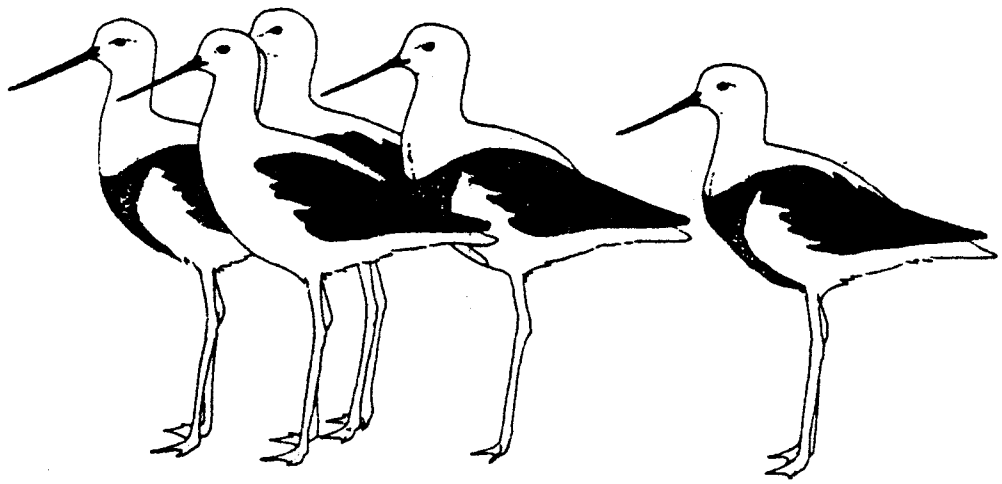
The Stilt



ISSN 0726-1888

BULLETIN OF THE AUSTRALASIAN WADER STUDIES GROUP

OF THE

ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

Number 27 **OCTOBER 1995**

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

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

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

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

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

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

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

Subscriptions for 1995/96:

Australasia	AUS $25
Overseas	AUS $30
Libraries	AUS $35

BACK ISSUES OF *THE STILT*

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

Australia and New Zealand
Single Copies - $A 6.00 surface post paid
Complete set (1-25) - $A90.00 surface post paid

Other Countries
Single copies - $A 7.00 surface post paid
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Stilt No. 7 contains the Index for Nos. 1-6
Stilt No. 13 the Index for Nos. 7-12
Stilt No. 19 the Index for Nos. 13-18.
Stilt No. 25 the Index for Nos. 19-24

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

NEWS VIEWS REVIEWS NEWS VIEWS REVIEWS

EDITORIAL

This issue of *The Stilt*, my thirteenth since taking over as Editor from the late David Thomas in October 1989, will probably be the last under my Editorship. As will be seen in this issue major changes in the structure of the AWSG Committee are proposed and it would seem timely for me to take up another position within the AWSG and to hand over the Editorship to someone new.

Although I have had many complimentary comments from *Stilt* readers on changes made in recent times it is always useful to have 'new blood' to keep the improvements coming. My duties as Editor have been greatly assisted by a number of people. In particular I would like to thank Mark Barter, Terry Barter and Lyn Johannessen (L&M Desktop Publishing) for their assistance.

This edition of *The Stilt*, another bumper issue, contains material on a wide variety of wader species and issues and from a wide variety of levels - from Ken Rogers' extremely technical, though important paper on sexing criteria to Clive Minton's more narrative reports on wader banding in Tierra del Fuego and the Northern Territory, plus much in between.

Jeff Campbell

Correction

In Banding Round-up (*Stilt* 25, October 1994) the first three recoveries listed under Red-necked Stint (041-70602/041-82923/GNV-58694) should in fact be listed under Curlew Sandpiper.

THE NEXT TEN YEARS - PROPOSED NEW COMMITTEE STRUCTURE

Many of you will have been around for long enough to know that the AWSG was "rejuvenated" in 1985 in order to take over the important elements of the RAOU Wader Studies Programme, for which funding ceased at the end of that year. If all the excellent groundwork up to that time was to be properly capitalised on, it was essential that the existing counting and banding activities should continue and that a forum for communication exist for those interested in waders in Australia.

We have come a long way in the last 10 years. Some of the highlights are:

- Continuation, and expansion, of the twice-yearly counting programme around Australia and successful completion of the Regular Counts Project.
- Upgrading and regular publication of *The Stilt*, which now goes on a complimentary basis to a number of wader researchers in the Flyway.
- Publication of *A National Plan for Shorebird Conservation in Australia* and *Wader Movements in Australia* - both in the RAOU Report Series.
- Continuation, on a biennial basis, of the AWSG Expeditions to north-west Australia. Many biologists from the Asian region have attended these, with significant benefits to flyway-wide wader research activities.
- Successful AWSG Expeditions to Vietnam and Java to train local wader researchers in counting and banding techniques.
- Involvement in international discussions on wader conservation, which are resulting in the development of a Strategy, Action Plans and a Site Network designed to conserve waders on a flyway-wide basis.
- Participation of members in a number of Siberian wader research programmes.

This list could easily be added to!

During the last 10 years, wader studies have expanded in Australia, with the formation of very active groups in Queensland and New South Wales, the movement towards internationalisation of wader research and conservation is evident and communication between those interested in waders has improved, especially through *The Stilt*, *The Tattler* and the Internet.

In the mid-1980s, there was good reason to have an organisation which was run mainly from Melbourne. That's where most of the leading wader enthusiasts lived and it also housed the most active banding group. In planning for the next ten years we need to have an organisational structure that both takes into account the developments that have occurred in recent years and allows us to tap the skills available around Australia.

In order to do this it is suggested that the Committee structure be altered as follows:

New	Current
Chair	Chair
Vice-Chair	Secretary
Secretary-Treasurer	Treasurer
Research Coordinator	Research Coordinator
Editor	Editor
Assistant Editor	Liaison Officer
Conservation Officer	Up to three Committee
Liaison Officer	Members
Up to six Committee Members	

It is also suggested that the State WSG Chairs, or their nominated representative, should have ex-officio membership of the Committee.

The new structure will:

- allow for sharing of the Chairperson's work load, through appointment of a Vice-Chair,
- amalgamate the Secretary and Treasurer roles (it is proposed that the RAOU Office take over maintenance of membership records and banking activities),
- through the appointment of an Assistant Editor, provide support for the Editor, including responsibilty for production of *The Tattler*,
- raise the important conservation role to a formal position,
- have sufficient Committee Members to provide the required experience and geographical coverage,
- improve formal communication between the National and State WSGs.

As the new committee structure will require amendments to be made to the AWSG Rules, these will need approval from both RAOU Council and from a majority of AWSG Members. Assuming that Council approval is obtained it is proposed to send out ballot papers in the April 1996 *Stilt*.

Mark Barter

ELECTION OF OFFICE BEARERS

The term of office of the current Committee expires on May 31, 1996.

As explained above, your Committee is proposing that a new committee structure be adopted. Assuming that RAOU Council and AWSG members approve the change, in accordance with Rule 7 of the Rules of the Australasian Wader Studies Group of the Royal Australasian Ornithologists Union, any written additional nominations for committee positions as detailed below, seconded by a member of the Group, shall be sent to the Chairperson by January 31 1996. The new Committee shall take office on June 1 1996 and shall have a term of two years.

The proposed new Committee, with the names of those willing to stand, is:

Chairperson	Mark Barter
Vice-Chair	Peter Driscoll
Secretary-Treasurer	Jeff Campbell
Research Coordinator	Roz Jessop
Editor	Michael Weston
Assistant Editor	Phil Straw
Conservation Officer	Sandra Harding
Liaison Officer	Hugo Phillipps
Committee Members	Clive Minton
(maximum 6)	Brenda Murlis
	Ken Harris
	Doug Watkins
	David Henderson

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

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

Should an election be necessary, ballot papers will be included in the April 1996 edition of *Stilt*.

Brenda Murlis

SUBSCRIPTION FEES

The inevitable time has arrived when subscription fees have to be raised. Your Committee has decided that the 1996 subscriptions should be increased by $10 for each membership category. The new rates will be:

Australia	$25
New Zealand	$25
Overseas	$30
Institutions	$35

Fees were last raised in 1988 when the stated intention was "to retain the new rates for at least three years". Well, we've done much better than that, especially over a period when consumer prices increased by 41%.

A major role in containing costs has been the increasing use of computerisation in the production of *The Stilt*. However, despite this, the cost of producing, printing and posting *Stilt* has increased from 80% (in 1987) to 100% of subscription income!

As we have other expenses as well, mainly administrative, the Group has been living on surplus funds generated mainly through sales of publications, such as the *National Plan* and *Wader Movements*. In effect. we've been slowly going backwards. This is, obviously an unhealthy situation as subscription income should, at the very least, cover *Stilt* and administration costs.

Another expense recently incurred has been the production and posting of four issues of *The Tattler* each year. *Tattler*, in addition to going to members, is sent to an additional 350 organisations and individuals throughout the Flyway who may not, otherwise, be aware of what is happening with waders in our region.

Whilst we can't promise another seven years without an increase in subscriptions, we can assure you that we're constantly looking at ways to make every one of your dollars count for waders. We hope you agree that your getting value for money.

David Henderson

NORTH-WEST AUSTRALIA WADER STUDY EXPEDITION 1996

Introduction

This note is to provide a precis of information to prospective participants in the next Wader Study Expedition to N.W. Australia, in March/April 1996. Please note that many people have already indicated their participation and available places are now limited.

The area is one of the topmost regions in the world for waders with up to three quarters of a million individuals of 50 species spread between the three main locations:

Roebuck Bay/Roebuck Plains	(near Broome)
80 Mile Beach/Anna Plains	(250 km S.W. of Broome)
Port Hedland Saltworks	(600 km S.W. of Broome)

Easy accessibility has made the area a prime location for the study of many species of waders previously not studied elsewhere, as well as for the northern populations of species which occur in southern Australia and in other parts of the world. Research has been carried out by a series of expeditions, dating back to 1981, supplemented in recent years by year round data collection by the wardens of (and visitors to) Broome Bird Observatory (set up by the Royal Australasian Ornithologists Union in 1988).

The 1996 expedition will be the sixteenth to N.W. Australia and will last for seven weeks - from 2 March to 20 April. Participants are encouraged to come for as long as possible (preferably a minimum of 2-3 weeks). They are also welcome to stay at Broome Bird Observatory outside the 'core' expedition dates - counting of migration departures will, for example, be continuing until the end of April.

A detailed itinerary has been drawn up on the basis of high tide height/time information. It is intended that around 20 persons be in the field together throughout the seven week period. As in previous years it is expected that between one third and one half of these will be from overseas, with a good variety of countries represented (usually around eight). Participation in the expedition is also being offered to a limited number of delegates attending the international Ramsar Conference being held in Brisbane from 19 to 27 March 1996.

Objectives

The fieldwork programme outlined below is designed to build on foundations laid in earlier expeditions and, in particular, to fill gaps in the existing data collection. The main activities will include:

(a) **Banding** - mainly by cannon netting, but with some mist netting - and associated leg-flagging (yellow flags) and

moult/weight/other biometric data measurement. During the NWA 1994 expedition 6000 waders of 36 species were caught (as well as eight species of terns and several hundred passerines).

The principal components and objectives of the banding programme will be:

1) during the first three weeks, before the main migratory departures, attempts will be made to capture a significant sample (50-100 birds) of as many species as possible in order to measure the proportion of first year birds in the population. This will provide a measure of the breeding success in the 1995 summer on the northern hemisphere breeding grounds.

2) regular (weekly) catches of birds to measure weight gain prior to departure on migration. Efforts will be particularly concentrated on 'second line' species (such as Whimbrel, Common Greenshank, Black-tailed Godwit) where little data so far exists; as well as filling in gaps in the data on other species. In addition attempts will be made to obtain weight samples as close as possible to the time the birds are seen to be taking off on migration (i.e. to obtain the most accurate possible assessment of take-off weights).

3) further banding and flagging of all species to determine migration routes and key stopover sites. This is especially important in the light of the proposed East Asian-Australasian Shorebird Reserve Network. Particular effort will be put into the less regularly banded species, such as Little Curlew, Oriental Plover and Oriental Pratincole, if the opportunity presents itself.

(b) Visible migration departure counts

Four years of data at Roebuck Bay has now been collected, with some 20-40,000 individuals being seen leaving each year - mainly from about 25 March to 15 April, though some departures occur from early March and daily departures continue right through to the end of April. In 1995 some departures took place up to a week later than in previous years, and a further years data will be helpful in examining variability and possible reasons for this (e.g. weather, lunar/tidal cycle).

It was discovered during the 1994 expedition that major departures of waders could also be seen from 80 Mile Beach. Particular effort will also be made in 1996 to obtain comparisons between departures from 80 Mile Beach and Roebuck Bay, with observations taking place at both localities simultaneously.

(c) Counting

Population counts at all the main locations will be made, as usual, throughout the March/April period - to correlate with visible migration and banding data.

Itinerary

The schedule prepared indicates the planned locations of the expedition for the seven week period. It may be varied somewhat due to local circumstances at the time. The number of days to be spent at each location is:

Broome/Roebuck Plains.....20 days
80 Mile Beach/Anna Plains.....17 days
Port Hedland Saltworks (and Sewage Works)... 5 days

The remaining eight days will be spent in travelling between locations, though this does not preclude the possibility of banding or counting activities on such days also.

Conclusion

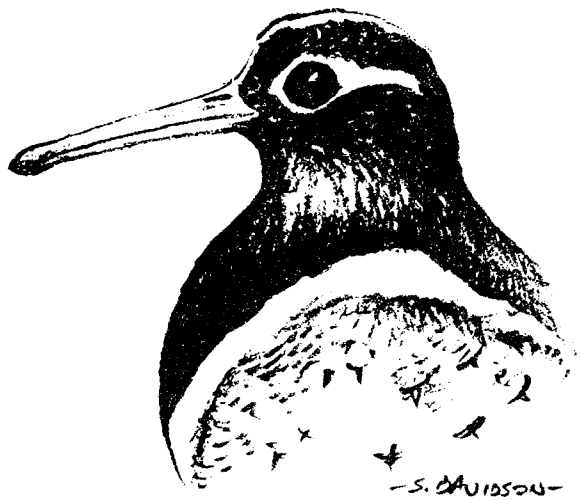
The success of the expedition will be maximised if we have a strong team in the field throughout the seven week period. It will be particularly valuable to have people already experienced in wader banding and counting, but those with lesser knowledge are also welcome.

Many people have already indicated an interest in taking part in NWA '96. Would everyone now please indicate, as soon as possible, their firm intentions.

Clive Minton/Roz Jessop/Humphrey Sitters - Joint leaders/ Organisers

Principal contact: Clive Minton
165 Dalgetty Road
Beaumaris, Victoria, 3193
Australia
Phone/Fax (61)-3-9589 4901

Clive Minton



RAMSAR INFORMATION

What do you know about:

The Ramsar Convention?

Site selection criteria?

How Ramsar operates in Australia?

The location of Australian Ramsar sites?

Wetland types and their importance?

The National Wetlands Program?

and,

the 25th Anniversary Meeting in Brisbane next March?

Nothing, or not enough? Well, very useful information on all of these topics, in the form of attractive single page leaflets, is available from:

National Wetlands Program
Australian Nature Conservation Agency
GPO Box 636
Canberra ACT 2601

Tel: (06) 250 0385
Fax: (06) 250 0384

RAMSAR AND THE AWSG

The sixth Ramsar Conference (Convention on Wetlands of International Importance) will be held in Brisbane from 19-27 March 1996. This will be the first time that the meeting has been held in the Southern Hemisphere and it will also mark the 25th anniversary of Ramsar. Hosting of the anniversary Conference by Australia is very appropriate because Australia was not only the first signatory to the Convention, but also the Coburg Peninsular was the first Ramsar site.

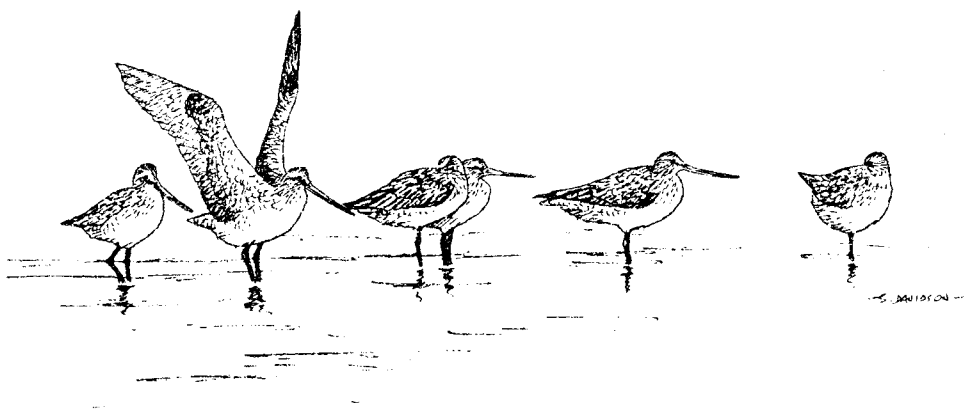
Up to 1,000 delegates from around 100 countries are expected to attend. Collectively, the Ramsar countries account for 75% of the world's land area.

The Conventions broad aims are *to halt the worldwide loss of wetlands and to conserve, through wise use and management, those that remain.* Nowhere do these aims need to be pursued more than in the Asia-Pacific Region and. particularly in the East Asian-Australasian Wader Flyway. In recognition of this need, Recommendation C.5.1. of the last Ramsar Meeting in Kushiro (1993) called on members to designate additional tidal wetlands in the East Asia Flyway, in view of their vital role in sustaining migratory waterfowl.

Since the Kushiro Meeting, there have been significant advances towards development of a multilateral waterbird strategy, shorebird action plans and a shorebird site network to provide protection for migratory birds on their breeding and non-breeding grounds, and during migration between these two areas.

In support of these developments and in recognition of the opportunity that the Brisbane Ramsar Meeting provides for effective lobbying of decision makers, the AWSG is holding a two day Conference in Brisbane on the weekend before the Conference commences. Details are given below. A Registration Form is included in this copy of *The Stilt*. I encourage you to come, listen, learn and contribute.

Mark Barter



AWSG Conference - Shorebird Conservation in the Asia-Pacific Region

Saturday 16 & Sunday 17 March 1996

OBJECTIVES:

1. Focus attention on the serious threats, and their impacts, to migratory shorebirds in the Asia-Pacific region.
2. Outline the current conservation status of shorebirds and their habitats in the region.
3. Discuss options for improving shorebird conservation and, in particular, the proposed Asia-Pacific Shorebird Action Plan and East Asian-Australasian Shorebird Reserve Network.
4. Obtain feedback on the proposed Plan and Network, through workshop sessions.

There will be opportunities for the collective recommendations and views of the Seminar participants to be made known to Ramsar Conference delegates through meetings sponsored by the Australian Nature Conservation Agency during the Conference.

PROGRAMME

SATURDAY

SESSION 1

0900 **INTRODUCTION**

0915 **BIOLOGY OF MIGRATORY SHOREBIRDS**

0945 **THREATS AND IMPACTS**
Overview
Case Studies
Habitat loss/alteration
Hunting
Disturbance

1045 **MORNING TEA**

1100 **STATUS OF SHOREBIRDS AND IMPORTANT SITES**
East Asian-Australasian Flyway Overview
Case Study - Australia

1200 **DISCUSSION**

1230 **LUNCH**

SESSION 2.

1400 **FRAMEWORKS FOR FLYWAY CONSERVATION**
Western Hemisphere Shorebird Reserve Network
African-Eurasian Migratory Waterbirds Agreement
Kushiro Initiative

1500 **AFTERNOON TEA**

1530 **ASIA-PACIFIC SHOREBIRD ACTION PLAN**
Overview
Implementation Mechanisms
Implementation Case Studies
Colour marking in migration studies
Population monitoring
Shorebird researcher training

1700 **END OF DAY 1.**

SUNDAY

SESSION 3

0900 **EAST ASIAN-AUSTRALASIAN SHOREBIRD RESERVE NETWORK**
Overview
Country Presentations
Russia
China
Japan
Philippines

1030 **MORNING TEA**

Indonesia
Australia

1130 **RESERVE NETWORK DISCUSSION**

1230 **LUNCH**

SESSION 4

1400 **ACTION PLAN WORKSHOPS** (4 X 2h)
Colour Marking Protocol
Network Reserve Managers Meeting
Training Needs
Communication Options

1600 **AFTERNOON TEA**

1630 **WORKSHOP REPORTS**

1700 **CONFERENCE SUMMARY AND STATEMENT**

1730 **END OF DAY 2.**

EAST ASIAN-AUSTRALASIAN SHOREBIRD RESERVE NETWORK PROPOSAL

Summary

The East Asian-Australasian Shorebird Reserve Network Proposal aims to facilitate international recognition and management of a network of important sites for shorebirds. The Network will work as a cooperative international environmental program, involving site management bodies and local communities, working for the conservation of wetlands of international importance for migratory shorebirds. The Proposal is modelled on a very successful program that has been in operation in the Americas for the past 10 years: the Western Hemisphere Shorebird Reserve Network.

The Shorebird Reserve Network Proposal has been developed in response to an international workshop on the conservation of migratory waterbirds in the East Asian-Australian flyway held in Kushiro, Japan in December 1994. The workshop specifically called for the establishment of a shorebird reserve network.

At the international level the Shorebird Reserve Network will be supported by a Shorebird Flyway Officer. An officer has been engaged by *Wetlands International (Asia-Pacific)*, on funding from the Australian Nature Conservation Agency, to work on the development of the Network. He works from the Oceania Office of *Wetlands International (Asia-Pacific)* which is co-located with the Australian Nature Conservation Agency in Canberra, Australia. A Shorebird Working Group is also proposed to oversee the development of the Network.

The Australian and Japanese Governments propose to launch the Shorebird Reserve Network at the Conference of Parties to the Convention on Wetlands of International Importance (Ramsar Convention) in Brisbane, Australia in March 1996. In the leadup to the Ramsar Conference activities are planned to encourage the 14 countries and territories within the flyway, that are parties to the Ramsar Convention, to nominate at least one site for the Network by the time of the launch.

It is hoped that the East Asian-Australasian Shorebird Reserve Network, along with the Western Hemisphere Shorebird Reserve Network, will act as catalysts for conservation action for migratory species in other flyways.

The Shorebird Network initiative is being made possible by the sponsorship and support of the Australian Nature Conservation Agency and the Japan Environment Agency.

1. Introduction

In December 1994 a workshop was held in Kushiro, Japan to discuss conservation of migratory waterbirds in East Asia - Australasia. The meeting was organised under the auspices of the Environment Agency of Japan and the Australian Nature Conservation Agency with assistance from the Asian Wetland Bureau and the International Waterfowl and Wetlands Research Bureau - Japan Committee. The meeting was attended by 92 representatives from 16 regional nations.

The workshop produced a summary statement called the "Kushiro Initiative". The statement calls for the:

- preparation of a conservation strategy for migratory waterbirds in the region (Asia-Pacific Migratory Waterbird Conservation Strategy)
- development of Action Plans for species-groups
- development of networks of internationally important sites for species-groups.

The Kushiro Initiative specifically called for the establishment of a network of internationally important sites for migrant shorebirds. This was to be based on the very successful Western Hemisphere Shorebird Reserve Network that has operated in the Americas since 1985 (see box). The shorebird reserve network is part of an Asia-Pacific Migratory Shorebird Action Plan, itself an element of the Asia-Pacific Migratory Waterbird Conservation Strategy.

