890627	U	U	SOVIET BANDING SCHEME
Distance: 11208 k	Direction: 355 degs.	Time elapsed:	10 yrs 7 mnths 2 days			
040-95238	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 790310	+2	U	VICTORIAN WADER STUDY GROUP
15 03	0FMANUK ESTUARY INDRAMAYU W JAVA INDONES	6d20m S	108d19mE 850921	U	U	KARDJA
Distance: 5079 km	Direction: 304 degs.	Time elapsed:	6 yrs 6 mnths 11 days			
040-95458	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 790324	+2	U	VICTORIAN WADER STUDY GROUP
03 13	3FSAN TIN HONG KONG	22d30m N	114d4m E 800411	U	U	MELVILLE
Distance: 7421 km	Direction: 329 degs.	Time elapsed:	1 yrs 0 mnths 18 days			
040-97136	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 800113	+2	U	VICTORIAN WADER STUDY GROUP
40 00	5FNING-BO CHINA	29d54m N	121d33mE 800512	U	U	SHI-LAI
Distance: 7893 km	Direction: 338 degs.	Time elapsed:	0 yrs 3 mnths 30 days			
040-97184	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 801026	+2	U	VICTORIAN WADER STUDY GROUP
15 05	7FGESIK CIREBON DIST WEST JAVA INDONES	6d44m S	108d34mE 850801	U	U	CHARLIM
Distance: 5031 km	Direction: 304 degs.	Time elapsed:	4 yrs 9 mnths 6 days			
040-97272	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 800126	+1	U	VICTORIAN WADER STUDY GROUP
40 03	21YAKUT O VERKHOYANSKIY USSR	67d41m N	135d0m E 000000	U	U	SOVIET BANDING SCHEME
Distance: 11751 k	Direction: 356 degs.					
040-97417	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 800126	+2	U	VICTORIAN WADER STUDY GROUP
61 05	1FRICE FIELD 15K S HO CHI MINH CTY VIETN	10d44m N	106d45mE 830426	U	U	NGUYEN VAN DAU
Distance: 6680 km	Direction: 315 degs.	Time elapsed:	3 yrs 3 mnths 0 days			
040-97590	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 800126	+2	U	VICTORIAN WADER STUDY GROUP
15 03	05SHANGHAI SHI CHONGMING DAO CHINA	31d38m N	121d27mE 810515	U	U	NATIONAL BIRD BANDING CENTER
Distance: 8078 km	Direction: 339 degs.	Time elapsed:	1 yrs 3 mnths 20 days			
040-97759	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 800126	+2	U	VICTORIAN WADER STUDY GROUP
40 00	10GAOHU FUJIAN CHINA	26d0m N	119d18mE 840505	U	U	NATIONAL BIRD BANDING CENTER
Distance: 7564 km	Direction: 335 degs.	Time elapsed:	4 yrs 3 mnths 10 days			
040-98966	X6EAST SIDE PIPE CLAY LAGOONTAS	42d58m S	147d32mE 791123	+1	U	HARRIS
03 04	0FTAICHUNG TADU RIV MOUTH CENTRAL W TAIW	24d12m N	120d28mE 890407	U	U	ZE-DE
Distance: 7938 km	Direction: 333 degs.	Time elapsed:	9 yrs 4 mnths 14 days			
041-00221	01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO	38d5m S	144d31mE 800308	+2	U	VICTORIAN WADER STUDY GROUP
40 00	07HABAROVSKI REGION CHEGDOMYN USSR	51d7m N	133d2m E 800525	U	U	SOVIET BANDING SCHEME
Distance: 9942 km	Direction: 352 degs.	Time elapsed:	0 yrs 2 mnths 17 days			

041-04218 01RALPHS BAY (WEST)TAS 43d2m S 147d26mE 820110 +2 U SHOREBIRD STUDY GROUP (BOAT)
03 13 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 870426 +2 U MELVILLE
Distance: 8021 km Direction: 327 degs. Time elapsed: 5 yrs 3 mnths 16 days

041-04246 01RALPHS BAY (WEST)TAS 43d2m S 147d26mE 821205 J U SHOREBIRD STUDY GROUP (BOAT)
55 00 6FOFF THAILAND COAST 12d30m N 100d45mE 850403 U U UMYINTLWIN
Distance: 5605 km Direction: 292 degs. Time elapsed: 2 yrs 3 mnths 29 days

041-04433 01RALPHS BAY (WEST)TAS 43d2m S 147d26mE 830102 J U SHOREBIRD STUDY GROUP (BOAT)
05 13 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 840218 +2 U VICTORIAN WADER STUDY GROUP
Distance: 604 km Direction: 335 degs. Time elapsed: 1 yrs 1 mnths 16 days

041-05283 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 840218 +2 U VICTORIAN WADER STUDY GROUP
40 02 15SREDNEKOLYMSKIY REGION YAKUT ASSR USSR 67d9m N 153d36mE 840603 U U SOVIET BANDING SCHEME
Distance: 11690 k Direction: 3 degs. Time elapsed: 0 yrs 3 mnths 14 days

041-05498 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 840218 +1 U VICTORIAN WADER STUDY GROUP
57 02 X1BAN TAN YONG LU LO PATTANI THAILAND 6d55m N 101d15mE 840400 U U STARKS
Distance: 6697 km Direction: 308 degs. Time elapsed: 0 yrs 1 mnths 11 days

041-10300 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 841226 +2 U VICTORIAN WADER STUDY GROUP
67 03 13TANGGU NEAR TIANJIN CHINA 38d54m N 117d37mE 860615 U U NATIONAL BIRD BANDING CENTER
Distance: 9032 km Direction: 338 degs. Time elapsed: 1 yrs 5 mnths 20 days

041-12982 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 850126 +2 U VICTORIAN WADER STUDY GROUP
01 00 04FUJIAN PROVINCE LONGHAI CO. CHINA 24d24m N 117d48mE 850515 U U NATIONAL BIRD BANDING CENTER
Distance: 7481 km Direction: 333 degs. Time elapsed: 0 yrs 3 mnths 20 days

041-13702 0480 MILE BEACH 7 KM SOUTH ANNA PLAINS 19d15m S 121d25mE 831031 +3 U WA WADER STUDY GROUP
67 03 01SHANGDONG SHOUGUANG COUNTY CHINA 36d48m N 118d42mE 870512 U U NATIONAL BIRD BANDING CENTER
Distance: 6237 km Direction: 357 degs. Time elapsed: 3 yrs 6 mnths 11 days

041-13864 0480 MILE BEACH 7 KM SOUTH ANNA PLAINS 19d15m S 121d25mE 831105 +2 U WA WADER STUDY GROUP
01 00 2FLUHUA VILLAGE FUJIAN PROVINCE CHINA 25d44m N 119d22mE 860326 U U RENGUAN
Distance: 4982 km Direction: 357 degs. Time elapsed: 2 yrs 4 mnths 21 days

041-14038 03SALTWORKS, PORT HEDLANDWA 20d11m S 118d54mE 831109 2 U WA WADER STUDY GROUP
05 13 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 900408 U U MELVILLE
Distance: 4750 km Direction: 353 degs. Time elapsed: 6 yrs 4 mnths 29 days

041-14089 03SALTWORKS, PORT HEDLANDWA 20d11m S 118d54mE 831108 +2 U WA WADER STUDY GROUP
03 13 12BELE LAKE SHIRINSKY KHAKASSKY USSR 54d43m N 90d4m E 850818 U U SOVIET BANDING SCHEME
Distance: 8741 km Direction: 343 degs. Time elapsed: 1 yrs 9 mnths 10 days

041-17308 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850324 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 07EAST END OF CHONGMING ISLAND CHINA 31d30m N 121d52mE 890300 U U EAST CHINA WATERBIRD GROUP
Distance: 5503 km Direction: 359 degs.

