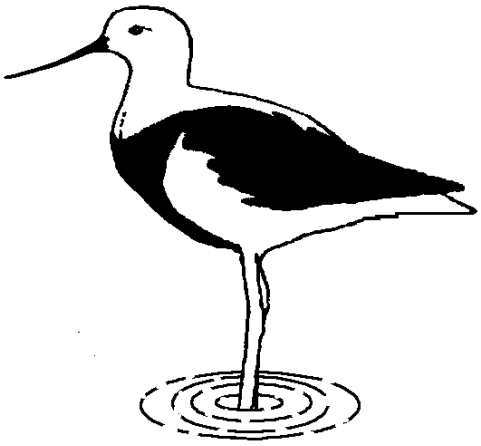
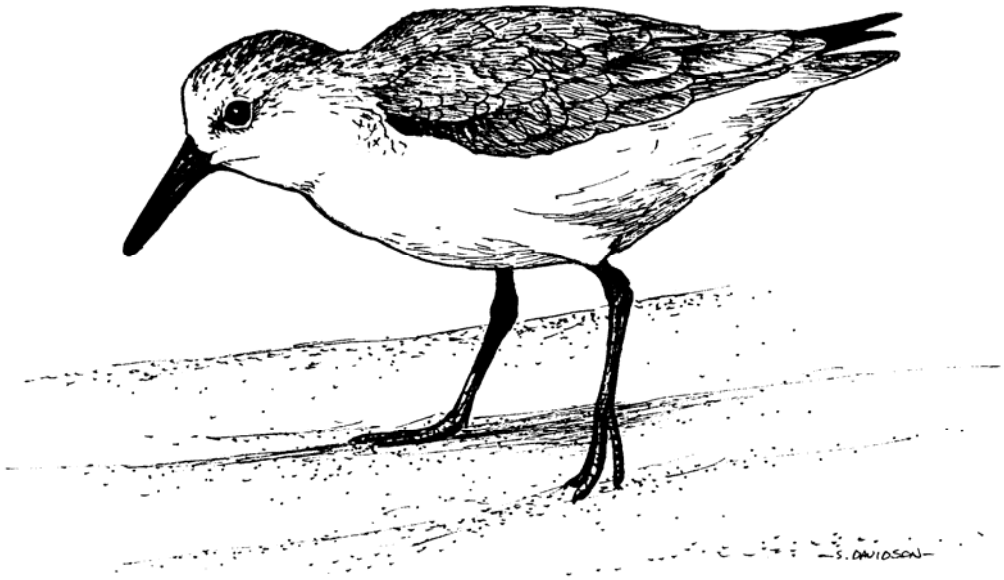
The *Stilt*



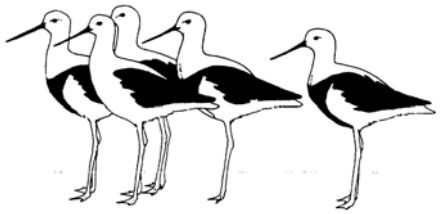
The Bulletin of the East Asian-Australasian Flyway



Australasian Wader Studies Group

A special interest group of Birds Australia

Number 41
April 2002



The Stilt

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MISSION STATEMENT

To ensure the future of waders and their habitats in Australia through research and conservation programmes and to encourage and assist similar programmes in the rest of the East Asian-Australasian Flyway.

OBJECTIVES

- To monitor wader populations through a programme of counting and banding in order to collect data on changes on a local, national and international basis.
- To study the migrations of waders through a programme of counting, banding, colour flagging and collection of biometric data.
- To instigate and encourage other scientific studies of waders such as feeding and breeding studies.
- To communicate the results of these studies to a wide audience through the *Stilt*, the *Tattler*, other journals, the internet, the media, conferences and lectures.
- To formulate and promote policies for the conservation of waders and their habitat, and to make available information to local and national governmental conservation bodies and other organisations to encourage and assist them in pursuing this objective.

To encourage and promote the involvement of a large band of amateurs, as well as professionals, to achieve these objectives.

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Mike Bamford, Mark Barter, Phil Battley, David Close, Clive Minton, and Doug Watkins.