The following proposal has been developed in response to the Kushiro Initiative, by the Asian Wetland Bureau, with funding from the Australian Nature Conservation Agency. Input has been provided by Wetlands for the Americas who coordinate the Western Hemisphere Shorebird Reserve Network.

2. Principles of the East Asian-Australasian Shorebird Reserve Network

The following principles outline the philosophy for the operation of the Network:

- Wetlands and shorebirds are a highly valued natural heritage by societies worldwide.
- All uses of wetlands will be consistent with their long term protection and sustainable use.
- Involvement of local communities in decisions on the management of wetland resources will be encouraged.
- Maintenance of populations of migrant shorebirds requires long term planning, close cooperation and coordination of ongoing and future management activities by all nations in the shorebird flyway.

The Western Hemisphere Shorebird Reserve Network

"The Western Hemisphere Shorebird Reserve Network (WHSRN) is a voluntary collaboration of government and private organisations that are committed to shorebird conservation. WHSRN gives international recognition to critically important shorebird sites and promotes cooperative management and protection of these sites as part of an international reserve network.

WHSRN was launched in 1985 in response to research which indicated significant declines in shorebird populations. It is currently managed through the Board of Wetlands of the Americas (an international non-government organisation) which also provides secretarial services.

During migration, shorebirds depend on a chain of critical wetland sites strategically located along their flyways extending from the Canadian high arctic to Tierra del Fuego in southern Argentina. The diminished ecological function of just one of these critical sites could have disastrous affects on specific shorebird populations or even entire species. WHSRN identifies these areas and seeks to work together with wildlife agencies, land owners, private conservation groups and others to help ensure the conservation of shorebirds and shorebird habitats.

As of 1994, WHSRN has designated 25 internationally important reserves throughout the Western Hemisphere, offering protection for approximately 30 million shorebirds and over 4 million acres of wetlands. WHSRN uses shorebirds as a symbol of the intense conservation challenge facing wetlands and of the need for international cooperation in the protection of these areas."

(from Wetlands for the Americas Policy Paper 1995)

- Development and the appropriate management of an international network of internationally important sites for shorebirds will greatly enhance the conservation of these and other species of waterbirds using the sites.
- The conservation of sites for migratory shorebirds will act as a catalyst for greater community appreciation of the natural environment.

Geographic coverage of the East Asian-Australasian Shorebird Flyway is shown on Map 1.

The East Asian-Australasian Flyway

3. Nature of the Network

The East Asian-Australasian Shorebird Reserve Network will be a cooperative international program for conservation of shorebirds and their habitats. It involves collaboration of site management bodies and local communities. This mechanism is primarily aimed at assisting "on-site" personnel while providing opportunities for assistance from "off-site" conservation agencies and organisations.

An important feature of the Network is that it enables site owners, managers, participating organisations and local people to obtain international recognition for the importance of their site and their conservation efforts.

The Shorebird Reserve Network will be a network of both sites and people. Managers of Network sites will be encouraged to establish a local advisory or liaison group. This will assist to build community support for the conservation management of the Reserve. All issues related to site

management will continue to be the responsibility of the Reserve management bodies.

The Network will be supported by a Shorebird Flyway Officer and a Shorebird Working Group. The Shorebird Flyway Officer will be provided by *Wetlands International (Asia-Pacific).* It is proposed for the Shorebird Working Group to involve Government and non-government representatives to guide the development of the Network (see Section 8).

4. Goal of the Network

To facilitate the recognition and appropriate management of a network of internationally important sites to ensure the long term conservation of migratory shorebirds in the East Asian-Australasian Flyway.

5. Activities of the Network

Site and Species

- Development of a network of sites that are of international importance for shorebird conservation in the East Asian-Australasian Flyway.

Site Management Bodies

- Prepare nomination information for the site.
- Management of the Reserve.
- Development of Reserve management plans.
- Promote the local recognition of the importance of the site for the conservation of shorebirds.
- Assist to promote, at a national level, the nomination of other internationally important sites.

Shorebird Flyway Officer

- Assist in the identification of internationally important sites for the conservation of migratory shorebirds.
- Promote recognition of the importance of these sites for the conservation of migratory shorebirds.
- Promote the establishment of site advisory/liaison groups consisting of the Reserve management body and members of the local community.
- To serve as an adviser to Reserve management bodies on matters relating to shorebird management and other wetland issues.
- Maintain a database on Network Reserves.
- Assist to provide training opportunities for Reserve managers.
- Facilitate communication and information exchange between Reserve management bodies, researchers and other relevant agencies in the network and other global networks.
- Assist Reserve management bodies to locate funding for the management of the Reserves.
- Assist in the implementation of the Asia-Pacific Migratory Shorebird Action Plan and the Asia-Pacific Migratory Waterbird Strategy.
- Prepare an annual work program and budget for endorsement of the Shorebird Working Group.

6. Joining the Reserve Network

A four step process is proposed for an important site to become a Shorebird Network Reserve. These are:

- Preparation of nomination documents by site management bodies.
- Assessment of site details against biological criteria.
- Acceptance of nomination by the Shorebird Working Group.
- Network Reserve declaration ceremony.

It is anticipated that almost all sites nominated will be controlled by government agencies. National Government endorsement will be needed for nominations.

Site nominations will be reviewed by the Shorebird Flyway Officer and the Shorebird Working Group for acceptance by the *Wetlands International (Asia-Pacific)* Council.

7. Biological Criteria to Qualify as Network Reserves

The Kushiro workshop agreed that the criteria for sites to qualify for inclusion in the Network should be modelled on the Ramsar Convention's "Special Criteria Based on Waterfowl for Identifying Wetlands of International Importance".

It is proposed that the Reserve Network criteria be modelled on the Ramsar numerical criteria for waterfowl. As such the criteria for a site is:

- it regularly supports > 20 000 migratory shorebirds; or,
- it regularly supports > 1 % of the individuals in a population of one species or subspecies of migratory shorebird; or,
- it supports appreciable numbers of an endangered or vulnerable population of migratory shorebird.

It is proposed to use the minimum population estimates stated in the Asia-Pacific Migratory Shorebird Action Plan in assessing site nominations. The guideline for applying the criteria to staging sites will be to use a turnover factor of four.

That is, staging sites will only need to meet the criteria of 5 000 shorebirds or 0.25 % of the population of a species or subspecies of a migratory shorebird.

It is anticipated that the Shorebird Working Group may reevaluate the biological criteria as assessments are made of the adequacy of the Network. Consideration may be given to listing Reserves under various importance categories.

8. Shorebird Network Support and Administration

Asia-Pacific Shorebird Working Group

It is proposed that the support and administration of the Shorebird Reserve Network be integrated with the broader migratory waterbird conservation actions that are being developed out of the "Kushiro Initiative". It also needs to be set in the context of recent changes to international wetland conservation organisations.

At an international conference in Malaysia in October 1995 it was agreed to form a new global wetland conservation organisation to be called *Wetlands International*. This will be created through the integration of the Asian Wetland Bureau (AWB), the International Wetlands and Waterbird Research Bureau (IWRB) and Wetlands for the Americas (WA). *Wetlands International* will have three regional councils: Asia-Pacific, Europe-Africa-Middle East and the Americas. The membership of the Councils will comprise of representatives of Governments in the region, non-government organisations and experts.

The formation of *Wetlands International* has important positive implications for the East Asian-Australasian Shorebird Reserve Network. The regional expertise of AWB will now be supplemented with the experience that WA has in the coordination of the Western Hemisphere Shorebird Reserve Network . IWRB bring the skills they have developed in the areas of waterbird research, working with the Ramsar Bureau and the development of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds.

Activities for the conservation of migratory waterbirds in the Asia-Pacific region will be overseen by the *Wetlands International (Asia-Pacific)* Council. It is proposed that the Council establish a committee to oversee the implementation of the Asia-Pacific Migratory Waterbird Conservation Strategy.

The Committee would then establish a Shorebird Working Group to take responsibility for the overseeing the implementation of the Shorebird Action Plan, which includes the development of the Shorebird Reserve Network. It is proposed that the Committee and the Shorebird Working Group have a membership drawn from Government, non-government organisations and experts actively involved in shorebird conservation.

The Shorebird Working Group would meet at least once each year to review the activities of the Network, provide expert advise on Network development, review site nominations and forward plans. The Shorebird Flyway Officer would provide the secretariat functions for the Shorebird Working Group.

An annual report of the Network would be prepared and circulated to all participating countries and Network sites.

Funding for the projects initiated under the Network will need to be identified. The projects would include activities such as newsletters, educational and awareness material, training courses, Network site management and personnel exchange between Network sites.

Shorebird Flyway Officer

The Australian Nature Conservation Agency is already providing funding to Wetland International (Asia-Pacific) for Doug Watkins to fill this position on a half time basis. The funding will cover salary, travel and office expenses for up to six months work a year over three years. The Shorebird Flyway Officer will work from the Oceania Office of Wetland International (Asia-Pacific) which is co-located with the Wetlands and Migratory Wildlife Unit of the Australian Nature Conservation Agency in Canberra, Australia.

Doug Watkins
Shorebird Flyway Officer, Asian Wetland Bureau

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of the Australian Nature Conservation Agency,
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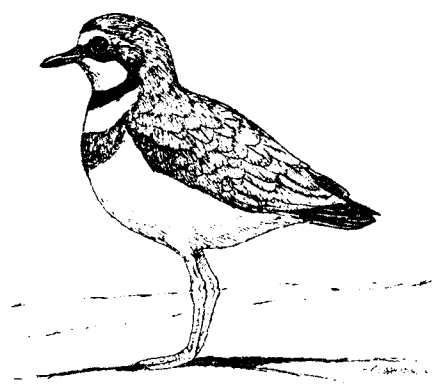

WETLANDS INTERNATIONAL

A NEW GLOBAL FORCE FOR WETLAND CONSERVATION

A new global force for wetland conservation was created in October 1995, by the decision of three existing international "wetland" organisations to integrate. The new organisation will be called WETLANDS INTERNATIONAL. The founder organisations are the Asian Wetland Bueau (AWB, with operational headquarters in Malaysia), the International Waterfowl and Wetlands Research Bureau (IWRB, with operational headquarters in the United Kingdom), and Wetlands for the Americas (WA, with operational headquarters in North America and Argentina).

This integration has been planned for several years, in recognition of the need for new initiatives and stronger partnerships to address the continuing loss and degradation of wetlands, worldwide. The final decision to integrate occurred during joint governing body meetings attended by more than 200 representatives of governmental and non-governmental organisations, as well as wetland specialists and observers. The meetings took place during the International Conference on Wetlands and Development that was held in Malaysia in October 1995. The Conference was inaugurated by the Prime Minister of Malaysia, YAB Dato' Seri Dr. Mahathir Mohamad, who also announced the creation of WETLANDS INTERNATIONAL.

Combined Strengths

The integration of AWB, IWRB and WA to form WETLANDS INTERNATIONAL draws together, and builds upon, the strengths and achievements of the three founding organisations, which date back more than 40 years. These achievements have included a key role in the development and technical support of the Ramsar Convention on Wetlands, major regional assessments of the status of wetlands and wetland species, research and conservation measures for migratory waterbirds, support to regional and national action plans for the conservation of wetlands and wetland species, training programmes in wetland management, and dissemination of information and awareness materials.

Mission

The Mission of WETLANDS INTERNATIONAL is "To sustain and restore wetlands, their resources and biodiversity for future generations through research, information exchange and conservation activities, worldwide."

Structure

WETLANDS INTERNATIONAL has non-profit/charitable status, and is governed by a global Board, comprising representatives of member countries, International organisations and wetland specialists. The regional operations for Asia/Pacific, Africa/Europe/Middle East, and the Americas are governed by separate regional Councils. Overall coordination is provided by a small International Coordination Unit, initially co-located with the headquarters for the AFrica/Europe/Middle East region.

The catalytic work programme of WETLANDS INTERNATIONAL will build on the combined activities of the founding organisations which have 14 regional or project offices on five continents and ongoing activities with local partners in over 100 countries. The programme benefits from the input of national delegates, specialist groups, partner agencies and networks of thousands of wetland experts. Long-standing partnerships with the secretariats of international conventions (notably Ramsar and Bonn) and other international organisations (particularly Bird Life International IUCN and WWF) will be strengthened. A short-term goal of WETLANDS INTERNATIONAL is to enhance its global membership particularly in developing countries.

Resources

Core support for WETLANDS INTERNATIONAL comes from an increasing number of member countries (currently 48) and sustaining donors. Global and regional programmes are supported by over 120 government agencies, national NGOs, foundations, development agencies, and private sector groups.

Launch

WETLANDS INTERNATIONAL will become fully operational and will be launched early in 1996. Until that time, the three founding organisations (AWB, IWRB, WA) will continue to operate under their current legal structures and corporate identity. Extensive consultations will be undertaken in each region with members, governments and partner agencies to ensure that cooperation agreements and programme arrangements continue strongly. For further information on the programme of WETLANDS INTE NATIONAL, or on how you can become involved, please contact any of the offices of the founding organisations.

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CANNON NETTING OF WATERBIRDS AND WADERS IN THE NORTHERN TERRITORY, SEPTEMBER 1995.

Periodicallly over the last 15 years wader banders in Australia have been requested to assist in the study of avian-borne diseases by allowing blood samples to be collected from birds caught for banding. In particular the north-west Australia expeditions have facilitated such studies, initially by microbiologists from one of the universities in Perth and more recently by veterinary officers from the Ministry of Agriculture.

A new development in this field was a request, early in 1995, from the Northern Territory Quarantine and Inspection Services in Darwin for the Victorian Wader Study Group to provide them with a cannon net, and associated equipment, so that they could themselves undertake a waterbird and wader catching programme specifically for blood sampling purposes. This happened to coincide with a growing interest in the Conservation Commission of the Northern Territory in finding out more about movements of waders and waterbirds, following their extensive and successful population determination work in recent years.

A 'joint venture' was thus born, with a comprehensive set of equipment supplied by the VWSG in July and 'commissioned' by a two week training workshop for NTQIB/CCNT personnel run by Clive Minton in Darwin in early September. A team of 8-12 people was in the field for ten days, initially catching waterbirds on inland freshwater wetlands and subsequently waders at coastal high tide roosts.

Prior to the visit Ray Chatto of CCNT undertook extensive recceing over a two month period. Almost all the sites he subsequently recommended were highly suitable for cannon netting. This preparation work is an essential foundation for successful fieldwork, especially when operating in a new area.

Initial catches were of waterbirds in order for the team to gain experience without the complications of tidal waters. Catches were made of 23 Wandering Whistling-Ducks, 22 mixed egrets/herons and 75 Magpie Geese. A new dimension was the need to take account of crocodiles - on occassion nets had to be set further back from the shore than optimal so that only the leading edge of the net reached the water on firing. It could thus be very quickly be moved back onto the bank.

Attentions turned to migratory waders on 10 September as suitable 'spring tides' commenced. Target catches continued to be restricted to a maximum of 100 until the team had built up experience. Catches of 43, 16, 93 and 18 gave useful samples of nine species of wader, with Greater Sand Plover (101) being the most numerous. Only on the second catch was a misjudgement made, the net being fired too early, 200 Terek Sandpipers/Grey-tailed Tattlers being pushed towards the catching area by the tide there was concern of making too large a catch if we waited longer. A consolation was the catching of a Beach Stone-curlew which happened to be standing in the catching area at the time!

Recceing had shown that Finnis Beach, 100 km SW of Darwin, had by far the greatest numbers of waders with some 10,000 Great Knot/Red Knot (and hardly any godwits!). The final catch, with an ABC News film crew present, was of 392 Great Knot and 271 Red Knot. The team was stretched - with the three ABC members acting as 'runners' during net emptying - but performed excellently, putting to the test all they had learned over the previous ten days.

One of the Red Knot had previously been banded in Victoria. This was the first recovery in northern Australia of a Red Knot banded in southern Australia. Surprisingly two juvenile Red Knot were caught - a long way south for such young birds to have travelled by mid September.

Two hundred blood samples were collected by the NTQIB personnel from the 954 waders and waterbirds caught during the workshop. Subsequent analysis of the wader samples has shown that four birds were carrying, or had previously been exposed to, the Avian Influenza virus.

The NTQIB intend to catch further samples of birds in the future for disease testing. The CCNT will continue to band such birds and additionally set up their own banding programme. Hopefully this fledgling NT 'wader group' will become established and prosper in the future, thus increasing the geographical coverage of wader studies in Australia. Certainly there are some excellent sites in the Darwin area - especially Finnis Beach, which is like the famous 80 Mile Beach in Western Australia, only without (at least in September) the godwits!

Clive Minton (AWSG/VWSG),
Ray Chatto (CCNT),
Andrew Moss (NTQIB).

VISIT TO TIERRA DEL FUEGO, ARGENTINA, 14 FEBRUARY - 4 MARCH 1995

Background

Banding recoveries and biometric measurements have traditionally been the main tools in delineating the breeding and non-breeding areas (and intervening migration routes) of different subpopulations of each species of wader. More recently DNA sampling has added a new dimension to study techniques by attempting to match DNA patterns from birds at different breeding locations with samples from birds in their non-breeding areas (or on migration routes).

The Red Knot has proved to be one of the more difficult species to fathom. There are relatively discrete pockets of breeding populations around the whole of the arctic and widespread, but discontinuous, areas in both the northern and southern hemispheres where Red Knot occur in the non-breeding season.

It is now well established that the Knot which breed in Greenland and NE Canada migrate to western Europe, and that those which breed in the Taimyr Peninsula region of NW Siberia move down the coast of Europe to spend the non-breeding season in west and south Africa. The birds which spend the northern hemisphere winter in Australia are thought to breed in the New Siberian Islands, off northern Siberia [see elsewhere in this issue for the first actual proof of this].

No one is sure where the Knot breeding on Wrangel Island, NE Siberia, migrate to and it also is not clear where those breeding in other parts of arctic Canada spend the winter. Quite large numbers of Knots do occur in specific locations ranging from Florida and other parts of the United States right down to the southern tip of Tierra del Fuego in South America. But which population comes from where is still somewhat of a mystery. There was even speculation that the Wrangel Island birds could be the ones which finished up in Tierra del Fuego - which would have corresponded to the longest migration in the world.

1995 project

The leading co-workers on the Red Knot are Professor Allan Baker of the Royal Ontario Museum (University of Toronto) - the world expert on DNA classification of waders - and Dr Theunis Piersma of the National Institute for Sea Research in the Netherlands - the world expert on Red Knot. They decided that a catching, banding, colour banding and blood sampling for DNA visit to Tierra del Fuego could be a critical step in unravelling the remaining mysteries of Red Knot migration.

I was invited to participate and to bring not only my experience but also a cannon net! With the excellent cooperation of Aerolineas Argentinas, Qantas and the Civil Aviation Authority I was able to do this - including taking electric fuses (but not black powder!) and even keeping cages.

The core objective of the visit was to catch a minimum of 200 Red Knot for full processing, banding, leg flagging and blood sampling. However it was intended that other species would also be studied, as opportunity allowed, and that census/conservation supporting work and feeding studies would also be undertaken.

Rio Grande, Tierra del Fuego

Rio Grande was selected as the optimum location on the basis of aerial survey work in the mid 1980's which indicated a population of several thousand Red Knot roosting at high tide on steep gravelly tidal shores. A recce by Daniel Blanco of Wetlands for the Americas in January 1995 confirmed the potential.

On arrival in Rio Grande on 16 February it was quickly apparent that it really was an excellent area to study waders - even if not the most attractive of environments or climate (cold and very windy). There were 17,000 waders in the area, discrete from the other good wader locations 80 km to the north (Bahia San Sebastian) and 30 km to the south. 3,000 were Red Knot. 10,000 White-rumped Sandpipers and 2,500 Magellanic Oystercatchers were the other most numerous species.

Waders fed on the mudflats immediately in front of the town - in fact they could be observed, well, from the comfort of the hotel lounge and restaurant! They roosted at a range of locations on the steep seaweed covered shingle beaches, all easily accessible. The huge tidal range (up to 12 m.) might have proved a problem but in fact the tide heights appeared to be predictable and not greatly affected by the weather conditions (at least at that time of the year).

Negative aspects of the environment were of the aesthetic variety. No trees grow within 50 km of Rio Grande - just windswept grasslands, grey gravel beaches and a brown muddy river. And the junk - metal, plastic, concrete - on the beaches had to be seen to be believed. More than compensating for this however was the friendliness, warmth and enthusiasm of the Argentinians themselves.

The catches

The group (three from Canada, two from elsewhere in Argentina, two from the Netherlands, one from Chile, one from Australia plus three local Argentinians) 'got its feet wet' with a couple of small test fires on White-rumped Sandpipers.

That is a somewhat simplistic statement and masks a variety of traumas. The "black powder" obtained by our hosts turned out to be a nitro-cellulose 'ball' powder used in seismic exploration work. All attempts to obtain regular black powder in Rio Grande, or to have it sent from Buenos Aires, failed. We eventually, in desperation, bought all the large rockets from the fireworks supplier in town, ground them up, and carried out test fires on the beach outside the hotel. This powder proved to be too weak. We tried a small quantity of the 'ball' powder - and blew up the barrel like a peeled banana. Unbelievably this apparent catastrophe at 8 am on a Saturday morning was retrieved by a new cannon being made by 6 pm the same day (one advantage of a local oil industry supply base and a six day working week).

Finally we were saved by someone finding 500 g of genuine black powder in the possesion of a firearms enthusiast at Ushuaia (400 km away). This arrived by overnight bus!

Then we came to the trial catches. Much to my embarrassment the net went off prematurely as it was switched in and before the firing button was pressed - and before the birds were catchable! A precious 100 g of black powder had gone (up in smoke!) with no benefit! This malfunction of a firing box had occurred once before, but had apparently been fixed, and was not detected in the usual pre-catch tests of the box. Testing again failed to reveal a problem - or a possible cause. The net was reset, the birds re-twinkled (White-rumped Sandpipers are quite cooperative), but with the same result - the net fired as it was switched in again. Fortunately this time 11 birds were caught.

These various shenanigans had one benefit - they had allowed even more time to observe the Red Knot's roosting habits. This was beneficial as the preferred roosting site changed markedly with tide height, weather conditions and disturbance. The latter was severe in places with walkers, joggers, four-wheel bike enthusiasts, fishermen and (especially) dogs (often in packs), especially at weekends.

Fortunately the Knot chose to settle most frequently in front of the Naval Police Headquarters - a relatively quiet beach even though on the edge of the town facing the Rio Grande estuary. The practical problem was mostly how to get a small enough catch (Knot roost very densely) and how to avoid getting a net full of Magellanic Oystercatchers at the same time (these two species, plus Hudsonian Godwit, often roosted together).

On catching day (20 February) all went perfectly. Birds built up right in front of the net over a prolonged period and no 'acts of God' (birds of prey or other disturbances) took place. Close to high tide we fired (using the switching in switch as a firing button, but this did not work, so we had to press the firing button this time!). The catch was an unbelievably successful 850 Red Knot and 34 Hudsonian Godwit (and around 150 Magellanic Oystercatchers released straight from the net, unbanded).

And joy of joys - six of the Knot already carried Brazilian bands and colour flags, as well as two birds being from the USA/Canada. (We had also seen another USA flagged bird in the field the previous day). This information pointed to the Tierra del Fuego birds being from the central Canadian arctic breeding grounds and definitely not from Wrangel Island.

Processing took a long time in increasingly bitter weather conditions (it sleeted for part of the time). I finished up leg flagging in the back of a truck which had been brought up for protection from the cold. We were all perished, but extremely happy, at the end of our stint.