041-17650 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 860323 +2 U VICTORIAN WADER STUDY GROUP
67 03 04YANGTZE RIVER CHINA 30d48m N 121d27mE 890517 U U EAST CHINA WATERBIRD GROUP
Distance: 7991 km Direction: 339 degs. Time elapsed: 3 yrs 1 mnths 25 days

041-17708 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850417 +2 U AUSTRALASIAN WADER STUDY GROUP
03 13 03SZO-TSAO TAIWAN 22d58m N 120d10mE 900429 U U TAIWAN BIRD BANDING CENTRE
Distance: 4538 km Direction: 356 degs. Time elapsed: 5 yrs 0 mnths 12 days

041-24668 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 870103 +2 U VICTORIAN WADER STUDY GROUP
03 13 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 870426 U U MELVILLE
Distance: 7446 km Direction: 329 degs. Time elapsed: 0 yrs 3 mnths 23 days

041-25257 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 870118 +2 U VICTORIAN WADER STUDY GROUP
03 13 05MAI PO MARSHES HONG KONG 22d29m N 114d19mE 910410 U U MELVILLE
Distance: 7432 km Direction: 330 degs. Time elapsed: 4 yrs 2 mnths 23 days

041-31101 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 870118 +2 U VICTORIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 890505 U U EAST CHINA WATERBIRD GROUP
Distance: 8020 km Direction: 339 degs. Time elapsed: 2 yrs 3 mnths 17 days

041-43141 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 880103 +2 U VICTORIAN WADER STUDY GROUP
06 13 8FTAJMYR PENINSULA NORTH SIBERIA USSR 76d4m N 98d32m E 910624 U U TOMKOVICH
Distance: 13096 k Direction: 349 degs. Time elapsed: 3 yrs 5 mnths 21 days

041-43622 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 880227 +2 U VICTORIAN WADER STUDY GROUP
67 03 15JIMO XIAN SHANDONG CHINA 36d18m N 120d24mE 880823 U U NATIONAL BIRD BANDING CENTER
Distance: 8599 km Direction: 340 degs. Time elapsed: 0 yrs 5 mnths 25 days

041-46645 05SALTWORKS, PORT HEDLANDWA 20d15m S 118d55mE 880409 +2 U AUSTRALASIAN WADER STUDY GROUP
03 13 05MAI PO MARSHES HONG KONG 22d29m N 114d19mE 910410 U U MELVILLE
Distance: 4777 km Direction: 354 degs. Time elapsed: 3 yrs 0 mnths 1 days

041-58597 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 900101 +2 U VICTORIAN WADER STUDY GROUP
03 13 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 900504 U U MELVILLE
Distance: 7479 km Direction: 328 degs. Time elapsed: 0 yrs 4 mnths 3 days

041-58597 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 900101 +2 U VICTORIAN WADER STUDY GROUP
03 13 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 900504 U U MELVILLE
Distance: 7479 km Direction: 328 degs. Time elapsed: 0 yrs 4 mnths 3 days

041-60318 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 910112 +2 U VICTORIAN WADER STUDY GROUP
25 16 5FYING KOU CITY PROVINCE OF LIAONING CHI 40d4m N 122d14mE 910510 U U ZHENG KUN
Distance: 9018 km Direction: 342 degs. Time elapsed: 0 yrs 3 mnths 28 days

041-62931 05SALTWORKS, PORT HEDLANDWA 20d15m S 118d55mE 900323 +1 U AUSTRALASIAN WADER STUDY GROUP
03 13 05MAI PO MARSHES HONG KONG 22d29m N 114d19mE 910410 U U MELVILLE
Distance: 4777 km Direction: 354 degs. Time elapsed: 1 yrs 0 mnths 18 days

GNB-19653 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 870426 +2 U MELVILLE
05 13 05SALTWORKS, PORT HEDLANDWA 20d15m S 118d55mE 900325 +2 U AUSTRALASIAN WADER STUDY GROUP
Distance: 4757 km Direction: 173 degs. Time elapsed: 2 yrs 10 mnths 29 days

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GNV-52467 03MAI PO MARSHES HONG KONG              22d29m N 114d2m E 900825   +2   U  MELVILLE
05 13     01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m  S 144d31mE 901230   +2   U  VICTORIAN WADER STUDY GROUP
Distance: 7445 km         Direction: 154 degs.              Time elapsed:   0 yrs 4 mnths 5 days

MM1-2903  01SERANGOON SEWERAGE WORKS SINGAPORE    1d23m  N 103d55mE 761009   +1   U  THE UNIVERSITY OF MALAYA
03 14     01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d3m  S 144d32mE 780303   +1   U  ROBERTSON
Distance: 6035 km         Direction: 140 degs.              Time elapsed:   1 yrs 4 mnths 25 days

S55-331?  01KHADYN LAKE 40 K STH KYZYL TUVA SSR US 51d18m N 94d36m E 820828   J    U  SOVIET BANDING SCHEME
05 14     0480 MILE BEACH 7 KM SOUTH ANNA PLAINS  19d15m S 121d25mE 831103   +1   U  WA WADER STUDY GROUP
Distance: 8242 km         Direction: 153 degs.              Time elapsed:   1 yrs 2 mnths 6 days
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Curlew Sandpipers are the third most frequently internationally recovered birds (after Great Knots and Double-banded Plovers) with a total of 42 recoveries. 041-43141 is potentially the most significant of these recoveries. This is the greatest single movement for a wader recorded for Australia. It was also recovered from a breeding area that had not previously been thought to contain Curlew Sandpipers from the East Asian Flyway. The bird was last seen alive with band on the Taimyr Peninsula. Another recovery of interest is the one fron India. Until recently no other Curlew Sandpipers had been recorded as moving between India and the East Asian Flyway. However, discussions with the Bombay Natural History Soceity revealed that they have had other recoveries from East China in recent years.

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162       RED-NECKED STINT                        CALIDRIS RUFICOLLIS
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032-10151 02PELICAN POINT, SWAN RIVERWA           31d59m S 115d49mE 740328   +1   U  LANE
40 00     3FCIREBON JAVA INDONESIA                6d44m  S 108d34mE 760200   U    U  SLAMET
Distance: 2895 km         Direction: 343 degs.              Time elapsed:   1 yrs 10 mnths 3 days

032-10431 23LASHMARS LAGOON KANGAROO ISLANDSA     35d49m S 138d3m E 750216   +1   U  LASHMAR
15 00     05SHANGHAI SHI CHONGMING DAO CHINA      31d38m N 121d27mE 810515   +2   M  NATIONAL BIRD BANDING CENTER
Distance: 7665 km         Direction: 344 degs.              Time elapsed:   6 yrs 2 mnths 27 days

032-10734 02PELICAN POINT, SWAN RIVERWA           31d59m S 115d49mE 741106   +1   U  LANE
15 00     05SHANGHAI SHI CHONGMING DAO CHINA      31d38m N 121d27mE 810417   U    U  NATIONAL BIRD BANDING CENTER
Distance: 7066 km         Direction: 5 degs.                Time elapsed:   6 yrs 5 mnths 11 days

032-10865 02PELICAN POINT, SWAN RIVERWA           31d59m S 115d49mE 750103   +1   U  LANE
15 05     6FGESIK CIREBON DIST WEST JAVA INDONESI 6d34m  S 108d32mE 810101   U    U  LEMAIN
Distance: 2913 km         Direction: 343 degs.              Time elapsed:   5 yrs 11 mnths 29 days

032-11759 X1STOCKYARD POINT WESTERN PORTVIC       38d25m S 145d23mE 741212   +1   U  EVANS
61 05     03TAREII LAKE BORZJA CHITA USSR         50d19m N 116d23mE 770910   U    U  SOVIET BANDING SCHEME
Distance: 10232 k         Direction: 341 degs.              Time elapsed:   2 yrs 8 mnths 29 days