MEMBERSHIP OF THE AUSTRALASIAN WADER STUDIES GROUP

Membership of the AWSG is open to anyone interested in the conservation and research of waders (shorebirds) in the East Asian-Australasian Flyway. Members receive the twice yearly bulletin *The Stilt*, and the quarterly newsletter *The Tattler*. Please direct all membership enquiries to the Membership Manager at Birds Australia (RAOU) National Office, 415 Riversdale Rd, East Hawthorn, 3122. Vic., AUSTRALIA.
Ph: 03-9882 2622, fax: 03-9882 2677.
Email: membership@raou.com.au

Annual Subscriptions:	Australia	A$30.00
	New Zealand	A$30.00
	Overseas	A$35.00
	Institutions	A$40.00

Cover Illustration: Stephen Davidson

EDITORIAL

This issue contains papers on a few of the recent recurring themes of previous issues of *Stilt*. We have three from eastern China, further expanding on the excellent range of surveys by Chinese shorebird scientists in collaboration with Mark Barter. In this issue, the previously under-reported patterns of shorebird abundance during southward migration are given for one of the more important sites on northward migration. We also have another paper on the shorebirds of Bangladesh by Islam that adds to our sparse knowledge of the birds of that country. It is also pleasing to see more data being published on our vulnerable resident shorebirds, particularly the elusive Painted Snipe. Chris Hassell and Danny Rogers report on the rarely recorded breeding of Painted Snipe in northwestern Australia and summarise other unpublished records from the region.

I am please to see another "Important wader site" published and I hope the information helps promote these sites and contributes to the recognition of their importance. We also have an Occasional Count from northeastern South Australia that highlights the importance of these ephemeral wetlands to many species. Knowledge of the numbers of birds and when they use these wetlands are needed if the data from the regular 'Population Monitoring Project' are to be interpreted correctly.

I would also like to correct inaccurate statements I made in my last editorial (in *Stilt* 40) when I failed to remember that the articles from the AWSG banding studies were not THE first, but in fact the first published in *Stilt* for about three years. I apologise to Clive Minton and others involved for my oversight. At the last AWSG committee meeting in June 2001, the group's scientific sub-committee, chaired by Jim Wilson, agreed to establish rules for access and publication of AWSG count and banding data. These have been finalised and I hope they will be published in the next issue of *Stilt* along with a list of manuscripts in preparation from these data. In this way, we hope to stimulate more analysis and publication of the results of our extensive banding studies.

I hope readers continue to enjoy *Stilt* and contribute to its value and on-going success by sending papers on studies of shorebirds or their habitats they have undertaken throughout the East Asian-Australasian Flyway. Please don't hesitate to contact me if you have any queries or suggestions.

David Milton

ANNUAL REPORT OF AWSG ACTIVITIES DURING 2001

Highlights

1. Expedition to NW Australia
2. Two Symposium days to celebrate RAOU/Birds Australia Centennial
3. A count of waders in Victoria
4. A count of waders along the Coorong SA
5. Development of a new leg-flag database
6. Development of a new wader count database

Other activities

7. Establishment of a publications committee
8. Three issues of the AWSG journal Stilt were published (usually two)
9. Four issues of the AWSG newsletter Tattler were produced
10. Overseas visits
11. Shorebird Action Plan

1. NW AUSTRALIA EXPEDITION

Coordinators - Clive Minton, Rosalind Jessop, Peter Collins and Dick Veitch

One of the highlights of the year was undoubtedly the very successful expedition to the north-west of Western Australia from September 15 to November 19. This was the 21st special visit to band and count waders in NW Australia since 1981. The expedition was timed to cover the main period of arrival of juvenile waders in NW Australia. The expedition spent 20 days at Roebuck Bay (Broome), 20 days at 80 Mile Beach, 5 days at Port Hedland Saltworks and 2 days at the Lacepede Islands. The principle objectives for the expedition were:

- to undertake a complete ground count of 80 Mile Beach (only the second ever),
- to count Bush Point in Roebuck Bay (the biggest single wader roost in the East-Asian Australasian Flyway),
- to count Port Hedland Saltworks
- to obtain recaptures of birds from previous years to facilitate survival rate calculations,

- to increase information of migration routes by sightings of leg flags and recoveries,
- to obtain a measure of breeding success in the 2001 Arctic summer by recording the number of juveniles present in catches in the latter part of the expedition,
- to expand studies of terns – including on the Lacepede Islands,
- to provide the opportunity for participants to train in techniques used in wader research including mist netting, cannon netting (including processing) and counting.

Forty-eight people from 10 different countries participated (Australia 20, United Kingdom 17, Russia 2, Taiwan 2, New Zealand 2, Japan 1, India 1, Canada 1, Germany 1 and The Netherlands 1).

Clive Minton deserves special thanks for organising the expedition. Dr David Seay, AQIS and CALM are thanked for financial donations. Thanks also to Helen Macarthur for organising food purchases and menus, members of the North West Wader Study Group, Broome Bird Observatory staff and all participants.

Further "mini" expeditions will be made in 2002/03. Dates will be advertised in *TheTattler*.