There were a few other practical problems apart from the weather. Promised band supplies failed to arrive so only 200 of the Knot could be metal banded. The leg flag combinations ran out after 400 birds. But 600 birds were fully processed - bill and total head length, wing length, weight, primary moult, % breeding plumage.

It was particularly interesting that most of the Knot were well advanced in their change into breeding plumage (many 50-75%). They were also already putting on significant premigratory fat reserves. This is some weeks ahead of their Australian counterparts and nearly two months ahead of those Knots which remain in the northern hemisphere. Clearly their behaviour is consitent with that of most waders, especially those visiting the southern hemisphere in the non-breeding season, in that they carry out much of their energy consuming body moult before they embark on their demanding northward migration.

With the main objective of the expedition achieved the remaining powder was used on a small catch of 150 waders (mostly White-rumped Sandpiper again) on 22 February.

Other Activities

These included:

(a) a daily wader census at high tide. Some surprising daily variations occurred and these did not have any logical explanation in this apparently closed population. On no single day was the maximum population of all species observed. This suggests that many single day/tide counts may underestimate the population in an area.

(b) food and feeding studies. Extensive collection of invertebrates in the foreshore mud - especially in the areas where Red Knots were seen feeding - was undertaken by Theunis Piersma and Petra de Goej. They also observed Red Knot feeding for long periods. Local Argentinians were trained in these techniques.

(c) two visits to Bahia San Sebastian, a huge (30 km diameter) embayment to the north of Rio Grande. This held up to 50,000 waders - including 20,000 Hudsonian Godwit (thought to be the largest flock in the world). This had an extensive, very flat saltmarsh and was totally unsuitable for catching. A "Fourtrax" had to be used to traverse the mud to get within counting distance of the birds even at high tide.

(d) conservation assessments. Oil production is already taking place in Bahai San Sebastian. The consequences of a spill would be disastrous. There is also need for a reserve free from disturbance on part of the beach near Rio Grande so that waders can roost in peace. Fortunately there is a suitable discrete point. A paper supporting conservation efforts at both sites was prepared to assist local Argentinian efforts.

(e) a visit to Ushuaia. This is a most beautiful place at the end of the Andes. It is used as a supply port for Antartica (the nearest part is only 1500 km away) and is the southernmost city in the world (latitude similar to Macquarie Island). Beavers (imported 100 years ago from North America) abound. Flightless Steamer Ducks were one of the interesting species seen.

Postscript

Several of the Red Knot colour flagged at Rio Grande were seen in central Argentina, a few weeks later, on northward migration. Others were later seen in North America.

A specific flyway-wide special project on Red Knot has now been proposed and will hopefully, over the next few years, fully elucidate the migrational strategy of this species in the Americas.

Acknowledgements

I would like to thank Prof. Allan Baker/Royal Ontario Museum for inviting me to participate in this project and for covering the costs of my air fare and accommodation.

It was particularly valuable to be able to join in studies of migrant waders at another location in the southern hemisphere and to compare the situation with Australia. It seems incredible that the Tierra del Fuego birds have to travel 17,000 km to reach their breeding grounds - and there is a conservation sign on the side of the road along the foreshore in Rio Grande pointing this out to everyone.

Clive Minton

BOOK REVIEW

The Birds of Broome - An Annotated Checklist. Peter Collins. Royal Australasian Ornithologists Union/Broome Bird Observatory. 1995.[84 pages, colour photographs, maps. Available from RAOU, 415 Riversdale Road, Hawthorn East, Vic., 3123, Australia. A $18 plus p&p.].

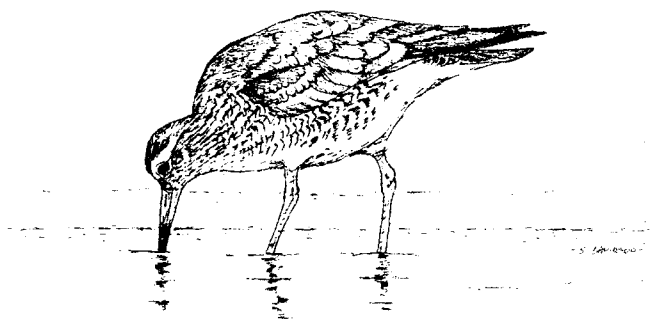
As the Broome area is one of the most important areas for waders in Australia it is obvious that any publication on the birds of the region would need to contain significant information on this group, and this small book certainly does that admirably.

Information on the distribution, seasonal occurence, and average and exceptional numbers of 48 wader species is presented (along with the around 250 other species of birds recorded in the area).

Peter Collins is to be congratulated on the preparation of this publication, it would be especially helpful for those travelling to the region for the first time or for those wishing to increase their 'life lists by seeing some of the many special birds of the region. It is also pleasing to see a list of those species for which further records are needed, it is of interest to note that despite the great deal of study that has been carried out on the waders of the area, records of numbers of these birds (particularly of large flocks inland) are still required.

This publication is highly recommended.

Jeff Campbell



RECENT LITERATURE

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

Appleby,G., R.Farnes & M.Griffith. 1995. A Grey Phalarope *Phalaropus fulicaria* at Port Fairy, Victoria. Australian Bird Watcher 16:34-38. (95 Broadway, Camberwell, Victoria 3124, Aust.). Fifth Australian record.

Baker,A.J., T.Piersma & L.Rosenmeier. 1994. Unravelling the intraspecific phylogeography of Knots *Calidris canutus* : a progress report on the search for genetic markers. Journal of Ornithology 135: 599-608. (Department of Ornithology, Royal Ontario Museum, Toronto, Ontario, Canada M5S 2C6).

Dowding,J.E. 1994. Morphometrics and ecology of the New Zealand Dotterel (*Charadrius obscurus*), with a description of a new subspecies. Notornis 41:221-233. (PO Box 36-559, Northcote, Auckland 1330, New Zealand).

Gill,R.E.Jr., R.W.Butler, P.S.Tomkovich, T.Mundkur & C.M.Handel. 1994. Conservation of North Pacific Shorebirds. pp.63-78. Transcripts of the 59th. North American Wildlife and Natural Resources Conference (1994). (National Biological Survey, Anchorage, Alaska).

McCrie,N. 1995. First Record of the Kentish Plover *Charadrius alexandrinus* in Australia. Australian Bird Watcher 16:91-95. (P.O. Box 41382, Casaurina, Northern Territory 0811, Australia).

Marks,J.S. 1995. Migratory behaviour of curlews with broken wings. Wader Study Group Bulletin 76:37-38. (Cooperative Wildlife Research Unit, University of Montana, Missouls, MT 59812, USA).

Minton,C. 1995. Leg colouration of Red-necked Stint. British Birds 88: 112. (165 Dalgetty Road, Beaumaris, Vic. 3193, Australia).

Rogers, K.G. 1995. SHEBA: Computer programs for sexing birds on measurements using univariate data. Corella 19:25-34. (340 Ninks Road, St Andrews, Victoria 3761, Australia).

Tulp,I., S.McChesney & P. de Goeij. 1994. Migratory departures of waders from north-western Australia: behaviour, timing and possible migration routes. Ardea 82:201-221. (SOVON, Rijksstraatweg 178, NL-6573 DG Beek-Ubbergen, Netherlands).

Wilson,G.W. 1994. The status of the Pied Oystercatcher *Haematopus longirostris* on the coastal flats of Keppel Sands and Joskeleigh on the Capricorn Coast of Central Queensland. Sunbird 24:7379. (Department of Biology, Central Queensland University, Rockhampton, Queensland 4072, Australia). Details increased disturbance and lack of breeding success.

Jeff Campbell

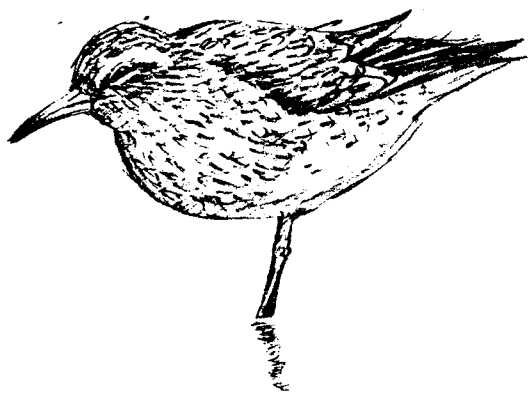
LONG-BILLED DOWITCHER - A NEW WADER SPECIES IN AUSTRALIA?

Whilst extracting birds from a cannon net catch at Barry Beach in Corner Inlet (Victoria) on 18 June 1995, members of the Victorian Wader Study Group were surprised to find a bird that was not immediately recognised along with the 38 Bar-tailed Godwit, 13 Red Knot and one Eastern Curlew which were also caught.

On closer examination, after the other birds had been processed, it was apparent that the bird was one of the 'American' Dowitchers (i.e. Long-billed Dowitcher *Limnodromus scolopaceus* or Shortbilled Dowitcher *L. griseus*). By good fortune a member of the team had a copy of the *Identification Guide to the Waders of the World* handy, and this was referred to in our identification of the bird. This task was not as simple as it might be assumed, given the common names of the two species, as there is in fact considerable overlap in bill lengths. However a preliminary assessment was made before the bird was released.

A complete set of biometric data, field descriptions and many photographs were taken of the bird, and these, and other reference sources, were later further referred to by ourselves and others in coming to the conclusion that the bird was a Long-billed Dowitcher (probably an adult male). The record has been forwarded to the RAOU Records Appraisal Committee for consideration and if accepted will become the first Australian record of this species.

Jeff Campbell and Clive Minton



AUSTRALIAN SECTION

NOTES ON THE SOOTY OYSTERCATCHER *Haematopus fuliginosus* IN VICTORIA, AUSTRALIA; DENSITIES, SOCIAL STRUCTURE AND PREDATION.

Michael Weston, 28 Craig Rd, Donvale 3111. Victoria, Australia.
David Heislers, 21/77 Dover Rd, Williamstown 3016. Victoria, Australia.
Claire Appleby, 95 The Broadway, Camberwell 3124. Victoria, Australia.

"The conservation of all animals, including birds, hinges upon information about numbers and changes in population size." (Lloyd 1981).

Introduction

Current and recent research into the Sooty Oystercatcher *Haematopus fuliginosis* includes extensive colour-banding (e.g. Minton 1990) and detailed examination of foraging ecology (Chafer 1992, 1994). However, little is known of the population biology of the species.

This paper uses data generated by volunteer based counts of Hooded Plovers *Thinornis rubricollis*. Hooded Plover counts tend to examine different habitats to those covered in the biannual National Wader Counts, which mostly cover estuarine systems. Some analysis of count data on Sooty Oystercatchers gathered as part of the National Wader Count project is presented in Hewish (1990).

The most recent population estimate of the Sooty Oystercatcher *Haematopus fuliginosus* was 4000 birds (the species is confined to Australia). This is a remarkably low figure, considering the population of Hooded Plovers, regarded as rare (Garnett 1992), was estimated as 5000 birds (Watkins 1993). Moreover, two subspecies of Sooty Oystercatcher are recognised (only one subspecies is currently recognised for the Hooded Plover), and the population of the northern subspecies *H.f. opthalmicus* has been estimated at only 1000 (Lane 1987). This is even more disturbing when considering that the taxonomic unit of conservation adopted by major conservation agencies is the subspecies (see Garnett 1992 for a justification).

Any species (or subspecies) with such a low population size is one that should be researched in order to determine any potential threats, and to investigate whether or not the population is stable. Watkins (1993) recognised the need for population monitoring of Sooty Oystercatchers. This paper presents some data on Sooty Oystercatcher densities in Victoria in order to contribute to an improved population estimate, and so that a baseline can be set. In addition, this paper presents some information on social structure and some other observations. This paper also discusses the need for further research by the AWSG.

Methods

Data used in this report were collected during surveys of the Victorian coast designed to monitor Hooded Plover populations (see Weston 1993, 1995). In addition, data from the 1993 autumn count of eastern Victoria is used (see Heislers 1994).

Detailed count methodologies are presented in the respective count reports. Basically, open ocean beach has been counted. The autumn 1993 count also covered many accessible rocky areas, whereas the late spring counts in 1992 and 1994 concentrated on sandy areas. It is recognised that for a complete count of Sooty Oystercatchers, all rocky areas should be covered. A comprehensive count is recommended as a priority for any future research project on the Sooty Oystercatcher.

For the late spring counts only those data sheets that definitely recorded the number or the absence of Sooty Oystercatchers are included in the results. For the 1992 count about 66% of count sheets were used, for the 1994 count 51% of count sheets were used. It is likely that some counters did not find Sooty Oystercatchers but failed to mark the result (i.e. zero Sooty Oystercatchers) on the data sheets. In this way the density figures may be artificially high.

The late spring 1994 count was conducted in extremely poor weather conditions. These conditions were so severe that they probably affected the count result.

Estuarine and embayment areas are excluded because of the poor coverage of these areas. Sooty Oystercatchers do occur in such habitats, for example, they are fairly regularly seen within Port Phillip Bay. Indeed, one was recorded at Sand Island, Queenscliff, in the 1992 count and ten were recorded on a mudflat within Corner Inlet by the autumn 1993 count.

Results and Discussion

Sooty Oystercatchers proved to be widespread in low densities.

Densities

Table 1 shows the densities of Sooty Oystercatchers recorded in Victoria by the different counts. Coverage is

based on sheets in which the number or absence of Sooty Oystercatchers was recorded.

Table 1. The densities of Sooty Oystercatchers recorded on the Victorian Coast (- = no coverage, NR = not recorded).

Region	Coverage Nov. 1992 (km)	Average Density Nov. 1992	Coverage Mar/Apr 1993 (km)	Average Density Mar/Apr 1993	Coverage Nov. 1994 (km)	Average Density Nov. 1994
NSW Border to Point Hicks	59	0.34	93	0.33	53	0.36 (19)
Point Hicks to Marlo	51.3	0.02	66	0.03	54	0.00 (0)
Marlo to Ninety Mile Beach	140	0.00	177	0.00	40	0.00 (0)
McLaughlin's Beach to Snake I.	54	0.13	14	0.71**	18	0.05 (1)
Wilson's Promontory	9.5	0.53	<8*	0.25	12	0.00 (0)
Darby Beach to San Remo	63	0.22	143	0.52	76	0.12 (9)
Phillip I.	16.5	0.12	50	0.14	20.5	0.44 (9)
Point Leo to Point Nepean	0	-	52	0.08	31.5	0.38 (12)
Queenscliff to Cape Otway	80	0.00	0	-	67	0.09 (6)
Cape Otway to Warrnambool	0	-	0	-	46.5	0.00 (0)
Warrnambool to SA Border	169	0.02	0	-	0	NR

***counters kept to beaches to Oberon Bay, and thereafter to walking tracks with occasional scattered beaches and visual observations from rocky points.**
**** all 10 birds observed were on a sheltered mudflat**

Some regions show similar densities in all counts, for example the three coastal regions east of Ninety Mile Beach. One region (Darby River to San Remo) had a comparatively high density in autumn, possibly as a result of seasonal factors. Other coastal regions reported different densities between counts that are difficult to explain in terms of biology, and are probably the result of sampling biases or the differences in weather.

In total, the number of Sooty Oystercatchers counted on open ocean beach habitats in late spring 1992 was 53, in autumn 1993 130 were counted, and in late spring 1994 56 were counted. The high number counted in autumn 1993 probably represents a higher coverage of rocky areas than that obtained on the other counts which concentrated on sandy areas. It is interesting that a similar number of Pied Oystercatchers *H. longirostris* were recorded by the autumn count (134, Heislers 1994).

In the autumn count the areas of highest densities of Sooty Oystercatchers were between Darby River and San Remo, and McLaughlins Beach to Snake Island (Corner Inlet), however, the latter figure refers to non-ocean coastline. The highest density in spring 1992 was on Wilsons Promontory, and in spring 1994 it was on Phillip Island. Once again, it is possible that the differences between counts lies in sampling bias or weather-related factors.

The low densities are surprising. In late spring 1992, 77% of count areas recorded no Sooty Oystercatchers. In late spring 1994, 77% of count areas that recorded Sooty Oystercatchers, recorded no Sooty Oystercatchers. Other published densities from coastline counts around Australia are shown in Table 2. Some of these densities are derived from the number recorded divided by the total count coverage (rather than as cited densities in the source literature).

Table 2. Some Published Densities of Sooty Oystercatchers.

Location	Source	km	Density (birds/km)
Kangaroo I., SA	Schulz 1995	509	0.49
Western Tas.	Schulz 1993	57	0.70
Flinders I., Tas.	Schulz 1990	150	3.85
King I., Tas.	Schulz 1990	93	0.95

Most of the average densities shown in Table 2 are much higher than densities reported from Victoria by the present investigators. The most probable explanation of the low densities recorded on Hooded Plover counts is that the counts do not cover suitable habitat to any extent. Indeed, this explanation was offered by Schulz (1993) for the low densities he recorded on a beach count of western Tasmania. This is consistent with the higher average density recorded on the autumn count, which covered more rocky areas than the late spring counts.

Social structure

Social organisation of the Sooty Oystercatcher is not well known (Marchant & Higgins 1993). The only count in which social structure was recorded was the autumn 1993 count. The social structure of the population in autumn is shown in Table 3.

Table 3. The social structure of Sooty Oystercatchers in autumn 1993.

Group Size*	Proportion of population	Proportion of social units
1	12.3%	35.6%
2	26.2%	37.8%
3	6.9%	6.7%
4	9.2%	6.7%
5	3.8%	2.2%
8	6.2%	2.2%
10	15.4%	4.4%
12	9.2%	2.2%
13	10.0%	2.2%

*** Group sizes not indicated were not recorded by the survey.**

The autumn count did not age Sooty Oystercatchers (nor did the 1992 or 1994 counts). Consequently, social units are based on the number of birds, and some social categories (such as a pair with a juvenile versus three adults) cannot be differentiated. Group sizes of three or more birds accounted for only 26.6% of social units, but these contained 60.7% of the population. It is apparent that the population is flocking in autumn. The proportion of Sooty Oystercatchers in pairs (26.2%) is higher than the proportion of Pied Oystercatchers *H. longirostris* in pairs as estimated on the same count (18%, Weston & Heislers 1995).

Secondary group formation (as discussed for Pied Oystercatchers *H. longirostris* by Weston & Heislers 1995) was not considered a major influence on the results.

Predation

It is considered that the reporting of observations which suggest factors responsible for mortality of a rare species are worthy of publication (e.g. Schulz 1992). Counters are always asked to report any information they have on predation or any other type of mortality.

On 19 Oct. 1992 near Red Bluff, Corner Inlet, Victoria, a White-bellied Sea Eagle *Haliaeetus leucogaster* attacked, killed and ate a Sooty Oystercatcher (C. Appleby pers. obs.). The Sooty Oystercatcher was feeding with other Sooty Oystercatchers and two Pied Oystercatchers on a sandspit. All but one Sooty Oystercatcher and the Pied Oystercatchers were put up by a pair of Sea Eagles, one of which stooped and killed the remaining Sooty Oystercatcher. The Sea Eagle moved to a wider part of the sandspit before beginning to eat the Sooty Oystercatcher. Silver Gulls *Larus novaehollandiae* harassed the Sea Eagle without effect, but when the Oystercatcher was about half eaten a Wedge-tailed Eagle *Aquila audax* drove off the Sea Eagle. It then inspected and tore at the carcass briefly. A Whistling Kite *Haliastur sphenurus* landed beside the carcass, turned it over and left. The Sea-eagle returned, picking up the remains and moving to a nearby rocky islet where they were lost to sight.

Anderson (1993) reports a possible attack on a Sooty Oystercatcher by a Whistling Kite, and notes that his observation appears to be the first recorded occurrence of a Sooty Oystercatcher being preyed upon by any other organism (C.J. Chafer *in litt*). The observation of predation given above therefore seems to be the first definite record of predation of a Sooty Oystercatcher. The fact that raptors take Sooty Oystercatchers is not entirely surprising, given that similar sized waders are also preyed upon by raptors. For example, a Swamp Harrier *Circus approximans* has been recorded taking a Pied Oystercatcher *Haematopus longirostris* (Minton 1989). The only wader previously recorded in the diet of White-bellied Sea-Eagle in Australia is the Masked Lapwing *Vanellus miles* (Marchant & Higgins 1993).

Discussion

This paper serves to present information gathered by volunteer-ba ed counts of the Victorian coastline. It is also intended to highlight the paucity of published data on a species with a disturbingly low estimate of population size. We also hope that some of the gaps in our knowledge have been narrowed to some small extent.

The *Stilt* has proven to be the major vehicle for the publication of the densities of waders along the Australian coast. This information is important because significant wader habitat does occur outside estuarine areas. This is emphasised by the results of the January 1985 count of the shoreline of Britain. This count found that a substantial proportion of the population of some species of wading-bird occur away from estuaries on rocky or sandy shores (Prater & Lloyd 1987). This suggests that it is important to count areas of open coastline, even though counting dispersed species requires a relatively large effort for the proportion of habitat counted.

It is hoped that this paper encourages other researchers to publish any information that they may have on the Sooty Oystercatcher.

Recommendations

It is recommended that:

- A more comprehensive study of population size of the Sooty Oystercatcher be conducted. We consider that the population size of the northern subspecies of the Sooty Oystercatcher (*H.f. opthalmicus*) requires urgent investigation.
- If necessary, monitoring of Sooty Oystercatcher populations be undertaken.

On southern Australian shores, counts could possibly be conducted in association with Hooded Plover counts. Counts of northern coasts would be more difficult to conduct, but would also provide useful data on the distribution of other waders, such as the Beach Thick-knee *Esacus magnirostris*. Aerial surveys have proved a successful technique for counting Sooty and Pied Oystercatchers in Western Australia (Halse *et al.* 1995) and could be used in other areas.

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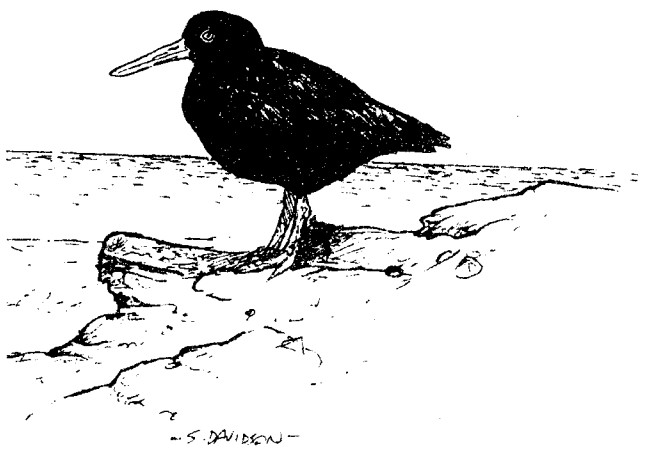

BIVARIATE SEXING CRITERIA FOR SHARP-TAILED SANDPIPER AND EASTERN CURLEW

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Summary

A bivariate sexing criterion is a rule using two measurements for assigning sex to individual birds of species in which the sexes are similar in plumage but differ in size. The concepts applied are those of Rogers (1995a) who discussed the univariate case. The method is simply extended using the results of the bivariate separation of the sexes method of Rogers (1995b). Case studies on the Sharp-tailed Sandpiper and the Eastern Curlew show that including a second measurement can, but does not necessarily, add much to the percentage of birds that can be correctly sexed by a univariate criterion.