032-14105 08ROEBUCK BAYWA                         18d4m  S 122d19mE 810830   +1   U  WA WADER STUDY GROUP
02 00     1FDIAN CHENG GUANGDONG CHINA            21d33m N 111d20mE 831222   U    U  JIAN
Distance: 4543 km         Direction: 344 degs.              Time elapsed:   2 yrs 3 mnths 23 days

032-17581 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m  S 144d31mE 790311   J    U  VICTORIAN WADER STUDY GROUP
01 05     5FQUINHON VIETNAM                       13d46m N 109d14mE 860420   U    U  HUOL
Distance: 6816 km         Direction: 320 degs.              Time elapsed:   7 yrs 1 mnths 9 days

032-19920 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m  S 144d31mE 790922   +2   U  VICTORIAN WADER STUDY GROUP
15 05     8FGESIK CIREBON DIST WEST JAVA INDONES  6d34m  S 108d32mE 820101   U    U  ADJID
Distance: 5031 km         Direction: 304 degs.              Time elapsed:   2 yrs 3 mnths 9 days

032-20571 34PIPECLAY LAGOON (EAST SIDE)TAS        42d58m S 147d32mE 791123   +2   U  SHOREBIRD STUDY GROUP (BOAT)
01 00     0FLUHUA VILLAGE FUJIAN PROVINCE CHINA   25d44m N 119d22mE 860326   U    U  RENGUAN
Distance: 8136 km         Direction: 333 degs.              Time elapsed:   6 yrs 4 mnths 3 days

032-22668 16SOUTH END OF PIPECLAY LAGOONTAS       42d59m S 147d31mE 791122   +2   U  SHOREBIRD STUDY GROUP (BOAT)
61 05     11CHITA O KALARSKIY REGION USSR         56d34m N 115d51mE 830700   U    U  SOVIET BANDING SCHEME
Distance: 11425 k         Direction: 342 degs.
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032-24453 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 800126 J U VICTORIAN WADER STUDY GROUP
02 00 2FDA NANG VIETNAM 16d4m N 108d14mE 830501 U U MINH XUAN
Distance: 7090 km Direction: 320 degs. Time elapsed: 3 yrs 3 mnths 6 days

032-29193 01RALPHS BAY (WEST)TAS 43d2m S 147d26mE 810920 +2 U SHOREBIRD STUDY GROUP (BOAT)
01 00 06SHANGHAI CHONGMING DAO CHINA 31d36m N 121d18mE 850500 U U NATIONAL BIRD BANDING CENTER
Distance: 8682 km Direction: 337 degs.

032-29403 34PIPECLAY LAGOON (EAST SIDE)TAS 42d58m S 147d32mE 811129 J U SHOREBIRD STUDY GROUP (BOAT)
01 00 03TIANJING TANGGU CHINA 38d55m N 117d36mE 850515 U U NATIONAL BIRD BANDING CENTER
Distance: 9257 km Direction: 335 degs. Time elapsed: 3 yrs 5 mnths 16 days

032-30357 X11CI SALTFIELDS NEAR ADELAIDESA 34d42m S 138d29mE 800215 +2 U SHURCLIFF
02 00 05SHANGHAI SHI CHONGMING DAO CHINA 31d38m N 121d27mE 810430 U U NATIONAL BIRD BANDING CENTER
Distance: 7556 km Direction: 344 degs. Time elapsed: 1 yrs 2 mnths 15 days

032-31696 075 KM SW USELESS LOOP SHARK BAYWA 26d13m S 113d23mE 810928 +2 U WA WADER STUDY GROUP
15 05 4FTAN YONG LU LO E OF PATTANI THAILA 6d55m N 101d15mE 840101 U U TEH
Distance: 3893 km Direction: 338 degs. Time elapsed: 2 yrs 3 mnths 3 days

032-33596 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 811125 +2 U VICTORIAN WADER STUDY GROUP
61 05 7FKHASAN DISTRICT PRIMORYE REGION USSR 42d51m N 131d21mE 821000 U U TATARINOV
Distance: 9058 km Direction: 350 degs.

032-34683 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 820221 1 U VICTORIAN WADER STUDY GROUP
41 02 19SASKYLAK ANABARSKIY YAKUT ASSR USSR 71d59m N 114d0m E 840601 U U SOVIET BANDING SCHEME
Distance: 12435 k Direction: 350 degs. Time elapsed: 2 yrs 3 mnths 8 days

032-35435 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 820724 1 U VICTORIAN WADER STUDY GROUP
01 00 06SHANGHAI CHONGMING DAO CHINA 31d36m N 121d18mE 840600 U U NATIONAL BIRD BANDING CENTER
Distance: 8079 km Direction: 339 degs.

032-35985 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 821204 1 U VICTORIAN WADER STUDY GROUP
61 03 0FKOMPONG BINSULOK SABAH 5d33m N 115d45mE 830425 U U SHELDON
Distance: 5737 km Direction: 320 degs. Time elapsed: 0 yrs 4 mnths 21 days

032-36273 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 821204 +2 U VICTORIAN WADER STUDY GROUP
15 05 9FPABEAN CI MANUK ESTUARY W JAVA INDONES 6d16m S 108d18mE 851024 U U KARDJA
Distance: 5151 km Direction: 303 degs. Time elapsed: 2 yrs 10 mnths 20 days

032-37294 08ROEBUCK BAYWA 18d4m S 122d19mE 820819 2 U WA WADER STUDY GROUP
67 03 13TANGGU NEAR TIANJIN CHINA 38d54m N 117d37mE 860615 U U NATIONAL BIRD BANDING CENTER
Distance: 6325 km Direction: 355 degs. Time elapsed: 3 yrs 9 mnths 27 days

032-38839 06BARRY BEACH CORNER INLETVIC 38d42m S 146d23mE 830109 +2 U VICTORIAN WADER STUDY GROUP
02 00 2FDA NANG VIETNAM 16d4m N 108d14mE 830501 U U MINH XUAN
Distance: 7249 km Direction: 319 degs. Time elapsed: 0 yrs 3 mnths 23 days

032-40741 05YALLOCK CREEK NEAR KOOWEERUPVIC 38d13m S 145d28mE 840129 +2 U VICTORIAN WADER STUDY GROUP
67 03 04YANGTZE RIVER CHINA 30d48m N 121d27mE 890517 U U EAST CHINA WATERBIRD GROUP
Distance: 8037 km Direction: 338 degs. Time elapsed: 5 yrs 3 mnths 19 days

032-44968 01RALPHS BAY (WEST)TAS 43d2m S 147d26mE 861206 1 U SHOREBIRD STUDY GROUP (BOAT)
03 13 4FDA TU TADU RIVER TAICHUNG TAIWAN 24d15m N 120d30mE 880813 U U TURMAN LAI
Distance: 7945 km Direction: 334 degs. Time elapsed: 1 yrs 8 mnths 7 days

032-51501 01RALPHS BAY (WEST)TAS 43d2m S 147d26mE 861206 2 U SHOREBIRD STUDY GROUP (BOAT)
03 13 03MAI PO MARSHES HONG KONG 22d29m N 114d2m E 870523 U U MELVILLE
Distance: 8021 km Direction: 327 degs. Time elapsed: 0 yrs 5 mnths 17 days

032-54546 06BARRY BEACH CORNER INLETVIC 38d42m S 146d23mE 850804 2 U VICTORIAN WADER STUDY GROUP
03 14 4FAGANO RIVER NIIGATA CITY JAPAN 37d58m N 139d7m E 870726 +2 U CHIBA
Distance: 8522 km Direction: 354 degs. Time elapsed: 1 yrs 11 mnths 22 days

032-74765 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 860329 1 U VICTORIAN WADER STUDY GROUP
61 03 25KOBYAYSKY YAKUT ASSR USSR 63d24m N 125d27mE 870614 U U SOVIET BANDING SCHEME
Distance: 11397 k Direction: 351 degs. Time elapsed: 1 yrs 2 mnths 16 days