2. SYMPOSIA DAYS

Two, one day, public symposia were held at Broome as the AWSG's contribution to RAOU/Birds Australia Centenary Celebrations. Twenty-four presentations were made and about 45 people (local residents as well as expedition members) attended each symposium.

Thanks to Chris Hassell, Helen Macarthur and Mavis Russell for organising venues. Thanks are also due to Broome Lotteries House and Broome Primary School for their assistance.

The next AWSG conference will take place in 2003 in Canberra.

3. WADER COUNT IN VICTORIA

Coordinator - Jim Wilson

A count of waders for the whole of Victoria including both inland and coastal sites was undertaken in January and February 2001 with the aid of Natural Heritage Trust funding. Large declines were detected in the counts of eight migratory wader species (a full report is available from the secretary).

Full acknowledgements are given in the report. Many thanks to all the counters involved. In particular BOCA are thanked for assistance with the Western Port counts.

Application has been made for NHT Funding to count the coast of NSW (Coordinator - Phil Straw).

4. WADER COUNT OF THE COORONG

Coordinator – Jim Wilson

The second year of monitoring waders in the Coorong in South Australia was undertaken with the assistance of funds from the Department of Environment and Heritage, Mt Gambier Office. Wader numbers continued to decline and although the decline of some species could be contributed to increased water levels in inland wetlands other species such as Red-necked Stint may be affected more by local variables (detailed results were published in *Stilt* 40).

Full acknowledgements are made in *Stilt* 40. Thanks to the staff of Coorong National Park (particularly Phil Hollow, Bill Koolmatrie, Simon Oster and Eric de Smit) for the provision of two boats and a 4WD vehicle. Permission to cross Aborigional land was given by George and Tom Trevorrow. Thanks to Bredon Greare of the DEHR Mt Gambia Office for arranging funding and other logistical support. Thanks to Iane Mitchener kindly brought and piloted his own boat. And a big thankyou to all participants.

A further count occurred in February 2002 (Coordinator Ken Gosbell).

5. DEVELOPMENT OF A NEW LEG-FLAG DATABASE

Co-ordinator – Clive Minton

Funding was received from Environment Australia to undertake the design and implementation of a new leg-flag database that could be used throughout the flyway. The design of the new leg-flag database has been completed. The task of ensuring that sightings of Australian

leg-flagged waders from previous years are on the database is also nearing completion. Leg-flag sightings can now be reported in electronic format through the AWSG web page. This has greatly reduced the amount of time involved in handling leg flag reports and will provide a useful tool in the future.

6. DEVELOPMENT OF A NEW WADER COUNT DATABASE

Co-ordinators – Jim Wilson, Doug Watkins, Ken Gosbell, Jenny Skewes

The new database for the Population Monitoring Project is also nearing completion. Unexpected technical difficulties with transferring counts from old formats to the new database has unfortunately delayed its completion. Final format is now expected early in 2002. AWSG was contracted by Environment Australia to provide the new database.

It is vitally important that our population monitoring programme covers all important wetlands in Australia. If you have counted wetlands in the past or are still counting wetlands or would like to become involved please the count coordinator Jenny Skewes.

7. ESTABLISHMENT OF PUBLICATIONS COMMITTEE

Requests to use AWSG count and banding data by universities, government agencies and private contractors has greatly increased over recent years. During the year, a publication committee chaired by Dr Clive Minton was set up to provide a coordinated approach to the release of AWSG data. The committee will encourage the publication of papers using data from the AWSG's databases. Broadly speaking, the committee will approve projected analysis and scope of data usage, advise on priorities for analysis and initiate analysis where necessary. Other committee members are Dr Rosalind Jessop, Ken Gosbell and Danny Rogers. Request for data use should be directed to Dr Clive Minton.

8. THREE ISSUES OF STILT PUBLISHED

Due to the large number of papers received by editor Dr David Milton during 2001, approval was given by the AWSG committee to publish an extra *Stilt* in 2001. David and his editorial team are to be congratulated on three excellent issues.

9. TATTLER

The quarterly newsletter *The Tattler* edited by Phil Straw again provided up to date news of wader issues throughout the flyway.

10. OVERSEAS VISITS

China

Mark Barter took a shorebird ecology training course at East Dongting Lake National Nature Reserve, Hunan Province, 14-19 March 2001 - attended by 20 people from eight inland nature reserves and provincial conservation departments.

A second workshop at was held at Tianjin, 23-24 March 2001, to discuss the importance of the Tianjin Municipality for migratory waterbirds - attended by 33 people from provincial conservation departments, nature reserves and universities.