Introduction

In many species of bird, the sexes do not differ in plumage but do differ in size and, often, the only clue to the sex of a trapped bird is its measurements. A sexing criterion is a rule by which birds of unknown sex from such a species can be assigned to a sex on the basis of a measurement or measurements.

There is no consensus in the literature on the requirements of a sexing criterion. Suggested univariate solutions range from, at one extreme, the recommendation of a single measurement above which birds can be assigned to one sex and below which to another (e.g. Pyke and Armstrong 1994). Rogers and Rogers (1995) argue that this rule is clearly wrong for species in which the sexes overlap in size. At the other extreme, Rogers (1995a) argued that a robust criterion should accommodate the precision with which the sexes are separated (which depends *inter alia* on the size of sample available), the precision with which the measurements concerned can be taken, and the confidence to be associated with any attribution of sex. The problem of developing multivariate sexing criteria from a sample of unsexed birds, of which the bivariate case considered here is the simplest example, has received no attention in the literature. Discriminant analysis, which requires a sample of sexed birds, has been used to provide multivariate sexing rules; its application has not addressed the adjustments considered here.

The first stage in the calculation of a criterion is the separation of the sexes i.e. the estimation of parameters (means, standard deviations, correlations) which describe the size of each sex. The SHEBA computer programs (Rogers 1995a) separate the sexes and enable sexing criteria to be developed using a single measurement. This paper extends the idea to the use of two measurements using the result of the bivariate separation of the sexes of Rogers (1995b). The expectation is that bivariate criteria will enable more birds to be sexed than will univariate criteria.

Bivariate criteria are developed for two species, Sharp-tailed Sandpiper *Calidris acuminata* in which males are larger and Eastern Curlew *Numenius madagascariensis* in which females are larger (HANZAB in press). These present different problems. A large sample is available of Sharp-tailed Sandpipers; these are approximately equally sex size dimorphic on the two measurements used, head-bill length and wing length. A much smaller sample is available of Eastern Curlew; the species is considerably more sex size dimorphic on culmen (bill) length than on wing length.

The data analysed were collected from live birds trapped by the Victorian Wader Study Group. Wing length measurements are maximum chord. All measurements are in millimetres. Measurement techniques used are described in Rogers (1989).

Methods

Exactly the same conceptual steps are required to develop a bivariate as a univariate sexing criterion; no methodological innovation is required. The calculations and the final criterion are, however, necessarily more complicated.

A univariate criterion consists of two numbers, the upper limit of size for a bird from the smaller sex (ULS) and the lower limit of size for a bird from the larger sex (LLL). Birds with a measurement falling between these limits are unsexed. For a bivariate criterion, ULS and LLL must be calculated for one measurement for each value that the other measurement can take in practice. The resultant criterion is therefore a table of numbers.

The steps in the calculation (see Rogers 1995a for more detail) of the criterion are:

- specification of the minimum probability of correct sexing required. The final criterion will only assign sex to birds at this probability or higher;
- decision on whether or not to use prior information on sex ratio in the criterion. It is reasonable to use this information if, for example, the criterion is to be used only on the sample birds or if the sex ratio at a catching location (say) is known to be different from 50%;
- adjustment of the criterion limits to reflect the precision with which the size parameters of each sex are estimated - the sampling adjustment. This requires a Monte Carlo calculation of many iterations. In each iteration, the size

parameters of each sex are sampled and unadjusted criterion limits calculated. These are used to calculate the appropriate sampling adjustment;

- further adjustment of the sampling adjusted values of the criterion limits to the precision with which the measurement concerned can be taken - the measurement precision adjustment.

Finally, the performance of the criterion is estimated. This is done by calculating the percentage of birds that will be correctly sexed, the percentage that will be unsexed, and the percentage that will be wrongly sexed by the criterion.

Statistical methods common to separation and sexing criterion estimation are described in Rogers (1995b). The appendix gives additional details relating to the calculation of sexing criteria.

Results

All sexing criteria are given at a minimum probability of correct sexing of 95%. They also assume no prior information on the sex ratio in the population.

Sharp-tailed Sandpiper

Sharp-tailed Sandpipers are difficult to age and have rather complicated primary moults (D. Rogers in *HANZAB* in prep.). D. Rogers reports that ageing should be good until December. After this month, although experienced processors and good light are needed for accurate ageing, these are not always available in the field and some immatures may be mis-aged as adults (Clive Minton, pers. comm.). On this advice, it is probably safe to assume that all birds caught before January will be properly aged so age specific criteria can be calculated for these birds. All birds caught in and after January should be considered as unaged; certainly it cannot be assumed that all birds caught in the future in this period will be correctly aged and the sexing criterion should reflect this uncertainty. An obvious feature of the post-December data is that some birds have new outer primaries and some have old ones. As worn primaries are shorter than new ones, these birds should also be considered separately. (Outer primaries are the longest ones and birds moulting them are necessarily excluded from the analysis.)

The first step in bivariate separation is to obtain univariate estimates of the parameters. This is done using the SHEBA programs of Rogers (1995a). The results are given in Table 1. The table shows that the univariate results fall naturally into the two groups specified below with similar parameter estimates. Head-bill parameters are similar across the two groups but wing parameters differ markedly suggesting that age-related differences in wing lengths are negligible and not as marked as those caused by primary wear.

Group 1 - Age 1 birds caught before January
- All birds caught post-December with new outer primaries

Group 2 - Adult birds caught before January
- All birds caught post-December with old outer primaries

TABLE 1. SHARP-TAILED SANDPIPER - SEPARATION OF THE SEXES

Data Set - Method	Sex	HEAD-BILL MEAN (S.D.; Number)	WING MEAN (S.D.; Number)
GROUP 1.	**(1) Age 1, pre-January (2) All Birds, post-December. Outer primary: new**		
(1) - UV	Female	49.6 (1.22; 57)	132.5 (2.82; 56)
	Male	52.6 (1.29; 58)	141.9 (3.02; 58)
(2) - UV	Female	49.7 (1.34; 59)	132.1 (2.49; 76)
	Male	52.3 (1.41; 102)	140.8 (2.66; 83)
(1)+(2) - UV	Female	49.7 (1.28; 123)	132.4 (2.74; 135)
	Male	52.5 (1.35; 153)	141.4 (2.93; 139)
(1)+(2) - BV	Female	49.9 (1.12; 124)	132.2 (2.57; 124)
rho = 0.2909	Male	52.6 (1.18; 133)	141.2 (2.75; 133)
GROUP 2.	**(1) Age Adult, pre-January (2) All Birds, post-December. Outer primary: old**		
(1) - UV	Female	49.5 (1.17; 515)	130.6 (2.63; 538)
	Male	52.6 (1.24; 455)	138.2 (2.79; 435)
(2) - UV	Female	49.8 (1.03; 150)	130.6 (2.86; 143)
	Male	53.1 (1.10; 76)	139.2 (3.05; 84)
(1) + (2) - UV	Female	49.6 (1.17; 683)	130.6 (2.69; 686)
	Male	52.7 (1.25; 515)	138.4 (2.85; 514)
(1)+(2) - BV	Female	49.6 (1.19; 684)	130.6 (2.75; 684)
rho = 0.1247	Male	52.8 (1.27; 517)	138.4 (2.91; 517)

Notes
(1) UV indicates univariate methods used; BV bivariate.
(2) rho is the common within sex correlation coefficient estimated by bivariate separation.

Sexing criteria are calculated for these two groups. The same sexing criterion is assumed to apply to all birds within each group. The advantages of grouping are that sexing criteria can be based on larger samples and can be applied in all months. Table 1 also gives the univariate parameter estimates for the two groups and the parameter estimates for each group obtained by the the bivariate separation method. The smaller total number of birds in the bivariate results is a consequence of the identification and exclusion of bivariate outliers (Rogers 1995b).

Table 2 gives, for the two groups, details of the parameter estimates obtained by the separation method and the corresponding values obtained from the Monte Carlo samples. The Monte Carlo parameter estimates closely correspond to those calculated from the data thus validating the calculation and the sampling adjustment calculated from it.

TABLE 2. SHARP-TAILED SANDPIPER - PARAMETER & MONTE CARLO ESTIMATES

	Number	Wing	Head-Bill
GROUP 1			
Parameter Estimates			
Central Estimates	124	132.163	49.910
Asymptotic Standard Errors	2.2248	0.0910	0.0323
Asymptotic Correlation Matrix	1		
	0.913615	1	
	0.741234	0.677835	1
Monte Carlo Estimates (1000 samples)			
Central Estimates	123.969	132.163	49.910
Asymptotic Standard Errors	2.2043	0.0890	0.0324
Asymptotic Correlation Matrix	1		
	0.913287	1	
	0.740067	0.674767	1
GROUP 2			
Parameter Estimates			
Central Estimates	684	130.634	49.621
Asymptotic Standard Errors	3.1883	0.0219	0.0095
Asymptotic Correlation Matrix	1		
	0.814708	1	
	0.774536	0.455285	1
Monte Carlo Estimates (1000 samples)			
Estimates from Data			
Central Estimates	684.019	130.633	49.621
Asymptotic Standard Errors	3.1579	0.0221	0.0091
Asymptotic Correlation Matrix	1		
	0.814368	1	
	0.774532	0.455520	1

Table 3 gives the univariate and bivariate sexing criteria for each group. Both the Group 2 univariate wing criterion limits are 2 mm lower than those for Group 1 whilst the head-bill limits are within the range of those for Group 1. Given the relatively small sample size for Group 1 which leads to larger sampling adjustments, these results suggest that the wing length criteria reflect the expected shorter wing lengths of birds with old outer primaries and that there is, possibly, little real difference in head-bill length between the two groups (as is also suggested by Table 1).

The bivariate criteria are a little more complicated. The Group 1 criterion, for example, falls into five regions:

- Wing length less than or equal to 120 mm: all birds are female on univariate considerations, these wing lengths being outside the range of measurements considered in the bivariate calculations;
- Wing length 121 mm to 129 mm
  - female if head-bill length less than or equal to the number in the left hand (Upper Limit for Females) column;
  - of unknown sex if greater than this value;

TABLE 3. SHARP-TAILED SANDPIPER - SEXING CRITERIA

	GROUP 1		GROUP 2	
	Upper Limit for Females	Lower Limit for Males	Upper Limit for Females	Lower Limit for Males
UNIVARIATE CRITERIA				
Wing	133	140	131	138
Head-Bill	49.6	52.8	49.6	52.6
BIVARIATE CRITERIA - Limits for Head-Bill given Wing				
Wing				
< 119	F	F	F	F
119	F	F	55.0	58.2
120	F	F	54.7	58.0
121	56.6	U	54.4	57.7
122	56.3	U	54.1	57.4
123	56.0	U	53.8	57.1
124	55.6	U	53.5	56.8
125	55.2	U	53.2	56.4
126	54.9	U	52.8	56.1
127	54.4	U	52.5	55.8
128	54.0	U	52.1	55.4
129	53.6	U	51.7	55.0
130	53.1	58.3	51.3	54.6
131	52.5	57.8	50.9	54.2
132	52.0	57.1	50.5	53.8
133	51.4	56.5	50.0	53.4
134	50.7	55.8	49.5	52.9
135	49.7	55.0	48.9	52.5
136	48.5	54.2	48.3	52.0
137	47.0	53.4	47.7	51.5
138	U	52.4	47.0	51.0
139	U	51.6	46.3	50.5
140	U	50.8	45.6	50.0
141	U	50.0	44.8	49.5
142	U	49.3	U	48.9
143	U	48.5	U	48.3
144	U	47.3	U	47.7
145	U	46.1	U	47.0
146	M	M	U	46.3
147	M	M	U	45.6
148	M	M	U	44.8
148	M	M	M	M

Note. F is female, M is male, U is sex unknown.

- Wing length 130 mm to 137 mm:
  - female if head-bill length less than or equal to the number in the left hand (Upper Limit for Females) column;
  - male if head-bill length greater than or equal to the number in the right hand (Lower Limit for Males) column;
  - of unknown sex if between these values;
- Wing length 138 mm to 145 mm:
  - male if head-bill length greater than or equal to the number in the right hand (Lower Limit for Males) column;
  - of unknown sex if less than this value;
- Wing length greater than or equal to 146 mm: all birds are male (sexed on univariate considerations).

Table 4 reports the sexing criteria performance. This demonstrates a clear advantage of bivariate over univariate sexing with similar percentages right, 81% and 82%, for the two groups. The univariate criteria give, at best, corresponding percentages of only 65% and 55%.

TABLE 4. SHARP-TAILED SANDPIPER - SEXING CRITERIA PERFORMANCE

Model	Data	Percentage Sexed Right	Don't Know	Sexed Wrong
GROUP 1				
Univariate	Wing	64.82	35.05	0.13
	Head-Bill	39.55	59.99	0.46
Bivariate	Wing, Head-Bill	81.32	18.36	0.30
GROUP 2				
Univariate	Wing	55.19	44.35	0.47
	Head-Bill	52.00	47.37	0.64
Bivariate	Wing, Head-Bill	80.64	18.94	0.42

Eastern Curlew

The results presented here are derived from the parameter estimates and same data as used in Rogers (1995b); due to a computer program enhancement, the parameter estimates differ slightly. Tables 5 and 6 give details of the separation and Monte Carlo estimates.

TABLE 5. EASTERN CURLEW - SEPARATION OF THE SEXES

Sex	WING Mean (S.D., Number)	CULMEN Mean (S.D., Number)
Separation		
Male	312.5 (7.40, 106)	153.0 (8.12, 106)
Female	325.5 (7.71, 221)	183.1 (9.72, 221)

Common Within Sex Correlation Coefficient = 0.105387

TABLE 6. EASTERN CURLEW - PARAMETER & MONTE CARLO ESTIMATES

	Number	Wing	Culmen
Parameter Estimates			
Central Estimates	106	312.519	153.012
Asymptotic Standard Errors	1.9420	0.1901	0.2795
Asymptotic Correlation Matrix	1		
	0.605501	1	
	0.865822	0.412427	1
Monte Carlo Estimates (1000 samples)			
Central Estimates	106.028	312.521	153.010
Asymptotic Standard Errors	1.9578	0.1890	0.2808
Asymptotic Correlation Matrix	1		
	0.605596	1	
	0.865092	0.410300	1

Table 7 gives the sexing criteria. Table 8 gives the performance of the criteria. These results differ markedly from those for the Sharp-tailed Sandpiper with the bivariate criterion adding only 6% to the 75% sexed correctly by the univariate criterion based on culmen length. This is not unexpected given the small separation estimated for wing length.

TABLE 7. EASTERN CURLEW - ADULTS - SEXING CRITERIA

Measure	Upper Limit for Males (ULS)	Lower Limit for Females (LLL)	Measure	Upper Limit for Males (ULS)	Lower Limit for Females (LLL)	Measure	Upper Limit for Males (ULS)	Lower Limit for Females (LLL)
UNIVARIATE CRITERIA								
Wing	304	333						
Culmen	158	176						
BIVARIATE CRITERIA - Limits for Culmen given Wing								
Wing	**ULS**	**LLL**	**Wing**	**ULS**	**LLL**	**Wing**	**ULS**	**LLL**
282	M	M	307	162	181	333	145	168
282	170	190	308	162	180	334	145	168
283	170	190	309	161	180	335	144	167
284	170	189	310	161	179	336	143	167
285	170	189	311	161	179	337	142	166
286	169	189	312	160	178	338	141	166
287	169	188	313	160	178	339	140	165
288	169	188	314	159	177	340	139	165
289	168	188	315	159	177	341	137	164
290	168	187	316	158	176	342	136	164
291	168	187	317	157	176	343	135	163
292	168	186	318	157	175	344	134	163
293	167	186	319	156	175	345	133	162
294	167	186	320	156	174	346	131	162
295	167	185	321	155	174	347	130	161
296	166	185	322	154	174	348	128	160
297	166	185	323	153	173	349	127	160
298	166	184	324	153	173	350	125	159
299	165	184	325	152	172	351	124	158
300	165	183	326	151	172	352	122	158
301	165	183	327	151	171	353	120	157
302	164	183	328	150	171	354	U	157
303	164	182	329	149	170	355	U	156
304	163	182	330	148	170	356	U	155
305	163	181	331	147	169	357	U	154
306	163	181	332	146	169	> 357	F	F

Note. F is female, M is male, U is sex unknown.

TABLE 8. EASTERN CURLEW - SEXING CRITERIA PERFORMANCE

Model	Data	Percentage		
		Sexed Right	Don't Know	Sexed Wrong
Univariate	Wing	14.53	85.20	0.27
	Culmen	74.94	24.70	0.36
Bivariate	Wing, Culmen	80.61	19.10	0.29

Discussion

No additional conceptual steps are required to extend the bivariate method described here to the consideration of any number of variables. Anticipation of the programming task, the time the programs would take to run (at least on a not very fast PC), and the complex nature of the final sexing criterion does, however, give bad dreams.

Received wisdom has it that sexing rules based on more variables are necessarily better than those based on fewer, the nine variable discriminant analysis models (based on 90 and 69 birds) of Counsilman *et al.* (1994) being, perhaps, the extreme example of this faith. The Eastern Curlew results presented here suggest that the result of adding a variable may not be as helpful as hoped. It must be true that adding variables to the criterion is an exercise in diminishing returns if the best explanatory variables are included first. The inclusion of additional variables should be done only if additional value is demonstrable. An obvious case where adding a variable is likely to be of little help is if two measurements are highly correlated and measure essentially the same thing, e.g. head-bill length and culmen length.

Finally, a word of caution is necessary. Geographical variation, whether absolute for subspecies or clines over large areas, does occur and a sexing criterion which applies in one part of the world may well not apply in another. A sexing criterion only has validity if applied to birds of which the data analysed are representative; application elsewhere could lead to mistakes in sexing and the interpretation of data.

Acknowledgements

Thanks are due to Danny Rogers and Annie Rogers for their helpful comments on a draft of this paper; to Clive Minton for his assistance on the ageing problem of Sharpies and for his dynamic leadership of the Victorian Wader Study Group without which there would have been no data to analyse; to Terry and Mark Barter for their stupendous efforts computerising all the data collected by the V.W.S.G. since its inception in 1979; and to Joe Rogers for his dogged, and much appreciated, support.

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APPENDIX. Statistical Details

Many of the methods described in Rogers (1995b) for separation of the sexes are used in developing and evaluating sexing criteria. These are not repeated here. Additional aspects, relevant to bivariate criteria, are described. The univariate case requires similar, but simpler, treatment. Rogers 1995a gives a general description of the univariate approach.

Monte Carlo Sampling

The bivariate separation method (Rogers 1995b) estimates by maximum likelihood nine parameters for the sample, all relating to the smaller sex:

- three central estimates; the estimated number of birds and mean value of each measurement;
- the asymptotic standard errors of the above;
- the asymptotic correlations between the estimates.

All nine parameters must be sampled since all are estimates. The sampling rests on the result that conditional distributions of a multivariate normal distribution are themselves normal. The stages in the process are as follows (the word "asymptotic" has been omitted in the several places where it should occur).

1. Sample the standard errors of the standard errors. If s is a standard error calculated on n observations, then:
$S.E.\{s\} = s / (2 * n)^{0.5}$

   Note. A random sample from a normal distribution with zero mean and unit variance is given by:
$[-2 * \log_e(z1)] * \cos(2 * 3.1.4159 * z2)$

   where z1 and z2 are random numbers in the range 0 to 1.

2. Sample one central estimate using the estimated mean and sampled standard error.

3. Sample the off-diagonal elements, r, of the correlation matrix. The distribution of these is non-normal but the distribution of z is approximately normal (Hoel 1971) where:

$$z = 0.5 * \log_e[(1 + r) / (1 - r)]$$

   and

$$S.D.\{z\} = 1 / (n - 3)^{0.5}$$

4. Set up the conditional distribution of the other two central estimates given the sampled estimate of the first. Note that the covariance of the components of the conditional distribution does not depend on the value sampled in step 2.

5. Sample from the resultant bivariate normal distribution using the same basic process as above.

   Other parameter estimates (standard deviations for smaller sex and all parameters for larger sex) are calculated using the method of Rogers 1995b. Unadjusted sexing criterion limits (see below) of the second measurement are found for each value which the first measurement may take over a reasonable range. The results of a large number of samples (e.g. 1000) are used to calculate the mean and standard deviation of the unadjusted criterion limits (this is done for each value which the first measurement may take). The sampling adjustment is found as the appropriate (i.e. corresponding to the minimum probability of correct sexing required) number of standard deviations relative to the mean - below for the smaller sex, above for the larger one. Finally, the adjustment for measurement precision is made.

Unadjusted Sexing Criterion Limits

The expression given by Rogers (1995a) for estimating the probability that a bird is of a particular sex can be rewritten as:

$$P_1(x,y) = n_1.B_1(x,y)/[n_1.B_1(x,y) + n_2.B_2(x,y)]$$

where

$P_1(x,y)$	is the probability that a bird with measurements x and y is from sex 1;
n_i	is the number of birds in sex i;
$B_i(x,y)$	is the bivariate normal distribution probability that a bird from sex i will have the measurements x and y.

If MIN is the minimum probability of correct sexing required (e.g. 0.95), then unadjusted criterion limits are found by:

- selecting values of y which correspond to units of measurement precision;
- for each value of y selected:
  - setting $P_1(x,y)$ = MIN and solving the above expression for x, which is the required unadjusted upper limit of size for the smaller sex.
  - setting $P_1(x,y)$ = 1 - MIN and solving the expression to get the unadjusted lower limit of size for the larger sex.

Inclusion of the terms n_i accommodates information on the sex ratio in the sample. If the sex ratio in the sample is known to be atypical, they can be substituted by percentages which reflect the known sex ratio. If the sexing criterion is to be applied to birds outside the sample, e.g. from future trappings, and, as will often be the case, there is no prior information that the sex ratio differs from 50:50, the terms n_i should be omitted.

A little algebra will show that ULS and LLL will vary quadratically with y unless the same variance-covariance matrix applies to each sex in which case the relationship will be linear.

POPULATION MONITORING COUNTS : Summer 1995

Ken Harris, 59 Strickland Drive Wheelers Hill, Vic 3150

It is pleasing to report that the Population Monitoring Counts are increasing in terms of both consistency and overall coverage. The Summer 1995 Count was completed over the first two weekends of February. Five new sites have been added as follows :

Queensland:	Townsville, Lockyer Valley
New South Wales:	Tweed River, Richmond River, Tuggerah Lakes

In total over 150 count sheets were supplied for 31 sites.

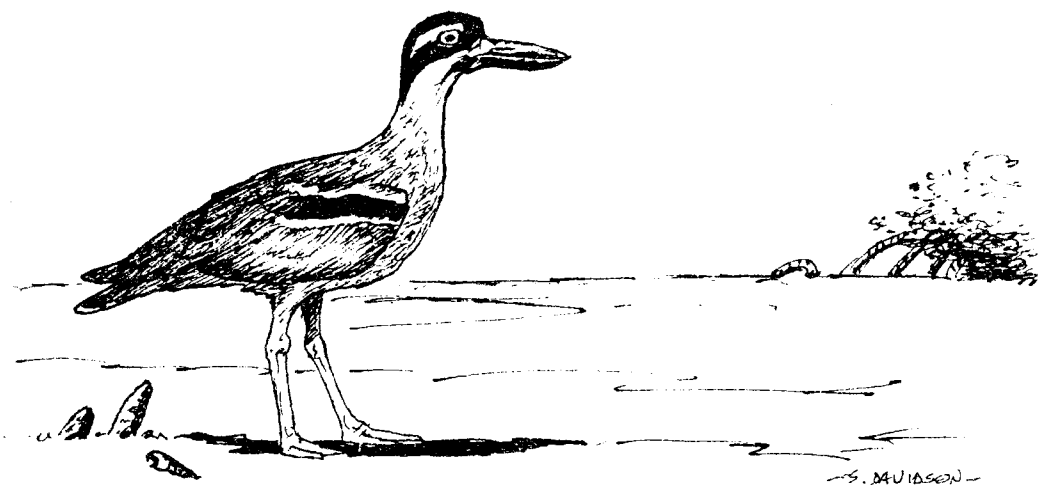
1994 was generally regarded as a good breeding year and a brief analysis has been done across the 1994 and 1995 results. Only those sites counted in both years have been included. The analysis shows the following points :

- 1995 shows an increase in numbers of 4% over 1994.