032-75856 02POINT COOK, ALTONAVIC 37d55m S 144d46mE 861025 2 U VICTORIAN WADER STUDY GROUP
99 05 4FAT A SALT PAN HANGU CHINA 39d15m N 117d47mE 870517 U U YAN-GONG
Distance: 8979 km Direction: 339 degs. Time elapsed: 0 yrs 6 mnths 23 days

033-42671 PLSALINE SWAMP SE SIDE OF PORT AUGUSTASA 32d31m S 137d47mE 890217 +1 U KLAU
03 13 1FTA-TU-HSI TAIWAN 24d12m N 120d28mE 890506 U U LIANG
Distance: 6541 km Direction: 341 degs. Time elapsed: 0 yrs 2 mnths 17 days

033-42671 PLSALINE SWAMP SE SIDE OF PORT AUGUSTASA 32d31m S 137d47mE 890217 +1 U KLAU
03 13 1FTA-TU-HSI TAIWAN 24d12m N 120d28mE 890506 U U LIANG
Distance: 6541 km Direction: 341 degs. Time elapsed: 0 yrs 2 mnths 17 days

033-43127 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 880220 1 U VICTORIAN WADER STUDY GROUP
68 05 7FXUAN THUY RESERVE VIETNAM 20d10m N 106d20mE 900300 U U VO QUY
Distance: 7626 km Direction: 321 degs.

033-65884 03INVERLOCH (ANDERSONS INLET & PT. SMYTH 38d37m S 145d45mE 881120 +2 U VICTORIAN WADER STUDY GROUP
67 05 06HANGZHOU BAY CHINA 30d48m N 121d27mE 900512 U U EAST CHINA WATERBIRD GROUP
Distance: 8117 km Direction: 338 degs. Time elapsed: 1 yrs 5 mnths 22 days

033-70197 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 890219 +2 U VICTORIAN WADER STUDY GROUP
68 05 7FXUAN THUY RESERVE VIETNAM 20d10m N 106d20mE 900300 U U VO QUY
Distance: 7602 km Direction: 321 degs.

GNB-19517 02SAN TIN HONG KONG 22d30m N 114d4m E 800512 +2 U BTO RINGING & MIGRATION SECTN
05 13 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 820327 +2 U VICTORIAN WADER STUDY GROUP
Distance: 7446 km Direction: 154 degs. Time elapsed: 1 yrs 10 mnths 15 days

GNB-19540 02SAN TIN HONG KONG 22d30m N 114d4m E 800512 +1 U BTO RINGING & MIGRATION SECTN
05 14 34PIPECLAY LAGOON (EAST SIDE)TAS 42d58m S 147d32mE 801122 U U SHOREBIRD STUDY GROUP (BOAT)
Distance: 8019 km Direction: 154 degs. Time elapsed: 0 yrs 6 mnths 10 days

J20-56374 05GAMOU SENDAI-SHI MIYAGI JAPAN 38d15m N 141d1m E 760830 U U YAMASHINA INST FOR ORNITHOLOGY
03 13 16KOORAGANG ISLANDNSW 32d52m S 151d46mE 761022 U U LANE
Distance: 7952 km Direction: 170 degs. Time elapsed: 0 yrs 1 mnths 23 days

SP7-29029 01KHADYN LAKE 40 K STH KYZYL TUVA SSR US 51d18m N 94d36m E 840907 J U SOVIET BANDING SCHEME
05 14 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850419 1 U AUSTRALASIAN WADER STUDY GROUP
Distance: 8164 km Direction: 152 degs. Time elapsed: 0 yrs 7 mnths 12 days

SS9-25103 02MAGADAN CHUCKOTKA UELEN USSR 66d9m N 169d47mE 790617 +2 F SOVIET BANDING SCHEME
02 13 X4POINT WAYLEN PERTHWA 32d2m S 115d48mE 801025 U U LANE
Distance: 11812 k Direction: 225 degs. Time elapsed: 1 yrs 4 mnths 8 days

A total of 38 international recoveries from 10 countries along the East Asian Flyway. The distribution of recoveries would seem to indicate a migration strategy employing shorter flights and hence the utilization of a greater number of wetlands along the flyway than species such as the Red Knot.

163 SHARP-TAILED SANDPIPER CALIDRIS ACUMINATA

040-13531 X1PELICAN POINT PERTHWA 31d59m S 115d49mE 610105 +2 M NICHOLLS AM
40 03 0412KM NORTH BATAGAJ USSR 67d40m N 135d20mE 610528 U U SOVIET BANDING SCHEME
Distance: 11169 k Direction: 7 degs. Time elapsed: 0 yrs 4 mnths 23 days

040-94391 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 790127 +2 U VICTORIAN WADER STUDY GROUP
40 00 08QIANSHAN LIAONING CHINA 41d0m N 123d6m E 800616 U U NATIONAL BIRD BANDING CENTER
Distance: 9021 km Direction: 343 degs. Time elapsed: 1 yrs 4 mnths 20 days

041-01835 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 811127 +2 U VICTORIAN WADER STUDY GROUP
01 13 5FTADU R.,COAST OF TAIWAN STRAIT, TAIWAN 24d15m N 120d30mE 850502 U U SEN-SHYOUNG WU
Distance: 7339 km Direction: 335 degs. Time elapsed: 3 yrs 5 mnths 5 days

041-05708 T1SALT PONDS 12 KM W OF BURRABOINSW 35d22m S 144d12mE 880131 +2 U MAHER
67 05 06HANGZHOU BAY CHINA 30d48m N 121d27mE 900512 U U EAST CHINA WATERBIRD GROUP
Distance: 7730 km Direction: 339 degs. Time elapsed: 2 yrs 3 mnths 11 days

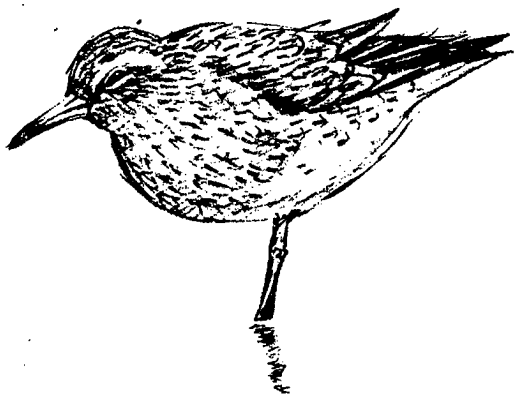
050-58964 01KOORAGANG ISLANDNSW 32d52m S 151d46mE 770129 +1 U VAN GESSEL
15 19 4FTAMBAKAN JAVA INDONESIA 7d3m S 110d40mE 821122 U U COMAN
Distance: 5113 km Direction: 294 degs. Time elapsed: 5 yrs 9 mnths 24 days

051-01012 02WOOLOOWARE BAY BOTANY BAYNSW 34d2m S 151d8m E 770212 +1 U WHITE
15 05 9FHUI AN COUNTY FUJIAN CHINA 25d7m N 119d5m E 770410 U U LI MIN
Distance: 7371 km Direction: 328 degs. Time elapsed: 0 yrs 1 mnths 26 days

051-02682 04RUSH LAGOON (NORTHERN END) KANGAROO IS 35d50m S 137d32mE 840229 +2 U LASHMAR
01 00 06SHANGHAI CHONGMING DAO CHINA 31d36m N 121d18mE 840400 U U NATIONAL BIRD BANDING CENTER
Distance: 7655 km Direction: 345 degs. Time elapsed: 0 yrs 1 mnths 0 days

051-06106 04SANDERSON SEWAGE FARM 12KM NE OF DARWI 12d22m S 130d54mE 781117 +2 U HERTOG
67 03 0FHANGZHOU BAY SHANGHAI CHINA 30d51m N 121d32mE 830412 U U SIQUAN , ECWESG
Distance: 4886 km Direction: 348 degs. Time elapsed: 4 yrs 4 mnths 24 days