Mark also undertook a shorebird survey of Yancheng National Nature Reserve, Jiangsu Province, 21 April-5 May 2001. More than 110 000 shorebirds counted (see paper on this survey in this issue).

Taiwan

Mark Barter visited the Taipei Wild Bird Fair - 27-28 October 2001. Organised exhibits and representation of four East Asian-Australasian Shorebird Network Sites. Fair attended by 60 000 people!!

Ken Gosbell and Tony Harbracken made a self-funded visit to Korea to promote conservation of Korean wetlands that are vital stopover sites for waders.

11. ASIA-PACIFIC SHOREBIRD WORKING GROUP

Mark Barter also represented Australia on the Asia-Pacific Shorebird Working Group which advises Doug Watkins (Shorebird Flyway Officer) on implementation of the Shorebird Action Plan.

12. CONSERVATION REPORT (BY SANDRA HARDING)

The AWSG Conservation objective for 2001 was to work towards increasing the list of sites on the Shorebird Reserve Network. To this end, Doug Watkins, Wetlands International, Oceania office proposed a list of potential sites for nomination to the network. This list and information on the Network was sent to the State Conservation Officers. An Information Paper on the Shorebird Site Network, the Shorebird Action Plan 2001-2005 and Ramsar Resolution VII.21 – "Enhancing the conservation and wise use of intertidal wetlands" was included in the material.

The State Conservation Officers identified a number of limitations with the proposed list, however they have proceeded with this work in different ways.

Also during the year the AWSG Conservation Officer made written representations on the following proposals:

- Kaolin Mining Proposal, Roebuck Bay, WA;
- Broome Airport Relocation;
- Draft Strategic Management Plans for Corner Inlet Ramsar site and Western District Lakes Ramsar site and Draft Strategic Directions Statement for the Management of Victoria's Ramsar Wetlands; and
- Saemankeum reclamation project.

As the AWSG is on the Australian Wetlands Alliance Reference Group, the AWSG Conservation Officer has supported the AWA secretariat, hosted by The Wetlands Centre. We have provided an AWSG case study for the National Ramsar Report, provided a coordinated input to the National Report and participated in regional wetlands workshops.

The WWF Shorebird Conservation Project funded by the National Heritage Trust has progressed with the appointment of a Project Officer. The Shorebird Conservation Project aims to conserve significant shorebird habitat sites in Australia through community based conservation action. To do this, the project contributes to the conservation of priority shorebird sites through awareness raising, capacity building and on-ground management actions.

The Project Officer is currently identifying sites most eligible for assistance and will be selecting 5 sites (nation-wide) to initiate community-driven conservation action this year (2002).

The AWSG conservation efforts in 2002 will be to:

- work with the WWF Project Officer on actions funded through the Shorebird Conservation Project;
- continue to lobby for selected sites to be nominated as shorebird reserve network sites; and
- support the NGO involvement at the Ramsar COP to be held on 18-26 November in Spain.

Rosalind Jessop
Interim AWSG Chair

TREASURER'S REPORT FOR 2001

The Consolidated Accounts provided below show that income exceeded payments by $4,588.72, however this includes commitments for expenditure on contracts yet to be paid of $24,500. In addition, Environment Australia have paid in advance for the provision of our publications and other services to nominated recipients in the Flyway.

The overall result, excluding one off contracts, is in accordance with the budget.

Research Fund

The Research Fund comprises Specific Donations and is included in the statement of accounts. In accordance with our Rules the following is a Report for the Fund as at 31 December 2001.

Brought forward from 31/12/00	$5,368
Donations 2001	$1,030
Total Research Fund 31/12/01	$6,398

Membership Statistics for 2001

The membership as at the end of 2001 was:

Australia/ New Zealand	196
Overseas (excl. NZ)	31
Institutions	18
EA Funded	94
TOTAL	339

I would like to express my thanks to the staff at Birds Australia who have again provided us with such excellent service in processing accounts and memberships.

Ken Gosbell, Secretary/ Treasurer

Australian Wader Studies Group
Consolidated Accounts
Statement of Receipts and Payments
1 January 2001 - 31 December 2001

RECEIPTS			**PAYMENTS**		
ITEM	**2001** $	**2000** $	**ITEM**	**2001** $	**2000** $
Balance B/f	47,139.43	23,982.61	Stationary/Printing	11,108.57	5,749.24
			Photocopying	129.39	15.75
Subscriptions	8,539.10	4,299.65	Insurance	100.00	350.00
E.A. Contract	6,000.00	6,000.00	Postage/Courier	3,030.16	2,379.45
Contracts - Federal Govt	9,090.91	16,140.00	Consultants	15,903.20	1,305.00
Contracts - State Govts	19,250.00	3,978.00	Field Expenses	7,020.95	8,520.04
Contracts - Other		500.00			
Sales		762.78	Phone/Fax	321.75	439.58
Specific Donations	1030.00	8320.00	Subscriptions		
Conference		4,520.43	Conference		1,389.55
Adjustment	(7.27)				
			Admin Fee (BA)	1,000.00	1,000.00
			Depreciation	300.00	485.00
			Advance	400.00	
TOTAL INCOME	**43,902.74**	**44,790.43**	**TOTAL EXPENSES**	**39,314.02**	**21,633.61**