- The more southerly breeding birds, (ie Black-tailed Godwit, Common Greenshank, Marsh Sandpiper, Eastern Curlew, Terek Sandpiper, Greater Sand Plover), all show good increases over 1994 numbers. This suggests that the last breeding season was more favourable in these regions.

- For Arctic breeders 1995 shows an overall slight increase reflecting a repeat of the good 1994 breeding season in that area. However on an individual species basis the results are mixed with Red Knot, Bar-tailed Godwit and Grey Plover showing substantial increases as against Pacific Golden Plover, Ruddy Turnstone, and Great Knot showing decreases. The most disturbing aspect in the numbers is the continued decline in Pacific Golden Plover numbers. In 1986, a count of 2,745 was recorded from 23 sites. Since then numbers have fallen steadily to the 1995 figure of 774 from 31 sites (some with increased coverage). The decline is consistent across all sites. No reason has as yet been attributed to this decline.

- Of the resident waders Red-capped Plover and Pied Oystercatcher showed increases this year with the former no doubt due to drought conditions inland causing the inland population to disperse to the coast. Recent catches of banded Pied Oystercatchers indicate this bird is far more mobile than originally thought and this mobility may be a factor in the increase in numbers. More data needs to be analysed before any firm conclusion can be drawn.



Result of the Summer 1995 Wader Count	QLD						NSW								VIC	
	Cairns	Tnsvlle	Mcky	Gldstn	Moretn Bay	Lockyer Valley	Tweed Est	Richmnd Est	Clrnce Est	Hunter Est	Tuggerah Lakes	Parr Est	Botany Bay	Shlhvn Est	Shallow/ Cnrlnlet	Wstnpt Bay
Latham's Snipe						6	8	2								
Black-tailed Godwit	3	361	8		159	36			158	300			646			
Bar-tailed Godwit	74	423	639	46	8094		265	236	327	2001	67	194		244	11880	591
Little Curlew													52	2		143
Whimbrel	9	116	95	2	183		67	105	63	315			316	105	1954	1638
Eastern Curlew	3	175	249	27	1390		163	96	110	400	4			4		
Marsh Sandpiper	2	8		1	11	252	151	2	1	433				1	137	372
Common Greenshank	11	13	1	12	88	1	98	45	1	140	12					
Wood Sandpiper		2													2	3
Terek Sandpiper	11		5				4	42	15	154						
Common Sandpiper				7			2	2		1						
Grey-tailed Tattler	24	98	3		8		31	68	37	2					1	4
Wandering Tattler																
Tattler sp.			2													
Ruddy Turnstone		5	11		31			11	2	5	23		35		47	211
Great Knot	192	1245	390		937			46	140	20					200	
Red Knot		157			60				4	15					2802	
Sanderling								43								
Red-necked Stint	142	57	251	17	783			61	30	51	62			99	17907	5208
Pectoral Sandpiper													104	1		
Sharp-tailed Sandpiper	18	221		23	92	366	72	29		218	61	2	86	198	10	419
Curlew Sandpiper	27	6			211		8	83	1	1520	127	19	149	15	2680	6175
Bush Stone-curlew																
Beach Stone-curlew		3	5						2							
Pied Oystercatcher		25	169	4	691		6	1	14				38	2	983	341
Sooty Oystercatcher			1	76							2		2	11	187	
Black-winged Stilt		303	10	14	98	401	323	48		555	92	8	45			
Banded Stilt																
Red-necked Avocet				4	2	48				40						
Pacific Golden Plover	3	35		5	5		14	110	10	145	41		42			41
Grey Plover		2	74		111										1120	
Red-capped Plover		57	9	28	77			20	2	3	14		8		11	50
Double-banded Plover					20						1			1		24
Lesser Sand Plover	44	472	315		1497			32	59	35			14		90	1
Greater Sand Plover	7	158	1		109			48	1						45	3
Oriental Plover		4			6											
Black-fronted Dotterel		10		2	2	4	3								4	
Hooded Plover																
Red-kneed Dotterel																
Banded Lapwing																
Masked Lapwing	13	45			9	124	11	29	8		68	4	8	15	16	482
Long-toed Stint																
Unidentified small		4			100											
Unidentified medium																
Unidentified large																
Spotted Redshank																
Broad-billed Sandpiper	1															
Ruff/Reeve																
Painted Snipe																
Snipe sp.		1	5													
Total Number	584	4006	2243	268	14674	1238	1226	1159	985	6353	574	227	1545	698	40076	15706
Total Species	17	27	29	16	26	9	16	22	20	20	13	5	14	14	19	17

Result of the Summer 1995 Wader Count	VIC				TAS				SA			WA				NT	
	East PtPhilip	Altona	Wrrbee Avalon	BllrneP/ Mud Isl	EDerw Pittw	Marion Bay	Cape Portland	NWCst Tas	SECst SA	West EyrePen	StVinc Gulf	Albany	Swan	80 Mile	Broome	Dwin	TOTAL
Latham's Snipe	3			46				1									66
Black-tailed Godwit			2	1							1				600		2275
Bar-tailed Godwit			8	456	20			284			283	63	5	15525	7360	110	49195
Little Curlew																	
Whimbrel				4	5				2		34	4		5	19	235	1460
Eastern Curlew			11	187	90			200	3		99			70	29	10	7329
Marsh Sandpiper	9	75	123	219							84						1375
Common Greenshank	8	73	124	520	46			100	13		889	288	23	134	3	8	3161
Wood Sandpiper			1														3
Terek Sandpiper											2	1		1885	62	5	2191
Common Sandpiper	1		1	2								1			2	10	29
Grey-tailed Tattler									12					1551	346	10	2195
Wandering Tattler																	
Tattler sp.												22					24
Ruddy Turnstone			12	215			101	1850	498		269	5		248	303		3882
Great Knot								14			34	400	129	14885	7872	35	26439
Red Knot				45	3			1050			57	200	1	2018	2711	4	9127
Sanderling								12						26		4	85
Red-necked Stint		2686	4315	8349	1068	24	485	4150	441		3072	4742	255	1610	756	5	56626
Pectoral Sandpiper			1														106
Sharp-tailed Sandpiper	125	419	3106	5971	1		36	35	510		2388	126	53			5	14590
Curlew Sandpiper		2376	2201	4527	494		50	3400	1126		1278	599	127	1163	1365		29727
Bush Stone-curlew																	
Beach Stone-curlew																	10
Pied Oystercatcher		13	61	67	699	67	31	524	9		10	62	84	11	25		3937
Sooty Oystercatcher				1	9		19	120				9	1		15		453
Black-winged Stilt	92	200	381	655							51	180	133			1	3590
Banded Stilt		225	1804	2214							7391	219	1				11854
Red-necked Avocet	7	130	1241	131							565	1150	23				3341
Pacific Golden Plover		31	8	60	19		12	112	66		3		2	10			774
Grey Plover				304	1			240			276	140	150	369	96	5	2888
Red-capped Plover	6	30	46	324	104	18	117	130	50		160	1101	166	44		3	2578
Double-banded Plover	2		1	39	8	2	7	7	2								114
Lesser Sand Plover				5			2	9						49	140	5	2769
Greater Sand Plover				1							1	70		3655	1528	50	5577
Oriental Plover														1			11
Black-fronted Dotterel	13		10	19					1								64
Hooded Plover				1	7	20	9	14				1					56
Red-kneed Dotterel				2													2
Banded Lapwing																	
Masked Lapwing	132	148	238	485	448	87	82	12	179		16					2	2661
Long-toed Stint																	
Unidentified small				700													804
Unidentified medium																	
Unidentified large																	
Spotted Redshank														1			1
Broad-billed Sandpiper			1												3		5
Ruff/Reeve		1	1														2
Painted Snipe																	
Snipe sp.																	6
Total Number	398	6407	13697	25550	3022	218	951	12264	2912	0	16963	9383	1153	43260	23235	507	251482
Total Species	11	13	23	29	16	6	12	20	14	0	22	21	15	20	19	18	

SIGHTINGS OF WADERS LEG-FLAGGED IN VICTORIA, AUSTRALIA - LIST No. 3

Clive Minton, 165 Dalgetty Road, Beaumaris, 3193.
(Phone/Fax (03) 9589 4901).

Orange leg-flagging of waders was commenced in Victoria in January 1990 and the majority of birds caught (except for some in large catches) have been orange flagged on the right tibia (a few on the right tarsus) since then. The results have been spectacularly successful with some five times as many reports being received as came from 'recoveries' reported via the Australian Bird and Bat Banding Office. Our knowledge of migration routes and key stopover sites for each species, both within Australia and overseas, is thus growing much faster than previously.

Below is a list of all flag sightings away from the banding areas reported since the last summary (*The Stilt* 24, April 1994). Appropriate comments are appended for each species.

These sightings are being analysed, in conjunction with recoveries, for all wader species banded in all locations in the Australian/East Asian Flyway. They will be extremely important in relation to identifying key sites for the proposed network of shorebird reserves throughout the flyway.

It is extremely important that everyone continues to report all sightings of colour flagged birds (except where close to the known banding site). Please do not become blasé or think that future sightings are any less valuable than past ones. Sighting details should be sent to me (at the above address) or to Mark Barter or the Australian Bird and Bat Banding Scheme (PO Box 8, Canberra, ACT 2601).

Latham's Snipe

Date	Location	Finder
22/10/94	Kyabram (northern Victoria)	Danny Rogers

This is the first sighting of a leg-flagged snipe. It would have been banded at Braeside Park, Melbourne in one of the two previous summers. It was pleasing that the observer did find it possible to see the flag on the bird as it took off.

Bar-tailed Godwit

Date	Location	Finder
02/10/94	Botany Bay, Sydney, NSW	Clive Minton *et al.*
04/10/94	Wallis Lake, Forster, NSW	Tony Rose & David Woods

Both of these birds were probably returning to Victoria via an east coast migration route. The number (except for the last figure) of the metal band on the first bird was read with a telescope. 071-8367x was banded at Corner Inlet on 19/03/91 or at The Gurdies, Westernport, on 29/09/91.

There were no sightings of orange flagged Bar-tailed Godwit from New Zealand in the last year.

Eastern Curlew

Date	Location	Finder
31/03/95	Yoshino River, Tokushima City Japan (34° 04' N 134° 36' E)	Hirotake Sora
early 04/95	250km W of Tokushima, Japan	?
14/07/95	Okinawa Island, Japan	per Asian Wetland Bureau
03/09/95	Port Curtis,Gladstone,Qld.	Don Arnold
14/08/95	Mouth of Brisbane River,Qld.	Peter Driscoll
03/09/95	Tweed River,Qld.	Edward Keiver
30/08/95	Kooragang Island,Newcastle, NSW	Renee Ferster Levy
07/09/95	Moruya,NSW	Mike Crowley
08/10/95	" (different bird)	"
02/95	Kangaroo Island,northern Tasmania	Simon Plowright

This is a wonderful selection of sightings and an appropriate reward for the increased effort put into this species in the last two or three years. This was partly at the request of parties to the Japan Australia Migratory Birds Agreement who singled out this species for special study at their 1993 meeting.

Previously there has been only one recovery of a Victorian banded Eastern Curlew (in northern China) and no sightings of flagged birds away from the banding area. There have been only three overseas recoveries (in total) of Australian banded Eastern Curlew.

The sightings in Japan are particularly significant in view of the severe threats to the few remaining intertidal estuarine sites. It is clear that they are important stopover sites on northward migration - a Queensland flagged bird was seen at the Tokushima site in 1994.

The recovery in Okinawa is especially exciting, particularly the early (14 July) date. The Eastern Curlew is the first wader to arrive back in Australia at the end of the southward migration (from early August) and this one, on an island between Japan and The Phillippines, seemed to be on course for its scheduled arrival.

The string of sightings down the east coast of Australia, from Gladstone in northern Queensland to Moruya in southern New South Wales, suggests a significant migration route. Several observers reported that birds were not observed again on subsequent days, which suggests birds may have been estuary-hopping rather than making single long-flight journeys at this stage of their migration.

The sighting in Tasmania may refer to a bird which was still on migration when banded or to a bird which had genuinely changed its non-breeding area.

Common Greenshank

Date	Location	Finder
late 09/94	Kooragang Island, Newcastle, NSW	Renee Ferster Levy

This is the first 'recovery' of a Greenshank in Australia. There are no previous recoveries or flag sightings away from the banding locations. This bird was probably on its way back to Victoria.

Ruddy Turnstone

Date	Location	Finder
18/10/94	Broome, W.A.	Helen Toohey et al.
16/02/95	Nelson Bay,8km S of Arthur River, Tasmania	Priscilla Park

This is the second Victorian banded Ruddy Turnstone to move on to Tasmania. The sighting in Broome is the first indication of the entry point into Australia of birds on migration to SE Australia.

Red Knot

Date	Location	Finder
25/05/95	Hualien,Taiwan (121° 36'E 23° 5'/'N)	per Wild Bird Society, R.O.C.
14/10/94	Miranda,Firth of Thames, New Zealand	Keith Woodley
02/01/95	Jordan's,Kaipara Harb., New Zealand	D.Lawrie
01/01/95	Karaka,Manukua Harbour, New Zealand (2 birds)	Tony Habraken
04/03/95	" " (2 birds)	" "
13/09/95	" " (1 bird)	" "
25/09/94	Parramatta River,NSW	Tom Kelsey
01/09/95	Karumba,Gulf of Carpentaria,Qld.	Mark Barter

The sighting in Taiwan is the first record of an Australian banded Red Knot there, although there have been many recoveries in China. The further reports from New Zealand confirm the strong link between Red Knot there and in Victoria. The sighting in the Gulf of Carpentaria is the first in northern Australia, indicating a likely entry location (see also under 'Recoveries').

Sanderling

Date	Location	Finder
27/08/94	Ichinomiya River,Chousei-gun, Chiba Japan (35° 24'N 140° 24'E)	per Japan Bird Mig ration Res. Centre
26/09/94	Congo Point,Moruya,NSW	Mike Crowley
13/10/94	Hopetoun (west of Esperance), WA	W.Heermans

Yet another nice sighting in Japan which seems to be the key stopover area on migration. The Australian sightings either indicate widely dispersed routes of birds returning to Victoria/S.E. Australia or else more nomadic wanderings.

Red-necked Stint

Date	Location	Finder
22&25/ 05/95	Sakhalin,Russia	Vladimir Zikov
01/08/94	Shounai River,Miriato-ku,Nagoya Aichi,Japan (35° 04'N 136° 52'E)	per Japanese Bird Migration Res.Cntr.
17/05/95	Ta-Tu River,Taichung,Taiwan	per Wild Bird Society R.O.C.
27/05/95	Hualien River,Hualien,Taiwan	"
21/04/95	Mai Po,Hong Kong	J&K. Shrader
06/05/95	" "	P.J.Leader
22/04/95	Cam Ranh Bay,Vietnam	Michael Hake
13/10/94	Lake Ellesmere,New Zealand	Colin Hill
08/11/94	Cairns,Queensland	Ian Burrows
21/09/95	Maryborough,Queensland	Chris Barnes
14/05/95	Roebuck Bay,Broome,W.A.	Kerry Jarvis
02/04/95	Port Hedland Saltworks, W.A.	Richard Chandler
20/09/94	Kooragang Isl.,Newcastle,NSW	Renee Ferster Levy
23/09/94	Smiths Lake,30km S of Forster, NSW	John Duranti
10/09/94	Long Reef,Sydney,NSW	Simon Blanchflower
18/09/94	Moruya,NSW	Mike Crowley
03/10/94	Congo Point,Moruya,NSW	"
19/04/95	Josse Springs,South Aust.	John Reed
21/01/93	Moulting Lagoon,Coles Bay,Tas.	Mike Crowley
26/10/94	Pipe Clay Lagoon,Hobart,Tas.	Priscilla Park
10/05/95	Bridgewater Bay,Portland,Vic.	Rob Farnes
14/11/94	Tamboon Inlet,eastern Vic.	Lyn Turner
13/11/94	Werribee S.F.(orange-flagged juv.)	Bob Swindley

Another interesting and varied set of Red-necked Stint sightings. Those in Russia and Taiwan are 'firsts'. It is noteworthy that the one at Sakhalin was present at the same time as a yellow flagged bird from NW Australia. They were presumably in their last stages of migration to the NE Siberian breeding grounds. It is interesting that others were still in Taiwan around the same time and one was still as far south as Broome on 14 May.

The Lake Ellesmere (NZ) sighting could well be a further return of one of the birds which was seen there in the 1990-91 and 1991-92 summers.

The September-November sightings in Australia indicate that some birds use an east coast route on southward migration back into Victoria. As with Curlew Sandpiper a few also carry through to Tasmania.

Two sightings in Victoria well away from the banding/flagging sites are also included. A third was a juvenile Red-necked Stint with an orange leg-flag seen at Werribee S.F. on the afternoon of 13 November. The only juveniles previously flagged that season were 18 at Queenscliff on that same morning! A same day movement of 25 km.

Sharp-tailed Sandpiper

Date	Location	Finder
15/01/95	Braeside Park,SE Melbourne	Anthea Whitelaw

This location is at least 40 km from the nearest site at which Sharp-tailed Sandpipers have been flagged. This species has a tendency to move location more frequently than other small migrant waders, probably because it often frequents ephemeral wetlands.

Curlew Sandpiper

Date	Location	Finder
21/08/94	Mai Po,Hong Kong	Geoff Carey
01/04/95	"	"
20/04/95	"	P.W. Maton
06/05/95	" (2 birds)	P.J. Leader
01/05/95	Ashmore Reef,650kms N of Broome	Des Pike
09/11/94	Roebuck Bay,Broome,W.A.	Becky Hayward & Jon Fallaw
12/11/94	" " (different bird)	"
04/06/95	" "	Tim Thornton
12/08/95	" "	Becky Hayward & Jon Fallaw
30/10/95	" "	"
10/01/95	Carnarvon,W.A.	Doug Watkins
21/11/94	Ballina,NSW	David Rohweder
09/11/94	Kooragang Is.,Newcastle,NSW (2 birds)	David Geering
10/11/94	" " (2 birds)	Renee Ferster Levy
23/01/95	" "	David Geering
01/09/95	" "	Renee Ferster Levy
19/09/94	Botany Bay,NSW	Keith Egan
26/09/94	"	"
12/09/94	Moruya,NSW	Mike Crowley
25/08/95	Lake Alexandrina, South Aust.	per Adrian Boyle
01/01/93	Orielton Lagoon,Hobart,Tas.	Mike Crowley
14/09/94	Cape Portland,NE Tas.	Ralph Cooper
12/11/94	Cundare Pool,Colac,Vic.	Don Arnold

Another nice selection of Curlew Sandpiper sightings. The August to September records probably refer to birds on return southward passage to Victoria. There seems to be a wide spread of routes, some entering via Broome in NW Australia whilst others filter down the east coast. One bird however seems to have remained at Kooragang Island, NSW, for the summer - indicating that not all birds return to the same location each year.

The record at Broome in early June was of a bird in non-breeding plumage. This indicates a surprisingly large movement by a presumed first year bird.

The bird at Carnarvon appears to have changed its 'summering' area in Australia. There are other examples in the past where this has occurred (e.g. between Newcastle, NSW, and Victoria) but not with such a large distance involved (c. 3200 km).

The sighting at Cundare Pool, Victoria, is included because it is well away from any of the banding/flagging areas.

There were fewer than normal sightings in Hong Kong during northward migration in 1995 because water levels in the Mai Po Reserve were not so suitable as usual for resting migrant waders.

Broad-billed Sandpiper

Date	Location	Finder
13/11/94 to 29/04/95	Little River,Werribee S.F.	Bob Swindley & Fred Smith

This was presumably the only Broad-billed Sandpiper ever banded/flagged at Werribee S.F. (on 19/02/94). It is interesting that it had returned in a subsequent season to this same location even though this is outside its regular range.

Lesser Sand Plover

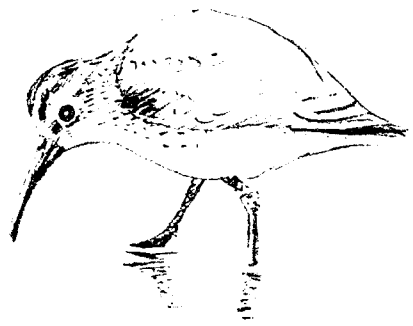
Date	Location	Finder
26/03/95	Thornside,Moreton Bay, Queensland	Arthur&Cheryl Keates
29/04/95	Manly Harbour,Moreton Bay,Qld.	"

These records could possibly refer to the same bird. Surprisingly, the bird/s did not show any breeding plumage.

Greater Sand Plover

Date	Location	Finder
13/01/95	Mouth of Bribane River, Qld.	Peter Driscoll

Only eight Large Sand Plovers have been leg-flagged in Victoria. This one appears to have changed its non-breeding area.



SIGHTINGS OF WADERS LEG - FLAGGED IN NW AUSTRALIA - LIST No. 2

Clive Minton, 165 Dalgetty Road, Beaumaris, Vic. 3192 and Rosalind Jessop, PO Box 97, Cowes, Vic. 3922.

Yellow leg-flagging of waders banded in NW Australia was commenced in August 1992. Since then the majority of birds caught have been flagged (about 12,000).

A complete list of all sightings away from the banding areas was published in *Stilt* 26 (April 1995). The list below is a further update.

Red-necked Stint

Date	Location	Finder
010495	Mai Po, Hong Kong	Geoff Carey
200595	Edagawa,Nishinomiya,Japan (34°42'N 135°22'E)	per Japan. Bird Migration Centre
190895	Kako River,Takasago,Japan (34°44'N 134°49'E)	"
090495	Werribee SF, Vic.	Bob Swindley

It is interesting there was two birds so far apart in early April with one already having reached Hong Kong before the other had even left Victoria on northward migration. See notes under "Curlew Sandpiper" re dearth of 1995 sightings at Mai Po.

Curlew Sandpiper

Date	Location	Finder
170495	Mai Po, Hong Kong	Geoff Carey
130595	Da Quing He Saltworks, Hebei China (39°12'N 118°45'E)	"
041095	Werribee S.F., Victoria	Joy Tansey & Lois Howard

These reinforce existing knowledge of migration routes and timing. The fewer reports from Mai Po in 1995 were because water levels were less suitable than usual during the wader migration season.

A correction - the date for the last record in the previous report was 291194 not 297794!

Broad-billed Sandpiper

Date	Location	Finder
180994	Mai Po, Hong Kong	per Geoff Carey

Records of this species are few, especially on southward migration.

Greater Sand Plover

Date	Location	Finder
010495	Mai Po, Hong Kong	Geoff Carey

There have been sightings at Mai Po each northward passage since yellow flagging started.