051-08339 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 800126 +2 U VICTORIAN WADER STUDY GROUP
99 05 17ABIYSKIY REGION YAKUT ASSR USSR 68d20m N 144d33mE 840528 U U SOVIET BANDING SCHEME
Distance: 11796 k Direction: 0 degs. Time elapsed: 4 yrs 4 mnths 2 days



164 RED KNOT CALIDRIS CANUTUS

050-10307 02PELICAN POINT, SWAN RIVERWA 31d59m S 115d49mE 731030 +1 U LANE
99 05 5FOKARO BAY NEW ZEALAND 36d18m S 174d9m E 760320 U U COOKSEY
Distance: 5320 km Direction: 112 degs. Time elapsed: 2 yrs 4 mnths 21 days

050-85436 54WARD SPIT 10KM WNW PT GERMEINSA 33d1m S 137d55mE 811227 +1 U WATERMAN OAM
01 00 01SHANGDONG SHOUGUANG COUNTY CHINA 36d48m N 118d42mE 850501 U U NATIONAL BIRD BANDING CENTER
Distance: 7983 km Direction: 343 degs. Time elapsed: 3 yrs 4 mnths 5 days

050-85642 54WARD SPIT 10KM WNW PT GERMEINSA 33d1m S 137d55mE 811227 +1 U WATERMAN OAM
40 00 09RUI'AN ZHEJIANG CHINA 27d42m N 120d36mE 840706 U U NATIONAL BIRD BANDING CENTER
Distance: 6965 km Direction: 342 degs. Time elapsed: 2 yrs 6 mnths 10 days

051-00208 16KOORAGANG ISLANDNSW 32d52m S 151d46mE 761228 +2 U LANE
06 05 7FHANGZHOU BAY SHANGHAI CHINA 30d47m N 121d25mE 860419 U U WANG TIANHOU & LU JIN-JIN
Distance: 7740 km Direction: 332 degs. Time elapsed: 9 yrs 3 mnths 22 days

051-02342 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 821031 +2 U VICTORIAN WADER STUDY GROUP
05 13 14SE KAIPARA HARBOUR NEW ZEALAND 36d30m S 174d20mE 870228 +2 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 4 yrs 3 mnths 28 days

051-08441 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 800322 1 U VICTORIAN WADER STUDY GROUP
99 05 08MAGADAN O OLYSKIY REGION USSR 59d35m N 151d15mE 820728 U U SOVIET BANDING SCHEME
Distance: 10860 k Direction: 3 degs. Time elapsed: 2 yrs 4 mnths 6 days

051-08452 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 800322 +2 U VICTORIAN WADER STUDY GROUP
67 05 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 890430 U U EAST CHINA WATERBIRD GROUP
Distance: 8015 km Direction: 339 degs. Time elapsed: 9 yrs 1 mnths 8 days

051-11419 54WARD SPIT 10KM WNW PT GERMEINSA 33d1m S 137d55mE 811227 P U WATERMAN OAM
99 03 23UST ALDANSKI YAKUT ASSR USSR 62d38m N 131d58mE 820715 U U SOVIET BANDING SCHEME
Distance: 10616 k Direction: 357 degs. Time elapsed: 0 yrs 6 mnths 19 days

051-11472 54WARD SPIT 10KM WNW PT GERMEINSA 33d1m S 137d55mE 811227 +1 U WATERMAN OAM
01 00 02SHANDONG YANTAI CHINA 37d30m N 121d24mE 840728 U U NATIONAL BIRD BANDING CENTER
Distance: 7993 km Direction: 346 degs. Time elapsed: 2 yrs 7 mnths 1 days

051-11482 54WARD SPIT 10KM WNW PT GERMEINSA 33d1m S 137d55mE 811227 P U WATERMAN OAM
40 03 22SOMEWERE IN NTH YAKUTIA YAKUT ASSR USS 0d0m N 0d0m E 880817 U U SOVIET BANDING SCHEME
Distance: 999999 Direction: 9999 degs Time elapsed: 6 yrs 7 mnths 21 days

051-11482 54WARD SPIT 10KM WNW PT GERMEINSA 33d1m S 137d55mE 811227 P U WATERMAN OAM
25 09 26CHITA O MOGOCHINSKY USSR 53d47m N 119d48mE 880823 U U SOVIET BANDING SCHEME
Distance: 9774 km Direction: 349 degs. Time elapsed: 6 yrs 7 mnths 27 days

051-15251 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 861108 1 U VICTORIAN WADER STUDY GROUP
05 13 6FSE KAIPARA HARBOUR NEW ZEALAND 36d34m S 174d26mE 890223 U U REIGEN
Distance: 2624 km Direction: 95 degs. Time elapsed: 2 yrs 3 mnths 15 days

051-15251 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 861108 1 U VICTORIAN WADER STUDY GROUP
05 14 8FMIRANDA FIRTH OF THAMES NEW ZEALAND 37d10m S 175d19mE 901103 U U BANDERS
Distance: 2686 km Direction: 97 degs. Time elapsed: 3 yrs 11 mnths 26 days

051-15386 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 861108 +3 U VICTORIAN WADER STUDY GROUP
05 13 14SE KAIPARA HARBOUR NEW ZEALAND 36d30m S 174d20mE 870228 +3 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 0 yrs 3 mnths 20 days

051-15556 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 881001 +3 U VICTORIAN WADER STUDY GROUP
05 13 6FSE KAIPARA HARBOUR NEW ZEALAND 36d34m S 174d26mE 890223 U U REIGEN
Distance: 2631 km Direction: 95 degs. Time elapsed: 0 yrs 4 mnths 22 days

051-16166 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 840603 1 U VICTORIAN WADER STUDY GROUP
05 13 14SE KAIPARA HARBOUR NEW ZEALAND 36d30m S 174d20mE 870228 1 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 2 yrs 8 mnths 25 days

051-16176 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 840603 1 U VICTORIAN WADER STUDY GROUP
99 03 7FSTH MANAKAU HARBOUR AUCKLAND NEW ZEALA 37d5m S 174d49mE 850519 U U RIEGEN
Distance: 2651 km Direction: 96 degs. Time elapsed: 0 yrs 11 mnths 16 days

051-18162 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 851019 +3 U VICTORIAN WADER STUDY GROUP
67 05 4FYANGTZE RIVER ESTUARY CHINA 30d52m N 121d52mE 870426 U U KUAI / DR JIANG XIONGLONG
Distance: 8010 km Direction: 339 degs. Time elapsed: 1 yrs 6 mnths 7 days

051-18305 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 851019 +3 U VICTORIAN WADER STUDY GROUP
05 13 14SE KAIPARA HARBOUR NEW ZEALAND 36d30m S 174d20mE 870228 +3 U NEW ZEALAND BANDING SCHEME
Distance: 2624 km Direction: 95 degs. Time elapsed: 1 yrs 4 mnths 9 days

051-18325 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 851019 1 U VICTORIAN WADER STUDY GROUP
67 05 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 890502 U U EAST CHINA WATERBIRD GROUP
Distance: 8015 km Direction: 339 degs. Time elapsed: 3 yrs 6 mnths 14 days

051-27757 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 850413 +2 U AUSTRALASIAN WADER STUDY GROUP
68 05 05MIAO-GANG YANGTZE RIVER ESTUARY CHINA 30d52m N 121d52mE 900412 U U EAST CHINA WATERBIRD GROUP
Distance: 5572 km Direction: 1 degs. Time elapsed: 4 yrs 11 mnths 30 days

051-28105 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 1 U AUSTRALASIAN WADER STUDY GROUP
06 05 7FHANGZHOU BAY SHANGHAI CHINA 30d47m N 121d25mE 860521 U U TIANHOU
Distance: 5424 km Direction: 359 degs. Time elapsed: 1 yrs 1 mnths 3 days

051-38886 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 880403 +2 U AUSTRALASIAN WADER STUDY GROUP
67 03 0FHANGZHOU BAY SHANGHAI CHINA 30d49m N 121d28mE 880503 U U TIANHOU
Distance: 5540 km Direction: 0 degs. Time elapsed: 0 yrs 1 mnths 0 days