BALANCE AT 31/12/01 51,728.15

SHOREBIRDS IN THE EASTERN INTERTIDAL AREAS OF CHONGMING ISLAND DURING THE 2001 NORTHWARD MIGRATION

Z.J. Ma[1], K. Jing[1, 2], S.M. Tang[1] & J.K. Chen[1*]

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ABSTRACT
Shorebird counts were carried out from the middle of March to the middle of May 2001 in the eastern intertidal areas of Chongming Island. A total of 44 904 shorebirds of 32 species were counted. Dunlin, Great Knot and Kentish Plover were the dominant species and accounted for nearly 90% of the shorebirds seen. In addition to the six species of shorebirds (Dunlin, Kentish Plover, Great Knot, Eastern Curlew, Lesser Sand Plover and Spotted Redshank) already known to occur at Chongming Island in internationally important numbers, we found the Island to be internationally important for Whimbrel. Bu Yu Gang and the surrounding regions contain the main shorebirds habitats. Following action by local government authorities, hunting activities had almost disappeared from the eastern tidal areas during the 2001 northward migration.

INTRODUCTION

Located in the Yangtze River estuary, Chongming Island is the third largest island in China and the largest alluvial island in the world. The eastern intertidal areas of the island continue extending eastwards to the sea, because of the accretion of sediments deposited by the Yangtze River, with about five km^2 of additional intertidal land created annually. However, the Shanghai government has regularly reclaimed the intertidal areas during the last half century and about 500 km^2 of land has been recovered to date. During the last 20 years, frequent large-scale reclamation has destroyed the structure of the intertidal ecosystem and high intensity development activities have changed the succession course of the intertidal areas.

Chongming Island lies in the middle of the East Asian-Australasian Flyway. It is estimated that about one million shorebirds pass through every year (Huang *et al.* 1993). From the 1980s onwards, shorebird counts have been carried out many times and the results have shown that the intertidal areas are important stopover sites for migratory shorebirds. The area is of international importance for six species: Dunlin, Great Knot, Kentish Plover, Eastern Curlew, Lesser Sand Plover and Spotted Redshank. Chongming Island is also an emergency staging site for migrants in bad weather conditions (Wang & Qian 1988, Scott 1989, Chen *et al.* 1997, Barter *et al.* 1997a).

During the 1996 northward migration, the Australasian Wader Studies Group and the National Bird Banding Centre of China carried out a joint shorebird survey. The survey provided detailed data about shorebirds during the first half of the northward migration period (Barter *et al.* 1997b). Two years after this survey, a new dike was built about two km further out and approximately 60 km^2 of intertidal area was reclaimed (Fig. 1). In order to determine the current status of shorebirds in the area, we carried out a count during the 2001 northward migration to find out whether the recent reclamation had affected shorebird numbers through habitat loss.

METHODS

The eastern intertidal areas of Chongming Island can be classified into three regions: Bei Ba Yao, Dong Wang Sha and Tuan Jie Sha. Because of the reclamation and development activities in Bei Ba Yao and Tuan Jie Sha in recent years, only a few birds can be found in these two regions. In this study, the field investigation was concentrated in Dong Wang Sha, specifically in the four main regions (Bai Gang Canal, Bu Yu Gang South, Bu Yu Gang North and Dong Wang Sha east). These sites were also visited in 1996 and found to be the most important for shorebirds (Barter *et al.* 1997b). Each region was counted at both high and low tide. We walked on the tidal flats and counted birds along the water edge on low tides, and observed shorebirds from the dikes during high tides. When the tidal flats were submerged during high tide,

* Author to whom correspondence should be addressed.