SIGHTINGS OF JAPANESE LEG-FLAGGED WADERS IN AUSTRALIA

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

Blue leg-flags have been put onto waders in Japan since 1992. The sighting of a blue flagged Red-necked Stint near Broome was reported in the last issue of *The Stilt* (No.26, p.39). Since then two further reports have been received of blue flagged birds.

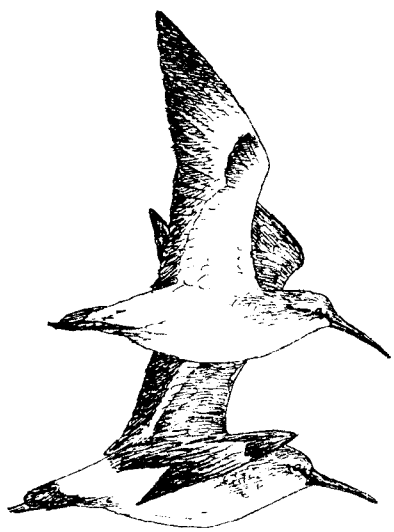
Grey-tailed Tattler

Date	Location	Finder
180995 & 190995	near Mackay, Queensland	Les Thyer

Red-necked Stint

181095	Bynoe Harbour, near Darwin Northern Territory	Ray Chatto

We now have information from the Japanese Bird Migration Research Centre that, because all three birds, were flagged on the left tibia, they had been banded at Furen Lake, Nemuro, Hokkaido (43° 16'N 145° 27'E). Flagging has taken place there in the July to October period each year since 1992.



SIGHTINGS OF RUSSIAN LEG - FLAGGED OR COLOUR-BANDED WADERS IN AUSTRALIA

Clive Minton, 165 Dalgetty Road, Beaumaris, Vic. 3195, Australia.

Great Knot

Banding		Sighting	
Date	Location	Date	Location
220694	Balaganchik River NE Siberia Russia (64°55'N 168°35'E)	090994	Broome,W.A.
		190994	"
		270695	Balaganchick River Russia
		171095	Broome, W.A.

This bird was initially included in the last report (*The Stilt* 26, p.39) but the banding date was wrongly stated.

The bird has now undertaken a 'double-double journey' movement! Since the report in the abovementioned *Stilt* the bird has been seen back on its Siberian breeding grounds by Pavel Tomkovich and then, amazingly, back in Broome again by Becky Hayward and Jon Fallow, the Broome Bird Observatory wardens.

Red Knot

A most exciting Red Knot sighting has recently been reported.

Banding		Sighting	
Date	Location	Date	Location
100794	Faddeyevski Island New Siberian Islands Russia (75°33'N 143°50'E)	101195	Broome,WA

It was banded as an adult, at the nest. There has been much speculation over the years on the breeding areas of Red Knot which visit Australia. Recently the New Siberian Islands were predicted to be the most likely location. This recovery is the first direct evidence.

Curlew Sandpiper

Two Curlew Sandpipers from the " Tundra Ecology '94" expedition have now been sighted in Australia. Details are:

Banding		Sighting	
Date	Location	Date	Location
050894	Yana Delta, northern Siberia, Russia (72°21'N 140°15'E)	301094	Perkins Island northern Tasmania (Simon Plowright)
150794	Indigirka Delta,northern Siberia,Russia (71°35'N 149°14'E)	010595	Ashmore Reef 650km N of Broome,WA (12°20'S 123°05'E) (Des Pike,ANCA)

The first bird was banded as a newly fledged juvenile. The second as an adult female, with chicks.

WADER COMPETITION ON NON-BREEDING GROUNDS - OR WHY ARE AUSTRALIAN RED KNOTS SO SMALL?

Pavel S. Tomkovich, Dept. of Ornithology, Zoological Museum of Moscow University, Herzen St. 6, Moscow 103009, Russia.

Summary

Red Knot *Calidris canutus* spending the non-breeding season in Australia, and probably originating from different breeding populations, have the smallest body sizes of all the knot sub-species. It is only in the East Asian-Australasian Flyway, during migration and on the non-breeding grounds, that Red Knot co-exist with the closely related and larger Great Knot *Calidris tenuirostris*. Character displacement is to be expected, providing additional indirect evidence of competition between *Calidris* waders away from the breeding grounds.

Commencing with publication of the studies of Holmes and Pitelka (1968), it has been widely accepted that waders do not need to compete on the breeding grounds because of the abundant supply, although of a narrow range, of food items and that their morphological differences can largely be explained by ecological segregation outside the breeding season (Lack 1971). However, varying opinions exist about competition between waders on the non-breeding grounds (Baker & Baker 1973, Duffy *et al* 1981, Myers & McCaffery 1984). These differences occur because there is no clear, direct evidence about competition between birds; opinions are normally based on indirect evidence. Nevertheless, if it does occur, one could expect competition to be most evident between closely related species and this will influence their distribution, behaviour and/or morphology (eg. Recher 1966, Schoener 1965).

During my study of geographic variability in the Red Knot *Calidris canutus* (Tomkovich 1992), I was surprised to find that birds from the New Siberian Islands and Chukotski Pen., both populations of which most probably migrate to Australasia, are smaller than other Red Knot populations which move to Europe, Africa and the Americas during the non-breeding season (see Cramp & Simmons 1983, Roselaar 1983). However, Red Knots in the East Asian-Australasian Flyway co-exist outside the breeding season with the closely related Great Knot *Calidris tenuirostris*. These two species have common migration routes and broadly overlapping non-breeding ranges, as well as similar feeding habitat (Marchant 1986, Lane 1987).

The only comparative study of the feeding behaviour and food of both knot species, carried out in north-western Australia, revealed an unexpectedly diverse diet for both species

and a rich biomass available to them but, nevertheless, there was some evidence that spatial competition did occur, at least at neap tides (Tulp & de Goeij 1994). Great and Red Knots seem to like each other's company, but in the April-May period were accompanied more frequently by their conspecifics. Amongst visibly recorded prey, bivalves made up a large part of the diet of both knots but, contrary to Great Knot, the main bulk of Red Knot prey could not be seen (Tulp & de Goeij 1994, P. de Goeij pers. com.). Therefore, at least prey size seems to form an essential difference in diet between the two species.

According to published biometric data (Table 1), there is only a very small overlap between the measurements of Great and Red Knot obtained by Australian banding teams. Red Knots from other populations are intermediate in size (especially in bill length) between Australian Red Knots and Great Knots (Roselaar 1983, Tomkovich 1992). Importantly, this is very much the case for populations of Red Knot which also breed in Siberia, but belong to other flyways (ie. East Atlantic and West American).

Table 1. Ranges of wing and bill lengths of Great Knot and Red Knot in Australia.

Species	Wing length	Bill length	Source
Great Knot	168-201	39-50	Barter 1986
Red Knot	146-177	27.0-39.4	Barter *et al* 1988

The large size difference between Great and Red Knots in Australia is a good example of "character displacement" in coexisting closely related species (Schoener 1965). This displacement could have developed during co-evolution of the two species on the same flyway and non-breeding grounds. It forms additional indirect evidence of competition between related *Calidris* species, at least during some period of their evolution.

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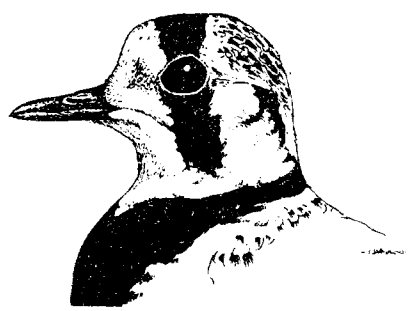
Editor's Note:

Since this paper was written, proof has been obtained that Red Knot visiting Australia do indeed breed on the New Siberian Islands as speculated by Pavel. (see *Sightings of Russian leg-flagged or colour-branded waders in Australia*, p 34, this issue).



THE RESULTS OF THE 1994 HOODED PLOVER *Thinornis rubricollis* SURVEY FOR SOUTH AUSTRALIA.

V. Natt, and M.A. Weston, c/- 28 Craig Rd, Donvale 3111.

"Whatever the state of weather here and now, the one certainty is that it will not remain that way. Moreover, when it changes it will do so without even a token reference to the needs or wishes of the humans in its path." (Thompson & O'Brien 1968).

Bransbury (1983) counted Hooded Plovers *Thinornis rubricollis* in the south-east of South Australia. Bransbury (1987) conducted a state-wide count, however, the only regular and ongoing counting in South Australia has occurred between the Victorian border and the Murray mouth (see Stewart 1993 for a summary). Recently, a comprehensive count was made of the Hooded Plover population on Kangaroo Island (Schulz 1995). This paper presents the results of a second state-wide count held in spring 1994.

The 1994 Hooded Plover and Pied Oystercatcher *Haematopus longirostris* survey was conducted around the weekend of 5 and 6 November. Like the counts in New South Wales and Victoria, held on the same weekend, poor weather was a major problem. This count is part of the ongoing Hooded Plover project of the AWSG, and forms the first state-wide count conducted by the AWSG in South Australia. The results of counting the beaches between the Victorian Border and the mouth of the Murray River will appear in separate reports prepared by I.D. Stewart for the *Stilt*. However, this report does include results from non-open ocean beach sites within this region.

Weather

The weather just before, during, and after the weekend of 5 and 6 November was terrible. Selected statistics supplied by the Bureau of Meteorology indicate the severity of the weather. The winds were predominantly south-westerlies. Windspeed at 9:00 on the 5 and 6 November, and minimum temperatures for both days are shown in Table 1.

Table 1. Selected meteorological statistics.

Coastal location	Wind speed 5 Nov. (kph)	Wind speed 6 Nov. (kph)	Min temp. 5 Nov. (°C)	Min temp. 6 Nov. (°C)
Ceduna	28	26	14	14
Port Lincoln	19	28	13	13
Neptune Is	50	65	16	13
Cape Willoughby	37	65	12	13
Victor Harbour	32	32	19	13
Robe	46	74	13	17
Cape Northumb.	28	37	12	15

Rain also fell in many coastal regions of the state during the count weekend.

Methods

Counts were made by foot and vehicle. The organisational structure of the count was essentially the same as for Victoria. The coastline was divided into eleven sections, and a regional organiser was appointed to each section. The sections are roughly equal in size, but the amount of suitable habitat varies considerably between sections. The sections make logistical rather than ecological sense. For the purposes of this paper, the regions delineated by Bransbury (1987) are used, so that the results of the counts can be compared.

In addition to Hooded Plovers and Pied Oystercatchers, Red-capped Plovers *Charadrius ruficollis*, Pacific Gulls *Larus pacificus*, White-bellied Sea-eagles *Haliaeetus leucogaster* and Little and Fairy Terns, *Sterna albifrons* and *S. nereis*, were also counted. The results for these species will be presented elsewhere.

Disturbance was measured in the same way as in the Victorian count (see Weston 1995). The disturbance data are considered to represent a substantial underestimate of the normal levels because of the extremely poor weather encountered during the count.

Results and Discussion

Coverage

The weather prevented a particularly high coverage. Nevertheless a significant coverage was attained with 106 sections being covered between 5 and 9 November, one on 20 October and another section on 28 November. Only 66.7% of data sheets specified the distance covered, however these sheets represented an impressive coverage of 699.1 km, similar to the 637 km covered in the summer of 1987 (Bransbury 1987). It should be noted that Hooded Plovers are known to occur in areas that were not covered, particularly on islands e.g. the islands off the Eyre Peninsula (Hornsby 1978), Wedge Is off Yorke Peninsula (Bonnin & Angove 1979).

Population

The detailed results for Hooded Plovers are compared with the results of Bransbury (1987), in Table 2.

Table 2. The Number and Density of Hooded Plovers on the South Australian Coast.

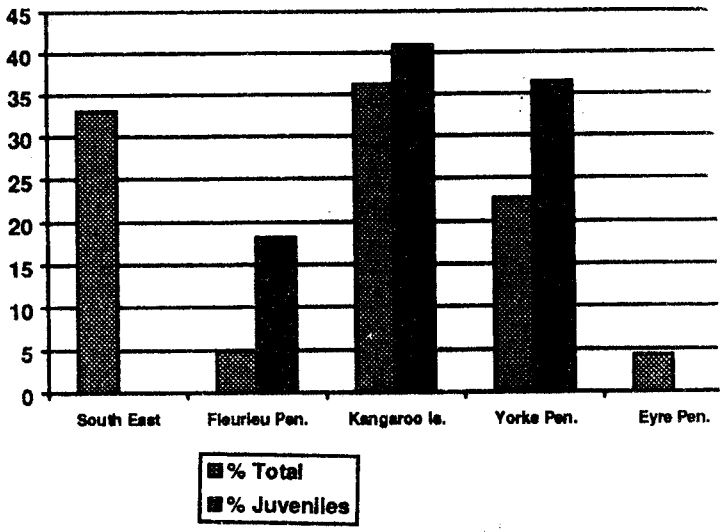
Section	No. in 1987	Coverage in 1987 (km)	Density in 1987 (birds/ km)	No. in 1994	Coverage in 1994 (km)	Density in 1994 (birds/ km)
South East	62#	254	0.24	5, 1J@	109@	0.06@
Fleurieu Pens.	20*	0	-	19 4J	38	0.61
Kangaroo Is.	84	53	1.58	160 9J	115.4	1.46
Yorke Pens.	80	128	0.62	98 8J	226	0.48
Eyre Pens.	67	202	0.33	20	210.7	0.09
TOTAL	313	637	0.46	298, 22J	699.1	0.46

* indicates an estimate; # indicates the summer result which was not used by Bransbury (1987) in his final population estimate; @ refers to non-open ocean beach as well as beach.

If the summer population on the beach between the Victorian border and the mouth of the Murray River is included, instead of the poor coverage figure of this count (153 in 1992, Stewart 1993), then the total population for South Australia is at least 467 birds. This indicates that South Australia has a similar population to that reported for Victoria (466 in 1992, Weston 1993). This figure is in the upper half of Bransbury's (1987) population estimate of 321-540 birds. The higher estimate (540) was a combination of birds actually observed plus an estimate of birds which were missed. Considering that our estimate of 467 birds does not account for missed birds, and that our count was held in very poor weather, it seems likely that the population of Hooded Plovers in South Australia is close to, or even higher than Bransbury's (1987) upper figure of 540.

The results indicate that of all coastal regions, Kangaroo Island has the highest number, as well as the highest density of Hooded Plovers in the State. Bransbury (1987) also found the highest number and density of Hooded Plovers in South Australia was on Kangaroo Island. The population on Kangaroo Island accounts for 52.8% of all Hooded Plovers recorded during the 1994 count. The relative distribution of Hooded Plovers between coastal regions is shown in Figure 1.

Figure 1. The Distribution of Hooded Plovers in South Australia (numbers indicate the percentage of Hooded Plovers occurring within each coastal region, based on a South Australian population of 467). NB: Juveniles were not considered for the South East Region.



If the South East region is excluded (it was poorly covered by this count), the overall density of Hooded Plovers was 0.53 birds/km.

Population Change

It is not valid to examine the data for population trends between 1987 and 1994, because of the probable effect of poor weather on the 1994 count result. Paton *et al.* (1994) found no change in the distribution of Hooded Plovers in the Adelaide region between 1974-5 and 1984-5. Another state wide count in better weather will allow such a comparison across South Australia.

Reproductive Success

Of the 320 Hooded Plovers counted by the 1994 survey, 22 (6.9%) were identified as juveniles. However, counts made during the breeding season are not considered to give realistic estimates of reproductive success (Heislers & Weston 1993). Indeed, the 1994 survey located four Hooded Plover nests, indicating that breeding was still in full swing, and thus confirming that this survey produced an underestimate of reproductive success.

The effects of poor weather on Hooded Plovers

There is little doubt that the poor weather affected the number of Hooded Plovers counted. The count on the weekend of the 5 and 6 November recorded no Hooded Plovers in some regions where Hooded Plovers are known to have occurred in the recent past e.g. no birds were recorded at Waterloo Bay, Eyre Peninsula, on 6 Nov. but two were recorded there on 1 Oct. (I.J. Penna pers. comm.).

The results from Kangaroo Island (169 Hooded Plovers) compares well with the result from a progressive count in September and October 1994 of 177 Hooded Plovers (Schulz 1995). This suggests that most birds remained on the beaches on the count weekend, despite the weather.

The data give us a good idea of how Hooded Plovers are distributed during poor weather. Unfortunately, it is impossible to compare this distribution with the normal one, because in the only baseline available (Bransbury 1987; counts in the south-east are conducted only in fine weather, I.D. Stewart pers. comm.) the effect of weather may be obscured by possible population trends which might have occurred in the intervening years. Future counts will resolve this problem, by establishing a baseline in better weather (hopefully!).

Disturbance

Fifteen different kinds of disturbance were recorded. Of the 108 count areas 27.8% did not record information on disturbance of the particular section of coast covered, 30.6% of sections had no disturbance, 22.6% of sections recorded that disturbance was present and 18.5% of sections recorded the number of each disturbing agent. The frequency and density of each type of disturbance, as recorded on the latter coastal sections is shown in Table 3. Density is based on the coastal sections where the number of each disturbance was recorded; 70% of these sheets recorded the distance covered, a total of 340.5 km. It is this figure that is used to calculate density, consequently the density figure is a maximum estimate, and is likely to be lower if it was possible to incorporate the distances covered but not specified on the sheets.

Table 3. The Frequency and Density of Different Types of Artificial Disturbance in South Australia (i.e. excluding Sea Lions).

Frequency Ranking (highest to lowest)	Disturbance	Maximum Density of Disturbance (per km)
1	Walkers	1.39
2	Fisherman	0.13
3	Vehicles	0.04
4	Dog off leash	0.03
5	Bike	0.02
6	Swimmers	0.01
7	Horses, Boats, Surfers	0.00
8	Dog on leash	0.00

It is interesting to note that the maximum density of walkers on the South Australian coast was almost as high as the highest density of Hooded Plovers recorded on the South Australian coast. Other points of interest include the observation that 84.6% of dogs encountered were unleashed, and that people fishing were more common than vehicles. These figures are thought to be underestimates given the poor weather on the count weekend.

It is clear that open ocean beaches suffer from a high degree of disturbance. Moreover, 35 (10.9%) of Hooded Plovers were identified as being within 50 m of a disturbing agent. An amazingly high figure given that counters passed birds only briefly, and made a more or less instantaneous assessment as to whether any disturbance was active within 50 m.

Acknowledgments

The Bureau of Meteorology supplied all information on the weather. The authors would like to thank all counters and regional organisers for cheerfully carrying out their duties. Particular thanks to the Department of Environment and Natural Resources. Special thanks to Chris Baxter, Terry Dennis, Ian Falkenberg, Mary Johnstone, Wally Klau, Jane Needle, Albert Zepf and all the other counters that we will not mention individually here.

We sincerely hope that the weather will be more cooperative for the next count! If anyone can assist this project, please contact the authors.

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RESULTS OF THE 1994 HOODED PLOVER *Thinornis rubricollis* SURVEY OF VICTORIAN BEACHES

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"I do not know a more charming little bird than this .... plump little bodies on tiny twinkling feet ...." Belcher 1914 (p 83).

The 1994 Hooded Plover *Thinornis rubricollis* survey was conducted around the weekend of 5 and 6 November. Some sections of coast were counted a week before this weekend. Extremely poor weather on 5 and 6 November resulted in conditions which made it impossible to count some sections of coastline, so some sections were not counted until three weeks after the nominated weekend, and Corner Inlet and Three Mile Beach (on Wilson's Promontory) were not counted until over a month later (17 Dec. 1994). Mud Islands, in Port Phillip Bay, at best a marginal site for Hooded Plovers, was counted during a Crested Tern *Sterna bergii* banding exercise on 19 Dec. 1994. This count was part of the ongoing National Hooded Plover Project of the AWSG.

Weather

The weather just before, during, and after the weekend of 5 and 6 November was terrible. Selected statistics supplied by the Bureau of Meteorology indicate the severity of the weather. The winds were predominantly westerlies. On Sunday 6 November the maximum wind speed at Port Fairy was 57 knots, at Cape Otway 60 knots and at Wilson's Promontory (the windiest place in the state on that day), 78 knots. Temperatures at midday on the 6th were low: Port Fairy 14°C, Warrnambool 13°C, Airey's Inlet 12°C, Sale 13°C and Wilson's Promontory 12°C. Significant rainfall occurred in most, and possibly all coastal areas. In the 24 hours to 9:00 on 7 November, 4mm was recorded at Port Fairy, 11mm at Cape Otway, 15mm at Geelong and Airey's Inlet, and 31mm at Sale. At Loch Sport on 6 Nov. 1994 40mm of rain was recorded.

Most reports indicated that water levels were much higher than normal. For example, on the section of coast between the Somers Yatch Club and Sandy Point the sea was battering the scrub at the top of the beach. Even in inlets water levels were high e.g. the Mallacoota Inlet appeared about 0.5 m higher than normal.

Coverage

Plans had been made for the 1994 count to cover more suitable habitat than ever before, however the weather prevented a high coverage. Access to some sections was blocked, access along some sections was prevented, and some sections were basically under water. Table 1 indicates which sections could not be counted on the nominated weekend and the obstacle which prevented counting. This is intended to assist in the management of future counts at times when very poor weather threatens. It should be noted that some of these areas were counted at a later date. Some sections that were traversable were not counted simply because the weather was so bad as to make further efforts unworthwhile or extremely uncomfortable. These sections are not listed in Table 1.

Table 1. Sections where coverage was affected by poor weather and the reasons why.

Section	Mode	Problem
Sandpatch Point to Red River	Foot	Beach washed away
Rocky sections west of Red River	Foot	Dangerous conditions
Ninety Mile Beach east of Loch Sport	Vehicle	Beach washing away
Corner Inlet (all parts)	Boat and Foot	Seas too rough to launch boat
Three Mile Beach, Wilsons Promontory	Foot	Access blocked by fallen tree over road
Pt Smythe to Cape Liptrap	Vehicle	Usual access eroded. Alternative access under water
Sandy Point to Somers Yacht Club	Foot	High seas entirely over beach
Pt Roadknight to Aireys Inlet	Foot	High seas prevented passage around rocky bluffs
Princetown Beach	Foot	Sea too high

Many areas of suitable Hooded Plover habitat were not covered by the count, for example, in the Gippsland Lakes, Bunga Arm east of Ocean Grange and Lake Reeve were not counted. These sections are likely to hold Hooded Plovers and Pied Oystercatchers (J. Reside pers. comm.).

Methods

The usual methods were employed. Counting was conducted by boat, vehicle and by foot. In addition to Hooded Plovers and Pied Oystercatchers, Red-capped Plovers *Charadrius ruficollis*, Pacific Gulls *Larus pacificus*, White-bellied Sea-eagles *Haliaeetus leucogaster* and Little and Fairy Terns, *Sterna albifrons* and *S. nereis*, were also counted. The results for these species will be presented elsewhere. Data sheets used in Victoria were also used in the New South Wales and South Australian counts.

Disturbance

Beach disturbance was assessed by using a disturbance count method pioneered on the eastern Victorian coast by Heislers (1994). Disturbance data sheets were trialed in the 1993 December count from San Remo to Darby beach (the first of the annual counts recommended by Weston 1993a for that section), and in a count of the Queenscliff area on 7 June 1994 (Weston & Schipper 1994). These data sheets were refined and used by the present investigator for the 1994 count.

Another measure of potential disturbance was made by recording whether there were any potential disturbing agents within 50m of the initial position of the birds. This method does not seem to have been used before by a survey of this magnitude. It should be noted that counters estimated the distance.