051-54414 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 900409 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 6FFENGXIAN COAST OF SHANGHAI CHINA 30d50m N 121d45mE 910414 U U SHIQUAN
Distance: 5429 km Direction: 359 degs. Time elapsed: 1 yrs 0 mnths 5 days

061-31435 01WERRIBEE SEWERAGE FARM (SPIT, PT WILSO 38d5m S 144d31mE 790127 J U VICTORIAN WADER STUDY GROUP
05 13 7FKAIPARA HARBOUR NORTH ISLAND NEW ZEALA 36d20m S 174d20mE 800302 U U VEITCH
Distance: 2641 km Direction: 95 degs. Time elapsed: 1 yrs 1 mnths 6 days

NC3-1629 13TARAMAIRE FIRTH OF THAMES NEW ZEALAND 37d20m S 175d20mE 800817 +2 U NEW ZEALAND BANDING SCHEME
35 03 6FLIGHT TOWER SANDY CAPE MARYBOROUGHQLD 24d42m S 153d15mE 810331 U U SUTTON
Distance: 2521 km Direction: 297 degs. Time elapsed: 0 yrs 7 mnths 14 days

NC4-5844 34MIRANDA FIRTH OF THAMES NEW ZEALAND 37d10m S 175d19mE 901103 +1 U NEW ZEALAND BANDING SCHEME
67 05 05MIAO-GANG YANGTZE RIVER ESTUARY CHINA 30d52m N 121d52mE 910414 U U EAST CHINA WATERBIRD GROUP
Distance: 9384 km Direction: 316 degs. Time elapsed: 0 yrs 5 mnths 11 days

165	GREAT KNOT	CALIDRIS TENUIROSTRIS				
061-00236	02PELICAN POINT, SWAN RIVERWA	31d59m S	115d49mE	741205	+1	U LANE
67 05	18CHONGMING ISLAND SHANGHAI CHINA	31d27m N	121d53mE	850500	U	U NATIONAL BIRD BANDING CENTER
Distance: 7081 km	Direction: 6 degs.					
061-00276	08ROEBUCK BAYWA	18d4m S	122d19mE	810830	U	U WA WADER STUDY GROUP
67 03	0FHANGZHOU BAY SHANGHAI CHINA	30d51m N	121d32mE	830408	U	U SIQUAN , ECWESG
Distance: 5413 km	Direction: 359 degs.	Time elapsed: 1 yrs 7 mnths 9 days				
061-31238	08ROEBUCK BAYWA	18d4m S	122d19mE	810830	U	U WA WADER STUDY GROUP
67 03	0FHANGZHOU BAY SHANGHAI CHINA	30d51m N	121d32mE	830401	U	U SIQUAN , ECWESG
Distance: 5413 km	Direction: 359 degs.	Time elapsed: 1 yrs 7 mnths 2 days				
061-37861	04SWAN ISLAND QUEENSCLIFFVIC	38d15m S	144d40mE	841230	1	U VICTORIAN WADER STUDY GROUP
67 05	01EAST CHONGMING ISLAND SHANGHAI CHINA	31d30m N	121d52mE	880000	U	U EAST CHINA WATERBIRD GROUP
Distance: 8076 km	Direction: 339 degs.					
061-37953	08ROEBUCK BAYWA	18d4m S	122d19mE	810830	U	U WA WADER STUDY GROUP
67 03	0FHANGZHOU BAY SHANGHAI CHINA	30d51m N	121d32mE	830402	U	U SIQUAN , ECWESG
Distance: 5413 km	Direction: 359 degs.	Time elapsed: 1 yrs 7 mnths 3 days				
061-38111	0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA	19d15m S	121d20mE	820824	2	U WA WADER STUDY GROUP
03 13	6FHANGZHOU BAY, SHANGHAI SUBURB CHINA	30d47m N	121d25mE	850405	U	U WANG TIANHOU
Distance: 5536 km	Direction: 0 degs.	Time elapsed: 2 yrs 7 mnths 12 days				
061-38139	0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA	19d15m S	121d20mE	820824	+2	U WA WADER STUDY GROUP
05 13	09KHABAROVSK K SCHASTYA BAY CHKALOV I US	53d25m N	141d12mE	850700	U	U SOVIET BANDING SCHEME
Distance: 8300 km	Direction: 12 degs.					
061-38145	0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA	19d15m S	121d20mE	820824	2	U WA WADER STUDY GROUP
67 03	0FHANGZHOU BAY SHANGHAI CHINA	30d51m N	121d32mE	830330	U	U SIQUAN , ECWESG
Distance: 5544 km	Direction: 0 degs.	Time elapsed: 0 yrs 7 mnths 6 days				
061-38177	0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA	19d15m S	121d20mE	820824	2	U WA WADER STUDY GROUP
02 03	07CHONGMING IS SHANGHAI CHINA	31d38m N	121d27mE	870500	1	U NATIONAL BIRD BANDING CENTER
Distance: 5657 km	Direction: 0 degs.					
061-38231	0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA	19d15m S	121d20mE	820824	2	U WA WADER STUDY GROUP
67 05	8FHANGZHOU BAY SHANGHAI CHINA	30d51m N	121d32mE	880404	U	U TIANHOU
Distance: 5544 km	Direction: 0 degs.	Time elapsed: 5 yrs 7 mnths 11 days				
061-38245	0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA	19d15m S	121d20mE	820824	+2	U WA WADER STUDY GROUP
67 03	1FCHONGMING ISLAND SHANGHAI CHINA	31d27m N	121d53mE	870900	U	U ZHANG
Distance: 5611 km	Direction: 0 degs.					
061-38249	0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA	19d15m S	121d20mE	820824	+2	U WA WADER STUDY GROUP
01 00	06SHANGHAI CHONGMING DAO CHINA	31d36m N	121d18mE	860416	U	U NATIONAL BIRD BANDING CENTER
Distance: 5627 km	Direction: 359 degs.	Time elapsed: 3 yrs 7 mnths 23 days				

061-38253 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 +2 U WA WADER STUDY GROUP
67 03 3FCHONGMING ISLAND SHANGHAI CHINA 31d27m N 121d53mE 000000 U U ZHOU SHI-E
Distance: 5611 km Direction: 0 degs.

061-38266 0480 MILE BEACH 7 KM SOUTH ANNA PLAINS 19d15m S 121d25mE 820908 +2 U WA WADER STUDY GROUP
61 05 13KAMCHATKA O UST-KHAYRYUZOVO USSR 57d7m N 156d45mE 830829 U U SOVIET BANDING SCHEME
Distance: 9079 km Direction: 18 degs. Time elapsed: 0 yrs 11 mnths 21 days

061-38311 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
01 00 05SHANGHAI SHI CHONGMING DAO CHINA 31d38m N 121d27mE 850501 U U NATIONAL BIRD BANDING CENTER
Distance: 5631 km Direction: 0 degs. Time elapsed: 2 yrs 8 mnths 8 days

061-38342 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
67 05 8FHANGZHOU BAY SHANGHAI CHINA 30d47m N 121d35mE 870408 U U LU
Distance: 5536 km Direction: 0 degs. Time elapsed: 4 yrs 7 mnths 15 days

061-38347 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
67 03 1FCHONGMING ISLAND SHANGHAI CHINA 31d27m N 121d53mE 870900 U U ZHANG
Distance: 5611 km Direction: 0 degs.

061-38354 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
67 03 0FHANGZHOU BAY SHANGHAI CHINA 30d51m N 121d32mE 830401 U U SIQUAN , ECWESG
Distance: 5544 km Direction: 0 degs. Time elapsed: 0 yrs 7 mnths 8 days

061-38356 0480 MILE BEACH 7 KM SOUTH ANNA PLAINS 19d15m S 121d25mE 820824 +2 U WA WADER STUDY GROUP
67 05 01EAST CHONGMING ISLAND SHANGHAI CHINA 31d30m N 121d52mE 880000 U U EAST CHINA WATERBIRD GROUP
Distance: 5616 km Direction: 0 degs.