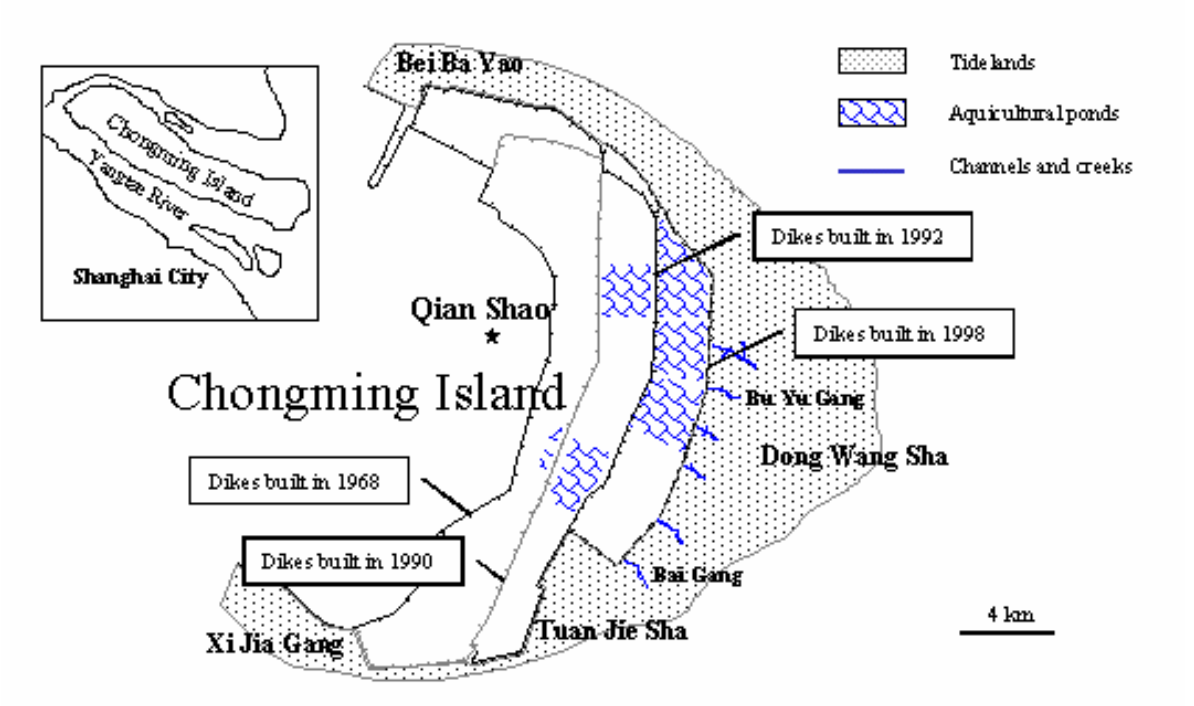

Figure 1. Map of the eastern intertidal areas of Chongming Island.

shorebirds roosted at sites near the dikes and these were conveniently counted by telescope from the dikes. We only report the maximum numbers of shorebirds counted in each region during either the high or low tide counts. In addition, we investigated the main aquaculture ponds inside the inner dikes by bicycle.

RESULTS

We made five counts from the middle of March to the middle of May. A total of 44 904 shorebirds of 32 species were counted (Table 1). Three species, Dunlin, Great Knot and Kentish Plover accounted for nearly 90% of the total number of shorebirds seen.

The peak numbers of the main shorebird species occurred at different times. The Kentish Plover was the first species to arrive, with numbers peaking in the middle of March. Dunlin were recorded in each survey and peak numbers occurred from the middle of March to late April. Great Knot spent only a short time at Chongming Island and this species was only recorded from the end of March to the end of April. By the middle of May, the numbers of the three dominant species had greatly declined and Whimbrel had become the major species present on the tidal flats. Whimbrel numbers decreased in the last two days of our investigation (May 12 and 13), suggesting that they had migrated northward.

Bu Yu Gang and the surrounding area was the most important region for shorebirds; more than 70% of the shorebirds seen were recorded there. In addition, aquaculture ponds were also important habitats for shorebirds. Some species, such as Black-winged Stilt, Little Ringed Plover and Marsh Sandpiper, were only recorded there. Some others, such as Eurasian Oystercatcher and Spotted Redshank, also occurred mainly in aquaculture ponds.

DISCUSSION

Comparing our results with surveys undertaken earlier in the 1990s, it appears that the diversity and numbers of shorebirds has decreased. Barter (in Chen *et al.*, 1997) considered that there might be better habitat for shorebirds at other sites. In recent years, our investigations in the middle and lower reaches of the Yangtze River have shown that the diversity and number of shorebirds have increased in those regions. Recent counts at the Yancheng National Nature Reserve (located about 400 km to the north of Chongming Island) have also shown that the number of shorebirds has increased. It is possible that shorebirds are now selecting other

Table 1. Numbers of shorebirds on the eastern tidal flats of Chongming Island during the 2001 northward migration in decreasing order of importance.