The extremely poor weather conditions mean that the disturbance data represent an absolute minimum value for the spring period. The figures are almost certainly a gross underestimate of the normal disturbance levels on the Victorian coast at this time of year. This is supported by data collected at the Point Nepean National Park where regular counts are conducted. The number of people on the beach on 26 Oct. was 19, just after the count weekend on 9 Nov. only 5 people were counted, and on the 23 Nov., 68 people were counted (B. Dowling pers. comm.).

Results and Discussion

Many data sheets did not record the distance covered. In order to estimate the number of kilometres covered, sheets that did not specify coverage were assigned a coverage based on the coverage achieved by the same counters in previous counts, or by using maps. Some sections could not realistically be assigned distances covered (such as in inlets). In total it is estimated 690 km of suitable habitat was covered in 1994. The 1994 count was the fifth since 1980 that achieved a coverage of over 600km.

The detailed results for Hooded Plovers are presented in Table 2.

Surprisingly, the count results from 1992 and 1994 were similar, with eleven more birds being counted in 1994 despite the poor weather. In terms of adults, 463 were counted in 1992 compared with 459 in 1994. Only 6 of the 11 (54.5%) coastal regions showed a decrease in the number of Hooded Plovers counted.

Warrnambool to Nelson remains the single most important coastal region, holding 45.5% of the Victorian population. Darby River to San Remo is no longer the second most important region of the Victorian coast, as it has been in every count 1980-92 (see Weston 1993a). In fact, the 1994 count ranks Darby Beach to San Remo as the third most important region. The December 1993 count of the San Remo to Darby River region found 41 adults, 2 juveniles and 2 runners; a figure slightly higher than the results from 1994 (43 birds). This is of concern as it indicates that the linear decrease in numbers in this region (as shown by Weston 1993a) might be continuing.

Table 2. Counts of Hooded Plovers in 1992 and 1994.

Stretch	Number of Hooded Plovers in 1992	Number of Hooded Plovers in 1994
NSW Border to Point Hicks	41	50
Point Hicks to Marlo	37	27
Marlo to Ninety Mile Beach	28	18
McLoughlins Beach to Snake Island	31	27
Wilsons Promontory	2	0
Darby Beach to San Remo	54	43
Phillip Island	18	21
Point Leo to Point Nepean	34	36
Queenscliff to Cape Otway	8	20, 2J
Cape Otway to Warrnambool	21	16
Warrnambool to Nelson	192	201, 16J
Total	466	459 + 18J = 477

The sheets in which distances were given, or could be assigned, accounted for 446 Hooded Plovers. Thus, the overall density of Hooded Plovers was 0.6 birds per kilometre. The comparable density from 1992 was 0.5 birds per kilometre. The higher density recorded in 1994 was due to a lower coverage of areas where Hooded Plovers occur at low densities (e.g. Ninety Mile Beach).

Social Structure

Of all data sheets, 54.5% recorded social structure. Of the Hooded Plovers recorded by these sheets 73.7% of social units were pairs, 17.3% of social units were singles, and 9.0% of social units were groups, that is, aggregations of three or more birds. On the data sheets that recorded social structure, 72.7% of Hooded Plovers were in pairs, similar to the figure of 79.8% recorded in 1992 (Weston 1993b); 8.8% of Hooded Plovers occurred as singles. Secondary group formation (see Heislers & Weston 1993) was not considered to have significantly affected the results.

Breeding

More Hooded Plover nests were detected by the 1994 survey (27 nests) compared with the 1992 survey (seven nests were detected). In addition, more juveniles were counted in 1994 (18) compared with in 1992 (3). These

figures suggest that breeding had occurred earlier in 1994 compared with 1992. Another explanation could be an increased level of nest-finding skills in counters, combined with a greater confidence at ageing juveniles. In addition, the 1994 count took place over a period of more than a month, and this might have contributed to the greater number of nests and juveniles located.

Many coastal sections affected by the extreme weather were not suitable for nesting months later. For example, between Easby Creek and Sandpatch Point, East Gippsland, the beach was heavily eroded and apparently unsuitable for nesting as late as late December, except for near a small rocky outcrop (I. Mansergh pers. comm.). Nevertheless, records subsequent to the count indicated that some breeding occurred later in the season (I. Mansergh pers. Comm.).

Disturbance

Disturbance is thought to be process that adversely effects Hooded Plovers (Schulz & Bamford 1987). Only 61.6% of data sheets recorded disturbance over the section counted, and of these 9.8% only indicated the presence or absence (and not numbers) of a potential disturbing agent. Table 3 shows the disturbance recorded for each coastal region, using only the sheets where the number of disturbing agents was counted.

Walkers were the most widespread potential disturbance, being recorded in nine of the eleven coastal sections (81.8%), and walkers were recorded on 42.4% of sheets which recorded disturbance. Fishermen were also frequently encountered, being recorded in 63.6% of the coastal sections (23.7% of sheets that recorded disturbance). Dogs were recorded in five (45.5%) of the coastal sections, and 77.8% were unleashed. It must be emphasised that the poor weather means that these data are almost certainly an underestimate of normal levels.

Of all data sheets, 43.8% recorded whether there was a potential disturbance within 50m of Hooded Plovers. These sheets recorded 233 Hooded Plovers, of which 17.2% were within 50m of a potential disturbance. This is a surprisingly high figure given the poor weather and the rapid nature of the assessment made by counters.

The effects of poor weather on Hooded Plovers

The results allow an examination of the effects of poor weather on Hooded Plovers. Hooded Plovers have been recorded sheltering from poor weather on the lee side of kelp at the back of the beach, behind rocks and in dune blow-outs (Schulz 1984; Bransbury 1987; Hewish 1989). On 28 Dec. 1993 one pair at Discovery Bay was seen sheltering from wet and windy weather at a point where a raised rocky headland

Table 3. Disturbance on Victorian Beaches and Coastal Wetlands (all disturbances are expressed as densities, no. per km). * = present at a density of <0.05 /km.

Stretch	Distances over which disturbances were counted	Walkers	Dogs on leash	Dogs off leash	Fishermen	Surfers, Sail-boarders & Swimmers	Sunbathers	Horses	Vehicles	Boats on beach
NSW Border to Point Hicks	10	0*	0*	0*	0*	0	0	0	0	0
Point Hicks to Marlo	55	0.3	0	0	0.3	0*	0	0	0	0*
Marlo to Ninety Mile Beach	46	0.3	0	0.1	0.2	0.1	0	0*	0	0
McLoughlins Beach to Snake Island	30	0	0	0	0	0	0	0	0	0
Wilsons Promontory	17	0.9	0	0	0	0	0	0	0	0
Darby Beach to San Remo	75	0.2	0	0*	0*	0*	0.1	0	0	0
Phillip Island	0	0	0	0	0	0	0	0	0	0
Point Leo to Point Nepean	35	0.2	0	0*	0.1	0.2	0	0	0	0.1
Queenscliff to Cape Otway	87.5	0.3	0*	0.2	0*	0.2	0*	0*	0	0
Cape Otway to Warrnambool	30	0.2	0	0	0	0	0	0	0	0
Warrnambool to SA Border	22.5	0.9	0	0	0.7	0	0	0	0	0

met the dunes (M.A. Weston & D.P. Hart unpubl. obs.). It is likely that such sheltering behaviour makes the birds more difficult to detect, and consequently results in a lower count result. However, it is obvious from this count result (based on the regions counted during the poor weather) that many birds remain detectable on the beaches.

It has been suggested that Hooded Plovers make longer movements in response to poor weather, moving from the beaches to near coastal wetlands (Bransbury 1987). However, there appears to be little published data to support this statement. Although far from conclusive, the results support the idea that at least some Hooded Plovers move inland in poor weather. The Queenscliff to Cape Otway section is the most appropriate section to examine, because of a relatively high coverage of suitable wetlands in both the 1992 and 1994 counts, and a relatively high comparability between the 1992 and 1994 counts. In the 1992 count, 0.0% of Hooded Plovers in that section were located away from open ocean beaches, whereas, on the 5th and 6th of November 1994, 22.7% (including some juveniles) were recorded away from open ocean beaches.

The implications of poor weather for the count program

A low count in 1990 was attributed to poor weather in the week preceding the count (Lane 1991). The 1994 count is the second time in the count program where weather has apparently caused problems for counters. The 1994 count was the eighth Victorian AWSG Hooded Plover/Pied Oystercatcher count, so 25% of the counts have been adversely affected by poor weather. It is very difficult to know how to overcome, or minimise the effect of, this problem.

One solution has been used in regular Hooded Plover counts in South Australia, between the Victorian/South Australian border and the mouth of the Murray River (see Stewart 1993). The count team only counts in fine weather, and will cancel a count if the forecast is poor (I.D. Stewart pers. comm.). Such a system is much more difficult to manage on a larger scale, particularly when counters travel long distances to coastlines, and make special arrangements for counting. The use of Department of Conservation and Natural Resources vehicles and boats, understandably, requires booking in advance. These factors reduce counting flexibility for many areas. Indeed, Bransbury (1987) was also forced to count in all weather conditions, in that case because of time constraints.

Site or area significance

Establishing site significance is difficult with a breeding population of non-colonial beach-nesting birds. This is because the definition of a "site" or "area" is rather unclear in the context of a population which is widely dispersed over large areas of suitable habitat. Watkins (1993) recognised the problem with defining an "area" and used an operational definition of the term as the geographical unit used during data collection. Watkins (1993) used a 1% criterion for establishing areas of international significance. In the case of the Hooded Plover (with the current population estimate) this equated to 50 birds. Using the units of data collection as "areas", no area of the Victorian coast would be classified to be of international importance for the Hooded Plover (38 was the most recorded on any one sheet). The main reason why this criteria cannot be applied to the Hooded Plover beach surveys is that the fundamental geographical units used in data collection vary greatly in size and make logistical rather than ecological sense. It is clear that the definition of critical areas for Hooded Plovers will require further research.

Acknowledgments

The poor weather was a great personal disappointment to me; not only had I organised the Victorian count but I had also helped organise the New South Wales and South Australian counts, both of which also suffered from poor weather! My heartfelt thanks goes to all of you; to the teams that drove long distances to have the count called off, to those who braved the conditions, and to those who made plans for the weekend to include the count. Thanks to those of you who managed to count at a later date. Once again the regional organisers were wonderful.

This count could not have occurred without the help of DCNR. The Bureau of Meteorology supplied all information on the weather. Thanks to Bernice Dowling for supplying figures for the Point Nepean (Mornington) National Park. The AWSG paid for postal and phone expenses. D.P. Hart and J. Peter helped check data and made useful comments on a draft of this paper.

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HOODED PLOVER STUDY: ANOTHER PLEA FOR HELP

I am currently undertaking a PhD on Hooded Plovers *Thinornis rubricollis* at the Department of Zoology, University of Melbourne. My project is basically one of conservation biology. Hoodies are being colour-banded in Victoria, in order to learn more about their movements and their ecology. In fact, we have now banded over 60 Hoodies in Victoria. Sightings of colour-banded birds are crucial to the success of the project, which seeks to gather information that will be essential for the conservation of the species. **All sightings of colour-banded Hooded Plovers should be reported immediately.**

Preliminary results (highlights) include the recovery of a Hoodie banded as an adult in 1982 (by theVWSG at Lake Victoria). Consequently, this bird is the oldest Hooded Plover known (ABBBS pers. comm.), and it had moved about one kilometre in 13 years! Other recoveries have shown that juveniles are prepared to move a bit further, and a number have crossed *The Rip*, at the mouth of Port Phillip Bay. The most recent recovery has shown that some adults are willing and able to move about as well! Every colour-band sighting is another piece of the jigsaw!

Your help is desperately needed and much appreciated. Please help the Hoodies.

Michael Weston

Information required

Information that should be recorded and reported includes:
(1) Date
(2) Time
(3) Location (as exact as possible)
(4) Sequence of colour-bands (which leg and whether each colour is on top or underneath)
(5) How many Hooded Plovers the colour-banded bird is with (e.g. with 1,2,3.... birds)
(6) Any other information (e.g. age)

In other words, report sighting as you would for Pied Oystercatchers!

Example:
On 25/8/1995, at 14:00, I saw a colour-banded Hooded Plover (Left leg: black over metal, Right leg: Blue over black). The bird was with one other Hooded Plover which was not banded, and both appeared to be adults. These birds were 20 metres west of the 5W exit to the beach at Point Lonsdale, Victoria (i.e. last exit west along Beach Road). My name is Jack Bander and I live at 12 Plover Way, Charadriville, 3138. You can phone me on XX 9XXX-XXXX.

Colours used
Colour used in this study are:
(1) Red
(2) Dark Blue
(3) Yellow
(4) Light Green
(5) Orange
(6) Black
(7) White
(8) Mauve

Band configuration
Each bird has one metal band, and three colour-bands. On one leg there is a single colour-band above a metal band. On the other leg there are two colour bands, these are either the same or different colours.

Contact information
Please send all sightings to Michael Weston by phone on **03 9870-1586** (after hours, or a message on an answering machine) or **03 9344-4334** or **03 9882-2622** (business hours). Alternatively, post full details to **Michael Weston, 28 Craig Rd., Donvale, Victoria, 3111.**

Please leave full contact details including postal address and phone numbers. Thank you.

BANDED STILTS *Cladorhynchus leucocephalus* BREEDING AT LAKE BALLARD, WESTERN AUSTRALIA.

Clive Minton*, Grant Pearson and Jim Lane.
* 165 Dalgetty Road, Beaumaris, Vic. 3192.
(adapted from *History in the mating: Banded Stilts do it again!*, Wingspan 5:(2) June 1995 and *Update on Banded Stilt breeding event*, Wingspan 5:(3) September 1995).

Banded Stilts - endemic to Australia - are unique among the 214 species of waders in the world in that they: nest colonially, lay white eggs (with a few black streaks and blotches), have white downy chicks and put their young into creches. They also have a special breeding habitat requirement - recently flooded salt lakes - because the young are reared predominantly on brine shrimps, so opportunities to breed only arise every few years. Only about 20 nesting events have ever been recorded - three in inland South Australia and the remainder in the southern interior of Western Australia.

We, and the ABC Natural History Unit, had been (im)patiently waiting for several years for the next nesting event, determined to move quickly enough to locate a nesting colony at an early stage of the breeding cycle. Most previous nesting attempts have only been identified once chicks have become mobile, or once breeding has been completed (via the abandoned colony).

Cyclone Bobby dumped 380 mm of rain in the Kalgoorlie area of Western Australia (WA) in four days of continuous downpour over 25-28 February 1995. Banded Stilts disappeared from all their coastal fringe sites in WA (e.g. Rottnest Island near Perth) almost immediately. Everything looked right for a Banded Stilt breeding spree.

Grant Pearson, Clive Minton and Marj Reni of the Victorian Wader Study Group, carried out a 4.5 hour aerial survey from Kalgoorlie on 12 March. Three large salt lakes, 150-250 km north of Kalgoorlie were covered - all previously known nesting locations. All three contained water (Lake Barlee least so) and looked ideal, with myriads of small islands dotted evenly throughout. Lake Marmion had no birds. But as soon as we reached Lake Ballard we encountered Banded Stilts on the water - all paired - and about 20 km down the lake a nesting colony. We could hardly believe our eyes! Only 16 days after the rain started there they were, some 2 000 nests on the top of a small island with about 5000 birds in attendance. At the core of the colony incubation seemed to have already begun.

This observation, and later observations on incubation periods and hatching dates, indicates that the first eggs in the colony must have been laid around 8 March, an incredible 12 days after the start of the rains, and only eight days after they ceased! Not bad for birds which had to recognise that a 'rain event' had occurred, migrate around 1000 km, find a suitable location, pair, mate, select a nest site, and grow and lay a clutch of eggs weighing almost as much as the female herself!

The aerial survey revealed a total of 10000 Banded Stilts on Lake Ballard and 20000 on Lake Barlee, but there was no sign of a breeding colony forming on the latter.

We immediately decided to visit the nesting colony and set up the first stages of a comprehensive research programme. A helicopter was available from Kalgoorlie on 15 March, and this enabled us to spend eight hours observing activities at the colony, pegging out and photographing a grid, and marking some 250 clutches of eggs to determine information such as clutch size, nest density, incubation period and hatching success. As no one has previously found a colony at such an early stage, much breeding biology of the Banded Stilt was unknown.

Since the nesting island was part of a small archipelago of small islands, it was possible to land the helicopter (and then to make a research base camp) some 600 m away from the colony on a rocky knoll (which even had some trees and shade!), without disturbing the birds. We initially made observations from a distance, but soon found we could sit quietly within 10-20 m of the colony without the birds apparently taking any notice.

There was an unbelievable frenzy of activity. The colony had doubled to an estimated 4500 nests within three days, and more birds were settling in every minute. Birds seemed to be bustling in every direction. Aggression associated with mates and nesting site selection was widespread. Up to 20 copulations were visible at any one time - on the water, on land, in the colony, standing, sitting, walking, swimming (and each lasting an average of 45 seconds!). Incubating birds were leaving the nest and running down to the water to dunk their breast feathers and have a quick drink before returning to the nest (it was a hot day). Overall it was like a cross between the main street of Tokyo and the 'red light district' of Kalgoorlie!

One of the most surprising observations was that a third of the birds did not have complete breeding plumage, and 10% had none at all, being completely white underneath - lacking the chestnut band on the breast and black patch below it. Yet such plumaged birds did not seem to be inhibited from full participation in activities, including copulation (both males and females) and incubation. It seems that assuming breeding plumage is a secondary consideration to being 'quick off the mark' to take advantage of these rare breeding opportunities (then why have breeding plumage?).

The research team, together with the ABC film crew, returned to Lake Ballard by amphibious vehicle and boat, on March 31, and one (or more) of us were in residence for quite some time after that date. A further aerial survey on March 30 revealed three new nesting colonies on Lake Ballard (but still no nesting, and fewer birds, on Lake Barlee). The main colony had grown to 20000 nests (at **10 per square metre** - just pecking distance apart), and there were 15000 nests in the largest of the new sites, only 4 km to the west.

Hatching began on 3 April. It was wonderful to see each family of chicks being led down to the water by a parent, then sailing away like little blobs of white fluff on the water. Most had two, three or four chicks, but the occasional bird had successfully hatched a brood of five. Several families were often all closely associated, but it was always possible to discern the individual parent-offspring relationships, and there was no sign of true creching (handing over the care of chicks to a lesser number of adults) at this stage or over the next few days when the chicks were still within three or four km of the colony. On some mornings up to 2000 chicks would leave the colony in just a couple of hours. Such sights will remain imprinted on our memories forever.

A pleasing feature was the relative lack of predation. The Banded Stilt nesting event at Lake Torrens in 1989 was heavily molested by Silver Gulls, which eventually totally destroyed the last part of the colony as well as taking many eggs and some chicks throughout the breeding cycle. At Lake Ballard a few corvids (thought to be Little Crows) started visiting the colony regularly once the chicks began to hatch, but they mainly fed on chicks which were already dead around the colony and were only twice seen to take live chicks (often seen to fail in their attempts). Once a Wedge-tailed Eagle snatched a chick from a group of adults and chicks which were crossing an island in the archipelago.

But, thankfully, not a single Silver Gull appeared. A consequence of their absence was that the colony became littered with ' lost eggs - ones that that had rolled or been blown out of nests, laid in the wrong place, or been left parentless for whatever reason. These quickly went bad in the hot sun, often popped (causing a minor local disturbance in the colony), and must have given a nasty surprise to any would-be predators.

Following the initial observations during the early stages of the breeding event research work by the authors and officers from the Department of Conservation and Land Management has continued at the lake. The ABC Natural History Unit also made a follow up visit in late May to film chick creching and fledging.

It seems that breeding has been successful, with an excellent rate of young birds surviving to fledging. Mark Lamble, the ABC camera-man, reported tens of thousands of well-grown chicks on the western end of Lake Ballard.

Although the newly hatched chicks could swim and feed in the normal metre deep water, they seemed to prefer to make their way gradually down to the shallow parts of the lake (30 km away) for the bulk of their fledging period. There they marched around on the wet mud or in very shallow water picking up minute items of food - too small to be the brine shrimp that are thought to be their preferred diet.

In contrast, the accompanying adults - which had greatly reduced in number as the chicks gradually coalesced into hundred-strong groups - seemed to find feeding in the shallows unsatisfactory. Thus they periodically left the chicks to fly to deeper water, presumably to feed on the now abundant supply of brine shrimps.

Banding and colour-flagging of chicks went very well, with nearly 1000 birds marked. To do this, we caught chicks in a handnet from a moving boat - a method which proved reasonably straightforward. When the chicks were still in family parties we found it necessary to catch only part of the brood at a time, then to return these birds to the parent before catching the rest of the brood. We also followed this precautionary procedure with larger groups of chicks. Incidentally, the behaviour we observed while catching the chicks provides yet another contrast between Banded Stilts and other waders: Banded Stilts neither actively defend their young nor perform distraction displays (such as the 'brokenwing act') to deter intruders, as do other waders.

At the time of writing there had apparently been no second round of breeding at Lake Ballard, unlike the breeding event at Lake Torrens in 1989. However, plenty of adults were still present at the lake, and some excited gathering and even copulating had been observed, so further nesting may have occurred.

A further aerial survey was planned for mid-July to see if any further nesting attempts had been made, and to log the number of adults and juvenile birds still present. The water levels were holding up well, which is encouraging.

A small nesting colony (5000 pairs) did form on nearby Lake Marmion, and at least 2000 chicks were seen in June, but nesting success was probably lower there than at Lake Ballard due to the regular presence of predators in the form of a Wedge-tailed Eagle and a Peregrine Falcon.

Would everyone, especially in Western Australia, please keep a look out for banded and yellow leg-flagged birds? Please also monitor, by regular counts, the return of birds to traditional non-breeding areas as they leave the drying salt lakes.

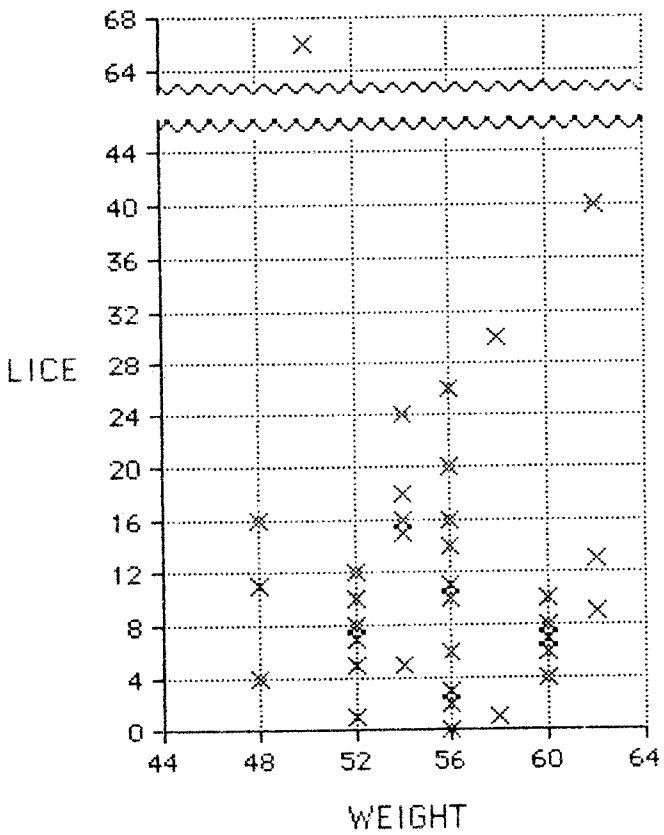
FEATHER LICE (Insecta: Phthiraptera) ON WRYBILL

Stephen Davies, 98 Sandringham Road, Mt. Albert, Auckland, New Zealand.