061-38418 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
06 05 7FHANGZHOU BAY SHANGHAI CHINA 30d47m N 121d25mE 840400 U U WANG TIANHOU & LU JIN-JIN
Distance: 5536 km Direction: 0 degs.

061-38504 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
01 00 1FLUHUA VILLAGE FUJIAN PROVINCE CHINA 25d44m N 119d22mE 860326 U U RENGUAN
Distance: 4981 km Direction: 357 degs. Time elapsed: 3 yrs 7 mnths 2 days

061-38528 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
67 03 0FHANGZHOU BAY SHANGHAI CHINA 30d51m N 121d32mE 830408 U U SIQUAN , ECWESG
Distance: 5544 km Direction: 0 degs. Time elapsed: 0 yrs 7 mnths 15 days

061-38571 0210 KM SOUTH OF ANNA PLAINS 80 MILE BEA 19d15m S 121d20mE 820824 2 U WA WADER STUDY GROUP
68 03 3FKHABAROVSKIJ KRAJ NIKOLAEVSKIJ DIST US 53d12m N 140d45mE 890913 U U ANONYMOUS
Distance: 8268 km Direction: 12 degs. Time elapsed: 7 yrs 0 mnths 20 days

061-39401 096K SW OF BROOMEWA 17d58m S 122d16mE 820330 +1 U WA WADER STUDY GROUP
68 05 7FTUGURSKI BAY OKHOTSK SEA COAST USSR 53d47m N 136d45mE 870800 U U PRONKEVICH
Distance: 8096 km Direction: 9 degs.

061-39485 096K SW OF BROOMEWA 17d58m S 122d16mE 820330 U U WA WADER STUDY GROUP
01 00 06SHANGHAI CHONGMING DAO CHINA 31d36m N 121d18mE 860416 U U NATIONAL BIRD BANDING CENTER
Distance: 5486 km Direction: 358 degs. Time elapsed: 4 yrs 0 mnths 17 days

061-39638 096K SW OF BROOMEWA 17d58m S 122d16mE 820330 U U WA WADER STUDY GROUP
67 03 3FCHONGMING ISLAND SHANGHAI CHINA 31d27m N 121d53mE 000000 U U ZHOU SHI-E
Distance: 5468 km Direction: 359 degs. Time elapsed: -6 yrs 0 mnths 0 days

061-39743 096K SW OF BROOMEWA 17d58m S 122d16mE 820401 +2 U WA WADER STUDY GROUP
67 05 01EAST CHONGMING ISLAND SHANGHAI CHINA 31d30m N 121d52mE 910421 U U EAST CHINA WATERBIRD GROUP
Distance: 5499 km Direction: 360 degs. Time elapsed: 9 yrs 0 mnths 20 days

061-39785 08ROEBUCK BAYWA 18d4m S 122d19mE 820904 2 U WA WADER STUDY GROUP
67 05 6FCHONGMING ISLAND SHANGHAI 31d28m N 121d27mE UNKNWN U U SIXIAN & ZHAO XIAO
Distance: 999999 Direction: 0 degs.

061-39973 04SWAN ISLAND QUEENSCLIFFVIC 38d15m S 144d40mE 860105 +2 U VICTORIAN WADER STUDY GROUP
06 05 7FHANGZHOU BAY SHANGHAI CHINA 30d47m N 121d25mE 860420 U U WANG TIANHOU & LU JIN-JIN
Distance: 8015 km Direction: 339 degs. Time elapsed: 0 yrs 3 mnths 15 days

061-41066 X1ROEBUCK BAY NORTHWA 17d59m S 122d18mE 831027 +3 U WA WADER STUDY GROUP
06 05 7FESTUARY OF YANGTZE RIVER SHANGHAI CHIN 30d52m N 121d25mE 870417 U U TIANHOU
Distance: 5406 km Direction: 358 degs. Time elapsed: 3 yrs 5 mnths 21 days

061-41608 1680 MILE BEACH 3KM SOUTH OF ANNA PLAINS 19d15m S 121d23mE 831031 +3 U WA WADER STUDY GROUP
67 05 01EAST CHONGMING ISLAND SHANGHAI CHINA 31d30m N 121d52mE 910421 U U EAST CHINA WATERBIRD GROUP
Distance: 5642 km Direction: 1 degs. Time elapsed: 7 yrs 5 mnths 21 days

061-41973 03SALTWORKS, PORT HEDLANDWA 20d11m S 118d54mE 831108 +3 U WA WADER STUDY GROUP
06 13 5FHANGZHOU BAY, SHANGHAI SUBURB CHINA 30d47m N 121d25mE 850328 U U WANG TIANHOU
Distance: 5646 km Direction: 2 degs. Time elapsed: 1 yrs 4 mnths 20 days

061-44140 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850325 +2 U AUSTRALASIAN WADER STUDY GROUP
03 13 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900407 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 5 yrs 0 mnths 13 days

061-44140 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850325 +2 U AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900407 U U EAST CHINA WATERBIRD GROUP
Distance: 5401 km Direction: 358 degs. Time elapsed: 5 yrs 0 mnths 13 days

061-44278 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850325 J U AUSTRALASIAN WADER STUDY GROUP
67 03 1FCHONGMING ISLAND SHANGHAI CHINA 31d27m N 121d53mE 860400 U U ZHANG
Distance: 5472 km Direction: 359 degs.

061-44355 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850326 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 6FFENGXIAN COAST OF SHANGHAI CHINA 30d50m N 121d45mE 900409 U U SHIQUAN
Distance: 5429 km Direction: 359 degs. Time elapsed: 5 yrs 0 mnths 14 days

061-44521 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 850413 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 8FHANGZHOU BAY SHANGHAI CHINA 30d51m N 121d32mE 880414 U U TIANHOU
Distance: 5544 km Direction: 0 degs. Time elapsed: 3 yrs 0 mnths 1 days

061-44558 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 850413 1 U AUSTRALASIAN WADER STUDY GROUP
61 03 27KHABAROUSK NIKOLAYEUSKY USSR 53d12m N 140d45mE 880704 U U SOVIET BANDING SCHEME
Distance: 8242 km Direction: 11 degs. Time elapsed: 3 yrs 2 mnths 21 days

061-44650 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 1 U AUSTRALASIAN WADER STUDY GROUP
54 05 3FSAKHALIN BAY L CHKALOV KHABAROVSK USSR 55d22m N 141d13mE 880701 U U YE Z
Distance: 8348 km Direction: 11 degs. Time elapsed: 3 yrs 2 mnths 13 days

061-44675 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 890406 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 3 yrs 11 mnths 19 days

061-44724 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 01EAST CHONGMING ISLAND SHANGHAI CHINA 31d30m N 121d52mE 880000 U U EAST CHINA WATERBIRD GROUP
Distance: 5478 km Direction: 359 degs.

061-44751 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 7FMOUTH OF YANTZE RIVER SHANGHAI CHINA 31d5m N 121d50mE 870411 U U LU
Distance: 5432 km Direction: 359 degs. Time elapsed: 1 yrs 11 mnths 23 days

061-44753 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 +2 U AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900408 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 4 yrs 11 mnths 21 days

061-44755 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 +2 U AUSTRALASIAN WADER STUDY GROUP
67 13 01EAST CHONGMING ISLAND SHANGHAI CHINA 31d30m N 121d52mE 890407 U U EAST CHINA WATERBIRD GROUP
Distance: 5503 km Direction: 359 degs. Time elapsed: 3 yrs 11 mnths 20 days

061-44807 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 1 U AUSTRALASIAN WADER STUDY GROUP
68 05 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900403 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 4 yrs 11 mnths 16 days

061-44896 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 850418 1 U AUSTRALASIAN WADER STUDY GROUP
67 03 1FCHONGMING ISLAND SHANGHAI CHINA 31d27m N 121d53mE 880400 U U ZHANG
Distance: 5472 km Direction: 359 degs.