Species	12-16 March	24-28 March	9-13 April	24-29 April	8-12 May	Species totals	%
Dunlin *Calidris alpina*	3220	2813	5208	6418	676	18325	40.83
Kentish Plover *Charadrius alexandrinus*	7880	4104	2534	213	5	14736	32.82
Great Knot *Calidris tenuirostris*	-	3510	2708	267	-	6485	14.44
Sharp-tailed Sandpiper *Calidris acuminata*	-	7	62	978	370	1417	3.16
Curlew Sandpiper *Calidris ferruginea*	12	805	112	88	-	1017	2.27
Greater Sand Plover *Charadrius leschenaultii*	-	-	234	366	34	634	1.41
Whimbrel *Numenius phaeopus*	-	6	12	9	524	551	1.23
Red-necked Stint *Calidris ruficollis*	-	-	112	384	15	511	1.14
Terek Sandpiper *Xenus cinereus*	-	-	11	94	210	315	0.70
Eurasian Curlew *Numenius arquata*	49	26	73	123	15	286	0.64
Ruddy Turnstone *Arenaria interpres*	-	-	2	93	3	98	0.22
Common Greenshank *Tringa nebularia*	-	2	7	80	8	97	0.22
Godwit sp. *Limosa sp.*	-	43	25	14	-	82	0.18
Broad-billed Sandpiper *Limicola falcinellus*	-	-	-	37	7	44	0.10
Common Redshank *Tringa totanus*	-	-	23	17	3	43	0.10
Common Sandpiper *Actitis hypoleucos*	3	4	3	29	3	42	0.09
Spotted Redshank *Tringa erythropus*	-	2	29	4	3	38	0.09
Lesser Sand Plover *Charadrius mongolus*	-	-	-	-	25	25	0.06
Black-winged Stilt *Himantopus himantopus*	-	7	5	11	-	23	0.05
Grey Plover *Pluvialis squatarola*	1	4	12	2	-	19	0.04
Ringed Plover *Charadrius hiaticula*	-	-	2	13	2	17	0.04
Eastern Curlew *Numenius madagascariensis*	6	2	7	1	-	16	0.04
Snipe sp. *Gallinago sp.*	-	2	6	7	1	16	0.04
Green Sandpiper *Tringa ochropus*	-	2	3	4	2	11	0.02
Spotted Greenshank *Tringa guttifer*	-	-	3	7	-	10	0.02
Little Ringed Plover *Charadrius dubius*	-	-	-	9	-	9	0.02
Pacific Golden Plover *Pluvialis dominica*	-	-	2	1	3	6	0.01
Red Knot C*alidris canutus*	-	-	5	1	-	6	0.01
Marsh Sandpiper *Tringa stagnatillis*	-	-	5	-	-	5	0.01
Eurasian Oystercatcher *Haematopus ostralegus*	-	-	3	-	2	5	0.01
Sanderling *Calidris alba*	-	-	-	3	-	3	0.01
Little Curlew N*umenius minutus*	-	-	-	-	2	2	<0.01
Count totals	11 171	11 339	11 208	9 273	1 913	44 904	100
Number of species	7	16	27	28	21	32	

regions as their stopover sites because of the large-scale reclamation at Chongming Island.

Studies in the spring of 1996 showed that the Great Knot moved through Chongming Island quickly (Barter *et al.*, 1997a). Our results confirmed that Great Knot only stay for a short time. The peak numbers occur from the end of March to the middle of April, and by late April only a few Great Knot remain.

Some investigations in the 1980s indicated that the Lesser Sand Plover arrived at Chongming Island earlier than the Greater Sand Plover (Wang & Qian 1988, Huang *et al.* 1993). In our study, we found that the Lesser Sand Plover arrived later than the

Greater Sand Plover, with the Greater Sand Plover arriving in the first third of April and the Lesser Sand Plover in early May.

Compared to the earlier investigations around 1990, the numbers of Eastern Curlew, Spotted Redshank and Lesser Sand Plover had decreased. We counted 524 Whimbrel in May, but no data have previously been collected at this time. This number exceeds the 1% criteria for the species (Bamford & Watkins in prep.). In addition, our results also confirmed that the intertidal areas are internationally significant for Dunlin, Great Knot and Kentish Plover.

Commercial hunting of birds on the intertidal areas of Chongming Island has existed for several decades and is a major threat to shorebirds (Barter *et al.* 1997c, Ma *et al.* 1998). In September 2000, we met hunters frequently during our field investigations. They hunted shorebirds using clap nets and decoys, and by imitating the call of birds with bamboo whistles. Most of the birds are sold in the markets or sent to restaurants. According to our investigations, about 10 to 15 hunters caught shorebirds everyday. This number is fewer than during the 1996 northward migration (Barter *et al.* 1997c).