One species of feather louse, *Quadraceps cedemajori* (Timmermann 1969), has been recorded on Wrybill *Anarhynchus frontalis* (Martens & Palma 1981; Pilgrim & Palma 1982). The same louse also has been found on Banded Dotterel *Calidris bicinctus*. In handling Wrybill, feather lice 2-3 mm in length often have been observed eating the barbules between the parallel barbs of primary feathers. Their dark bodies stood out against the pale grey of the feathers, especially if the wing was held to the light. Also plainly visible were "tracks" left by the lice's feeding. These lice showed a distinct preference for new over old feathers when birds are moulting.

Samples were taken from primaries and body feathers of Wrybill captured on February 1995. All were identified by Ricardo Palma of the Museum of New Zealand, Wellington, as *Quadraceps cedemajori*. On 19 March 1995 a count was made of the lice on the primaries of the right wings of 37 Wrybill (23 adults and 14 first-year). Only one bird was free of lice, while two others had only one. The maximum, 66, was noted on a first-year bird; the next highest totals were 40 and 30. For all birds the mean was 13 (sd 12). The mean for adults was 10 (sd 9) and for first-year birds was 18 (sd16). The loading of lice on first years was significantly higher than on adults (T_{39}=2.14, P<0.05).

Figure 1. Correlation between number of lice and weight.



If these parasites undermine the condition of their hosts, one would expect a correlation between the number of lice and the weight of the host, since a bird's weight should be indicative of its health. In Figure 1, these two variables are plotted against each other. The correlations are not significant (adult r2=0.067, P=0.234; first-years r2=0.033, P=0.537. There is no direct indication, that is, that the level of infestation is a sign of poor health.

Note, however, that Booth *et al.* (1993) demonstrated that feather lice are not so harmless as previously thought, having long-term effects on the fitness of feral Rock Doves *Columbia livia* in Illinois. Highly infested birds show a lower feather mass and increased thermal conductance, requiring a higher metabolic rate to maintain body temperature. The authors concluded that even "classically" benign parasites such as feather lice can reduce host condition through the accumulation of subtle energetic costs over time.

Wrybills are not subject to the temperataure extremes encountered by Rock Doves in Illinois but may face some energetic costs as a result of the depredations of the feather lice they host, both as a result of reduced feather insulation and of lowered flying efficiency due to damage to primaries.

Figure 2. *Quadraceps cedemajori* (x 50)

Acknowledgements

I am grateful to the New Zealand Wader Study Group's Auckland cannon netting team for the use of its data, to Phil Battley, and to Ricardo Palma of the Museum of New Zealand, Wellington.

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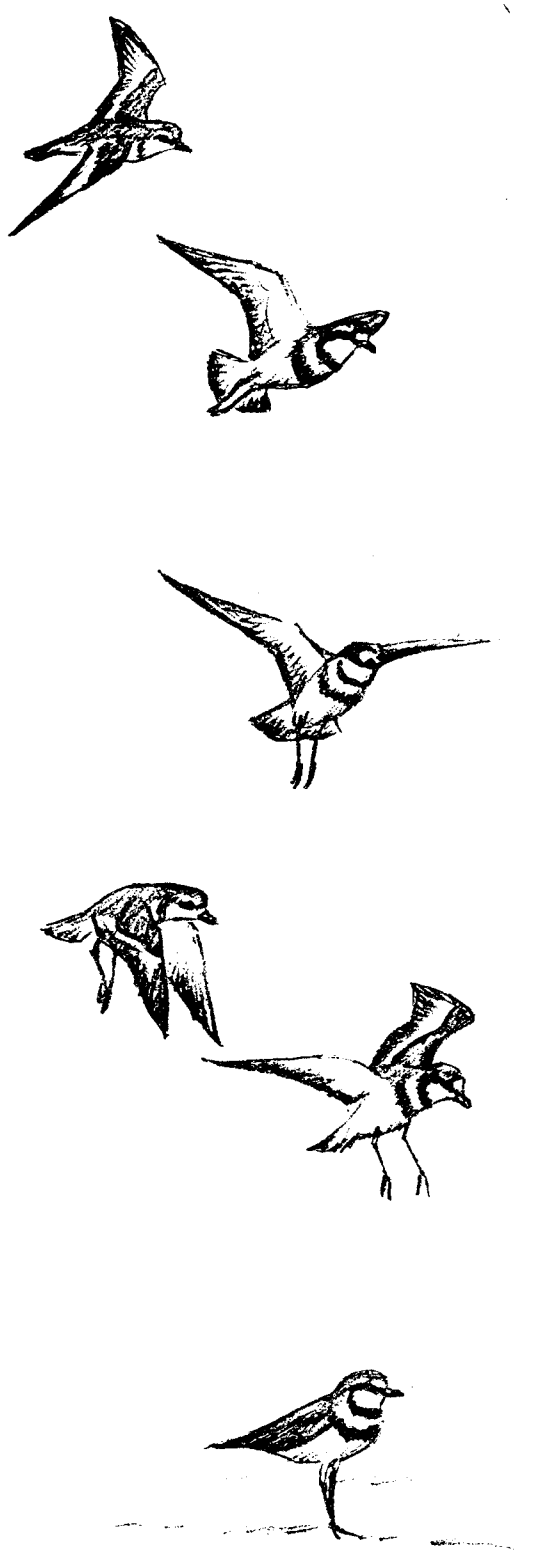


BANDING ROUND-UP

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

The following is a selected list of recoveries found after the last date reported in *Stilt 26* and up to 15 July 1995. Permission must be sought from the banders and clearance given by the ABBBS before using these data in publications.

Layout Of Data:

Line 1 - band number; banding place; co-ordinates; date of banding; age; sex; bander
(note: band numbers prefixed by the letters UNK are artificial numbers given to sightings of leg-flagged birds)
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
(note: for sightings of leg-flagged birds given as UNKN years)

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=trapped but device is unknown to the banding office;
03=trapped in a mist net;
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 a 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 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 after encounter:
00=status of bird and band is unknown;
01=status of bird unknown, band left on bird;
02=status of bird is unknown and the band was left on the 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, band status unknown;
13=bird released alive with band;
14=bird released alive, band removed;
26=bird was alive in the wild with the band;
29=bird partially decomposed. band removed.

153 Bar-tailed Godwit — *Limosa lapponica*

072-32974 01,BEACHES CRAB CK RD ROEBUCK BAY BRO 18d0m S 122d22mE 940303 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 05,MIAO-GANG YANGTZE R EST, SHANGHAI, CH 30d52m N 121d52mE 950424 U U TIANHOU & TANG SIXIAN
Distance: 5433 km Direction: 359 degs. Time elapsed: 1 yrs 1 mnths 21 days

072-33850 01,BEACHES CRAB CK RD ROEBUCK BAY BRO 18d0m S 122d22mE 940402 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 05,MIAO-GANG YANGTZE R EST, SHANGHAI, CH 30d52m N 121d52mE 950419 U U TIANHOU & TANG SIXIAN
Distance: 5433 km Direction: 359 degs. Time elapsed: 1 yrs 0 mnths 17 days

160 Terek Sandpiper — *Xenus cinereus*

051-53801 01,BEACHES CRAB CK RD ROEBUCK BAY BRO 18d0m S 122d22mE 900331 +2 U AUSTRALASIAN WADER STUDY GROUP
68 05 37,UDA RIVER DELTA, KHABAROVSK REG, RUSS 54d40m N 135d15mE 950715 U U TOMKOVICH
Distance: 8170 km Direction: 8 degs. Time elapsed: 5 yrs 3 mnths 14 days

165 Great Knot — *Calidris tenuirostris*

061-38561 02,10 KM SOUTH OF ANNA PLAINS 80 MILE BE 19d15m S 121d20mE 820824 +1 U WA WADER STUDY GROUP
67 05 05,MIAO-GANG YANGTZE R EST, SHANGHAI, CH 30d52m N 121d52mE 950423 U U TIANHOU & TANG SIXIAN
Distance: 5572 km Direction: 1 degs. Time elapsed: 12 yrs 7 mnths 30 days

061-45131 PR,SOUTH SIDE PRINCESS ROYAL HARBOUR ALB 35d5m S 117d53mE 940903 +3 U SMITH
67 05 05,MIAO-GANG YANGTZE R EST, SHANGHAI, CH 30d52m N 121d52mE 950420 U U TIANHOU & TANG SIXIAN
Distance: 7343 km Direction: 4 degs. Time elapsed: 0 yrs 7 mnths 17 days

061-90273 03,SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 921007 2 U AUSTRALASIAN WADER STUDY GROUP
63 04 35,BALAGANCHIK R (ANADYR DIST), NE SIBER 64d55m N 168d35mE 950712 +1 F TOMKOVICH
Distance: 10177 k Direction: 18 degs. Time elapsed: 2 yrs 9 mnths 5 days

061-90778 01,BEACHES CRAB CK RD ROEBUCK BAY BRO 18d0m S 122d22mE 930330 1 U AUSTRALASIAN WADER STUDY GROUP
67 05 05,MIAO-GANG YANGTZE R EST, SHANGHAI, CH 30d52m N 121d52mE 950420 U U TIANHOU & TANG SIXIAN
Distance: 5433 km Direction: 359 degs. Time elapsed: 2 yrs 0 mnths 21 days

061-91392 03,SHORES OF THE 80 MILE BEACHWA 19d15m S 121d20mE 940310 +2 U AUSTRALASIAN WADER STUDY GROUP
67 05 05,MIAO-GANG YANGTZE R EST, SHANGHAI, CH 30d52m N 121d52mE 950420 U U TIANHOU & TANG SIXIAN
Distance: 5572 km Direction: 1 degs. Time elapsed: 1 yrs 1 mnths 10 days

061-92046 BI,BISHOP IS MOUTH OF BRISBANE RIVERQLD 27d21m S 153d10mE 910303 +2 U DRISCOLL
25 11 OF,AT SEA NR BORDER OF INDONESA & PNG 9d25m S 141d1m E 950417 U U RORONA
Distance: 2366 km Direction: 325 degs. Time elapsed: 4 yrs 1 mnths 14 days

UNK-00238 LF,COASTAL AREA, SOUTH-EAST QUEENSLANDQL 27d20m S 153d10mE 920000 U U QLD WADER STUDY GROUP
46 26 10,LANYANG RIVER, I-LAN TAIWAN 24d42m N 121d35mE 950405 U U TAIWAN BIRD BANDING CENTRE
Distance: 6702 km Direction: 327 degs. Time elapsed: UNKN yrs 0 mnths 0 days

164 Red Knot — *Calidris canutus*

UNK-00240 LF,SOUTHERN VICTORIAVIC — 38d0m S 145d0m E 910000 U U VICTORIAN WADER STUDY GROUP
46 26 11,HUALIEN RIVER, HUALIEN, TAIWAN — 23d57m N 121d36mE 950525 U U TAIWAN BIRD BANDING CENTRE
Distance: 7307 km Direction: 337 degs. Time elapsed: UNKN yrs 0 mnths 0 days

166 Sanderling — *Calidris alba*

041-60356 23,KILLARNEY BEACHVIC — 38d21m S 142d20mE 910302 +2 U VICTORIAN WADER STUDY GROUP
05 13 53,BROWN BAY. 15KM E OF PORT MACDONNELLS — 38d3m S 140d50mE 950206 U U VICTORIAN WADER STUDY GROUP
Distance: 135 km Direction: 284 degs. Time elapsed: 3 yrs 11 mnths 4 days

162 Red-necked Stint — *Calidris ruficollis*

UNK-00239 LF,SOUTHERN VICTORIAVIC — 38d0m S 145d0m E 910000 U U VICTORIAN WADER STUDY GROUP
46 26 04,TA-TU-HSI TAICHUNG TAIWAN — 24d11m N 120d29mE 950517 U U TAIWAN BIRD BANDING CENTRE
Distance: 7371 km Direction: 336 degs. Time elapsed: UNKN yrs 0 mnths 0 days

UNK-00241 LF,SOUTHERN VICTORIAVIC — 38d0m S 145d0m E 910000 U U VICTORIAN WADER STUDY GROUP
46 26 11,HUALIEN RIVER, HUALIEN, TAIWAN — 23d57m N 121d36mE 950527 U U TAIWAN BIRD BANDING CENTRE
Distance: 7307 km Direction: 337 degs. Time elapsed: UNKN yrs 0 mnths 0 days

161 Curlew Sandpiper — *Calidris ferruginea*

041-64214 05,SALTWORKS, PORT HEDLANDWA — 20d15m S 118d55mE 920929 +3 U AUSTRALASIAN WADER STUDY GROUP
01 03 7F,BEN TRE - APP 150KM SW OF SIAGON VIET — 11d55m N 105d55mE 950331 U U VAN-CHUC
Distance: 3848 km Direction: 337 degs. Time elapsed: 2 yrs 6 mnths 2 days

130 Pied Oystercatcher — *Haematopus longirostris*

100-85195 06,BARRY BEACH CORNER INLETVIC — 38d42m S 146d23mE 880702 +2 U VICTORIAN WADER STUDY GROUP
48 26 98,SMITHTONTAS — 40d51m S 145d8m E 950625 U U PLOWRIGHT
Distance: 262 km Direction: 204 degs. Time elapsed: 6 yrs 11 mnths 23 days

100-96760 01,WERRIBEE SEWERAGE FARM (SPIT, PT WILS — 38d5m S 144d31mE 890416 +2 U VICTORIAN WADER STUDY GROUP
48 26 2F,ON THE BEACH AT CARPENTERS ROCKSA — 37d55m S 140d24mE 950205 U U & MS P PERT
Distance: 361 km Direction: 272 degs. Time elapsed: 5 yrs 9 mnths 20 days

100-96888 06,BARRY BEACH CORNER INLETVIC — 38d42m S 146d23mE 900610 +3 U VICTORIAN WADER STUDY GROUP
48 26 7F,PELICAN POINT CARPENTERS ROCKSSA — 37d54m S 140d22mE 950204 U U & MS P PERT
Distance: 532 km Direction: 278 degs. Time elapsed: 4 yrs 7 mnths 25 days

140 Double-banded Plover — *Charadrius bicinctus*

NB5-3552 01,CASS RIVER NEW ZEALAND
48 26 0F,13KM SSE OF GEELONGVIC
Distance: 2263 km Direction: 277 degs.

43d53m S 170d30mE 841223 J U NEW ZEALAND BANDING SCHEME
38d16m S 144d25mE 950712 U U WESTON
Time elapsed: 10 yrs 6 mnths 19 days

C5-0411 44,TEKAPO RIVER, CANTERBURY NEW ZEALAND
48 26 6F,CONGO POINTNSW
Distance: 1936 km Direction: 292 degs.

44d20m S 170d13mE 911105 +1 M NEW ZEALAND BANDING SCHEME
35d57m S 150d9m E 950315 U U CROWLEY
Time elapsed: 3 yrs 4 mnths 10 days

C5-0570 44,TEKAPO RIVER, CANTERBURY NEW ZEALAND
48 26 6F,CONGO POINTNSW
Distance: 1936 km Direction: 292 degs.

44d20m S 170d13mE 921110 +1 M NEW ZEALAND BANDING SCHEME
35d57m S 150d9m E 950313 U U CROWLEY
Time elapsed: 2 yrs 4 mnths 3 days

C5-0761 39,TEKAPO RIVER, SOUTH ISLAND NZ
48 26 4F,BONNIEVALE, PORT HACKINGNSW
Distance: 1990 km Direction: 298 degs.

44d20m S 170d12mE 931130 +1 F NEW ZEALAND BANDING SCHEME
34d5m S 151d9m E 950708 U U PEGLER
Time elapsed: 1 yrs 7 mnths 8 days

C5-0761 39,TEKAPO RIVER, SOUTH ISLAND NZ
48 26 4F,BONNIEVALE, PORT HACKINGNSW
Distance: 1990 km Direction: 298 degs.

44d20m S 170d12mE 931130 +1 F NEW ZEALAND BANDING SCHEME
34d5m S 151d9m E 950709 U U PEGLER
Time elapsed: 1 yrs 7 mnths 9 days

C5-0778 40,AHURIRI RIVER NEW ZEALAND
48 26 9F,WERRIBEEVIC
Distance: 2230 km Direction: 280 degs.

44d28m S 169d59mE 931209 +1 F NEW ZEALAND BANDING SCHEME
37d54m S 144d40mE 950517 U U SWINDLEY
Time elapsed: 1 yrs 5 mnths 8 days

C5-0778 40,AHURIRI RIVER NEW ZEALAND
48 26 9F,WERRIBEEVIC
Distance: 2230 km Direction: 280 degs.

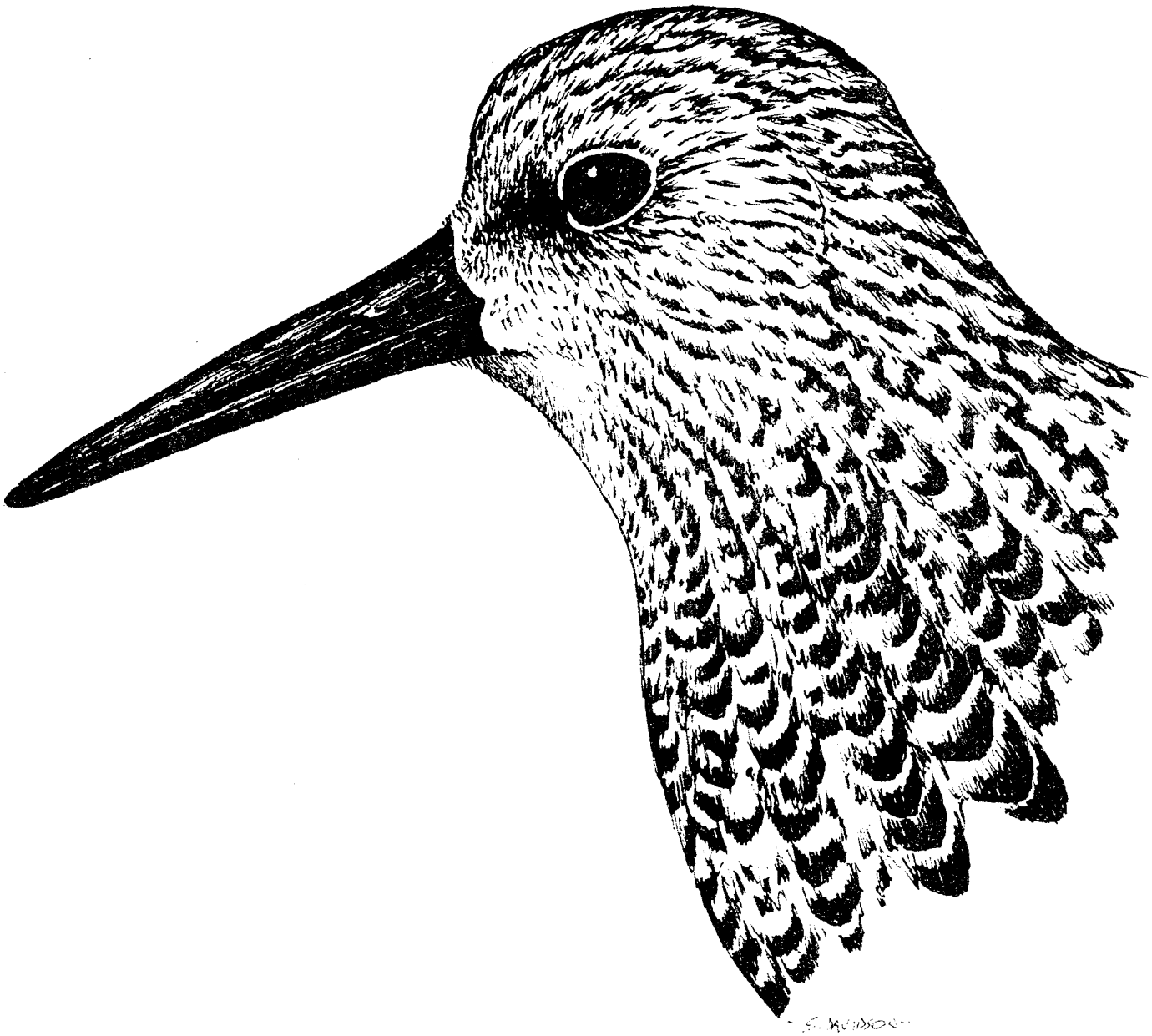
44d28m S 169d59mE 931209 +1 F NEW ZEALAND BANDING SCHEME
37d54m S 144d40mE 950521 U U SWINDLEY
Time elapsed: 1 yrs 5 mnths 12 days

C5-0885 40,AHURIRI RIVER NEW ZEALAND
48 26 X1,PERKINS ISLANDTAS
Distance: 2071 km Direction: 273 degs.

44d28m S 169d59mE 941113 +1 M NEW ZEALAND BANDING SCHEME
40d46m S 145d4m E 950714 U U PLOWRIGHT
Time elapsed: 0 yrs 8 mnths 1 days

C5-0900 40,AHURIRI RIVER NEW ZEALAND
48 26 X1,PERKINS ISLANDTAS
Distance: 2071 km Direction: 273 degs.

44d28m S 169d59mE 941127 P U NEW ZEALAND BANDING SCHEME
40d46m S 145d4m E 950714 U U PLOWRIGHT
Time elapsed: 0 yrs 7 mnths 17 days



AUSTRALASIAN WADER STUDIES GROUP
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Contributions will be accepted in any form. However where possible they should be typed,well spaced with generous margins and on one side of paper only. They may be submitted as either a computer disk and one hard copy or as hard copy only. Disks should preferably be saved as an ASCII file (text only). If an ASCII file cannot be provided the software used should be specified.Disks may be 3" or 5" and must be IBM compatible. For further advice on suitable software contact the Editor.

The style of presentation for *The Stilt* generally follows that given in 'Advice to Contributors in *Emu*. Briefly these are: Tables and figures should be numbered consecutively with Arabic numerals. Each table or figure should be presented on a separate sheet,be as simple as possible and designed to fit the width of a page or column,though exceptionally they may be printed lengthwise. Drawings and diagrams should be in ink or laser printed if by computer generation. Figures should be sized to allow for reduction (or enlargement) by up to 50%.

Scientific names of species and genera should be printed in italics or underlined. They should appear after the first mention of a species by its English name, not enclosed by brackets. Only one of the names need appear thereafter. English names for birds occurring in Australia are those in *The Taxonomy and Species of Birds of Australia and its Territories*, 1994, Christidis, L. and W. Boles, RAOU; for endemic New Zealand species those listed in *Annotated Checklist of the Birds of New Zealand*, 1970; and for South Asian birds not included in the above those given in *A Field Guide to the Birds of South-East Asia*, 1975 and reprints, King, B., M. Woodcock & E. Dickinson. Nomenclature and order of families should be those of *The Taxonomy and Species of Birds of Australia and its Territories*, or as above for New Zealand or South Asia. Where variation occurs in English or scientific names used in the above sources,or a species mentioned is not listed in any of them, the decision on naming will rest with the Editor.

References should be listed at the end of papers with titles of periodicals given in full. For style see those in this issue.

Dates should be written '1 October 1993' except in tables or figures where they may be abbreviated. The 24-hour clock should be used.

Manuscripts should be sent to the Editor, closing dates are 28 February and 31 August.

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AUSTRALIAN SECTION

NEW ZEALAND SECTION

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