061-69592 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880323 +2 U AUSTRALASIAN WADER STUDY GROUP
67 03 1FCHONGMING ISLAND SHANGHAI CHINA 31d27m N 121d53mE 880400 U U ZHANG
Distance: 5472 km Direction: 359 degs.

061-69597 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880323 +2 U AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900408 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 2 yrs 0 mnths 16 days

061-69612 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880323 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 01EAST CHONGMING ISLAND SHANGHAI CHINA 31d30m N 121d52mE 880000 U U EAST CHINA WATERBIRD GROUP
Distance: 5478 km Direction: 359 degs.

061-69632 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880323 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 03MEIOGONG SHANGHAI PROVINCE CHINA 30d52m N 121d52mE 890408 U U EAST CHINA WATERBIRD GROUP
Distance: 5433 km Direction: 359 degs. Time elapsed: 1 yrs 0 mnths 16 days

061-69698 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880325 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 07EAST END OF CHONGMING ISLAND CHINA 31d30m N 121d52mE 890430 U U EAST CHINA WATERBIRD GROUP
Distance: 5503 km Direction: 359 degs. Time elapsed: 1 yrs 1 mnths 5 days

061-69755 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880325 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 6FFENGXIAN COAST OF SHANGHAI CHINA 30d50m N 121d45mE 910330 U U SHIQUAN
Distance: 5429 km Direction: 359 degs. Time elapsed: 3 yrs 0 mnths 5 days

061-69936 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 880329 1 U AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900420 U U EAST CHINA WATERBIRD GROUP
Distance: 5564 km Direction: 0 degs. Time elapsed: 2 yrs 0 mnths 22 days

061-70158 03SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 880331 +2 U AUSTRALASIAN WADER STUDY GROUP
01 00 12CHONGMING DAO SHANGHAI CHINA 31d36m N 121d30mE 880425 U U NATIONAL BIRD BANDING CENTER
Distance: 5627 km Direction: 0 degs. Time elapsed: 0 yrs 0 mnths 25 days

061-70671 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880406 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 6FFENGXIAN COAST OF SHANGHAI CHINA 30d50m N 121d45mE 910514 U U SHIQUAN
Distance: 5429 km Direction: 359 degs. Time elapsed: 3 yrs 1 mnths 8 days

061-70798 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880407 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 6FFENGXIAN COAST OF SHANGHAI CHINA 30d50m N 121d45mE 910412 U U SHIQUAN
Distance: 5429 km Direction: 359 degs. Time elapsed: 3 yrs 0 mnths 5 days

061-70997 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 900327 +2 U AUSTRALASIAN WADER STUDY GROUP
68 05 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900403 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 0 yrs 0 mnths 7 days

061-71068 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 900327 +2 U AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900408 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 0 yrs 0 mnths 12 days

061-71354 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 900331 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 05MIAO-GANG YANGTZE RIVER ESTUARY CHINA 30d52m N 121d52mE 910410 U U EAST CHINA WATERBIRD GROUP
Distance: 5433 km Direction: 359 degs. Time elapsed: 1 yrs 0 mnths 10 days

071-84678 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880323 +2 U AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900420 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 2 yrs 0 mnths 28 days

071-84698 01BEACHES CRAB CK RD ROEBUCK BAY BROO 18d0m S 122d22mE 880323 1 U AUSTRALASIAN WADER STUDY GROUP
67 03 02ZANGHAI SHANGHAI PROVINCE CHINA 30d48m N 121d27mE 900408 U U EAST CHINA WATERBIRD GROUP
Distance: 5426 km Direction: 359 degs. Time elapsed: 2 yrs 0 mnths 16 days

The most frequently internationally recovered species with a total of 61 recoveries to date, the shortest of which is 4981 km. All the recoveries have been in China and the USSR, providing an indication that the Great Knot is another species that flies long distances non-stop. 061-70997, for instance, was banded in Broome, WA and recovered in Shanghai, China, 5426 km away 7 days later.

167 BROAD-BILLED SANDPIPER LIMICOLA FALCINELLUS

041-46537 05SALTWORKS, PORT HEDLANDWA 20d15m S 118d55mE 880408 +2 U AUSTRALASIAN WADER STUDY GROUP
03 13 1FTA-TU-HSI TAIWAN 24d12m N 120d28mE 890422 U U LIANG
Distance: 4920 km Direction: 2 degs. Time elapsed: 1 yrs 0 mnths 14 days

168 LATHAM'S SNIPE GALLINAGO HARDWICKII

060-76180 X1JILLIBY WYONGNSW 32d14m S 151d22mE 671223 +1 U SMITH
25 16 7FURIMAKU RIVER HOKKAIDO JAPAN 43d0m N 144d0m E 680617 U U KAINUMA
Distance: 8364 km Direction: 354 degs. Time elapsed: 0 yrs 5 mnths 25 days

J60-80251 04SHIZUKUISHI RIV MORIOKA-SHI IWATE JAPA 39d42m N 141d8m E 740731 U U YAMASHINA INST FOR ORNITHOLOGY
81 05 1FFARM NEAR HERBERTONQLD 17d23m S 145d23mE 760905 U U CAMPBELL
Distance: 6334 km Direction: 175 degs. Time elapsed: 2 yrs 1 mnths 5 days

J60-81207 05GAMOU SENDAI-SHI MIYAGI JAPAN 38d15m N 141d1m E 770814 +2 U YAMASHINA INST FOR ORNITHOLOGY
68 03 0FLAKE CARTCARRONG NEAR WINSLOWVIC 38d15m S 142d26mE 771130 U U WINES
Distance: 8472 km Direction: 178 degs. Time elapsed: 0 yrs 3 mnths 16 days

J60-81234 05GAMOU SENDAI-SHI MIYAGI JAPAN 38d15m N 141d1m E 780820 +2 U YAMASHINA INST FOR ORNITHOLOGY
68 05 9FNEAR PAKENHAMVIC 38d5m S 145d29mE 781100 U U WEBLEY
Distance: 8464 km Direction: 176 degs. Time elapsed: 0 yrs 2 mnths 11 days

J60-82259 06SHYUNKUNITAI WEMURO-SHI HOKKAIDO JAPAN 43d16m N 145d28mE 790814 +2 U YAMASHINA INST FOR ORNITHOLOGY
68 05 8FKILCUNDAVIC 38d33m S 145d29mE 791100 U U GREEN
Distance: 9061 km Direction: 179 degs. Time elapsed: 0 yrs 2 mnths 17 days

J60-89313 18WATENBATSU HOKKAIDO JAPAN 42d57m N 144d5m E 850607 +1 U YAMASHINA INST FOR ORNITHOLOGY
54 05 X3KING ISLAND YELLOW ROCK BEACHTAS 39d41m S 143d55mE 880104 U U ARCHER
Distance: 9152 km Direction: 180 degs. Time elapsed: 2 yrs 6 mnths 27 days

169 SWINHOE'S SNIPE GALLINAGO MEGALA

061-34370 1015KM SE OF DARWINNT 12d29m S 130d55mE 841222 U U HERTOG
08 00 6FNEAR BAAO,CAMARINES SUR,PHILIPPINES 13d27m N 123d22mE 850828 U U MAYAO
Distance: 2987 km Direction: 343 degs. Time elapsed: 0 yrs 8 mnths 6 days

061-34373 1015KM SE OF DARWINNT 12d29m S 130d55mE 841222 U U HERTOG
01 03 2FCANDELARIA (170KM NW MANILA) PHILIPPIN 15d38m N 119d56mE 850911 U U VERGARA
Distance: 3337 km Direction: 338 degs. Time elapsed: 0 yrs 8 mnths 20 days

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