The local government has recently increased its monitoring and restriction on hunting activities. They frequently checked markets, restaurants and the intertidal areas during the 2001 northward migration. They have also distributed publicity to local people, visited hunters and instructed them in the law. Poachers who continue to hunt birds have been prosecuted. All these measures have had a significant effect on hunting activity. During the 2001 northward migration, we only occasionally saw hunters. Some told us that they now never hunt birds because of the strict management. This shows that action by local government is the key factor in the conservation of birds. Due to the establishment of a management station and improved management strategies, shorebird hunting should be greatly reduced in the future.

The distribution of shorebirds indicated that Bu Yu Gang and the surrounding regions are the most important areas for shorebirds. This was also the situation during the 1996 survey. With the ongoing development activities at Chongming Island, large areas of tidal flats have been converted to aquaculture ponds, farmland and vegetable gardens. This has caused significant loss of shorebird habitat. Presently, due to ongoing sedimentation, the intertidal areas of the Bu Yu Gang region extend about 140 metres further seawards each year creating new shorebird habitat. In other regions, where there is a smaller area of tidal flats and intensive human disturbance, the diversity and numbers of shorebirds have been reduced.

Presently, the local government is cultivating *Spartina alterniflora* on the tidal flats in the Bu Yu Gang region to promote rapid sedimentation of soils and sands with the intention of reclaiming these tidal flats within a few years. However, it is not clear what effects *Spartina alterniflora* will have on the shorebirds and their habitats. As *Spartina alterniflora* is an alien species, its fast expansion will obviously have some effect on tidal flat development and vegetation. In addition, the Three Gorges Dam, currently being built in the upper reaches of Yangtze River, will reduce the supply of river-borne sediment to the middle and lower reaches of the river. This may also influence the sedimentation of soil and sand at the eastern end of Chongming Island. It will be necessary to monitor the changes in tidal flats and develop conservation strategies for shorebirds and their habitats in the long term.

ACKNOWLEDGEMENTS

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WADERS OF EAST DONGTING LAKE NATIONAL NATURE RESERVE, HUNAN PROVINCE, CHINA

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SUMMARY

A survey for shorebirds at East Dongting Lake in early March 2001 found 44 027 birds of 17 species. Spotted Redshank, Dunlin and Pied Avocet were present in internationally important numbers. The numbers of Spotted Redshank and Pied Avocet are the highest recorded so far at any site in the East Asian-Australasian Flyway. It is possible that the extensive system of lakes in the middle reaches of the Chang Jiang could be supporting very large numbers of Dunlin.

INTRODUCTION

Waders, or shorebirds, are relatively small birds that are difficult to identify. Previously, very little attention has been paid to them in China. Even at sites that are extremely important for them as non-breeding, staging and breeding areas. Consequently, information on shorebirds, especially those using inland fresh water areas in China is very limited.

The unique importance of Dongting Lake as an important non-breeding site for shorebirds, especially Dunlin *Calidris alpina*, Pied Avocet *Recurvirostra avosetta* and Spotted Redshank *Tringa erythropus*, first became apparent when one of us (GL) took part in a training course run by the Australasian Wader Studies Group at Chongming Dao in April 1996.

During the period 1st to 10th March 2001, we surveyed 6 sites that we believed to be the most important areas for shorebirds at that time (Fig. 1). The aim of the survey was to estimate the population sizes and distributions of shorebirds and to identify the main threats facing them.

East Dongting Lake is part of the huge Dongting Lake system, consisting of West, South and East Dongting Lakes, which has a total area of c.2,700 km^2. The East Dongting Lake National Nature Reserve is one of China's seven Ramsar sites, and covers an area of 1 900 km^2. The water level in the lakes fluctuate widely, with as much as an 18 m difference between the low water level in winter and high water level during the summer monsoon floods.

During winter, 290 km^2 of the Reserve area is covered by water and 200km^2 by reed beds, which are mostly harvested for paper making. Natural habitats such as sedge (*Carex* spp), meadows, mudflats and sandbanks cover 610km^2, whilst the remaining 800km^2 is mainly pasture land and agricultural fields.

The first zone above the waterline consists of bare mudflats and sandbanks. The next zone is made up of slightly higher mudflats mostly covered by plants, such as small clumps of sedge, grasses and Dicotyledons, especially *Rorippa* sp. Also *Polygonum lapathifolium* has been identified in this zone. Further from the water edge, sedge meadows are found and reeds (*Phragmites*) occur inland from the sedge zone.

Previous studies show that the Reserve contains 234 species of birds, 114 species of fish and 802 species of plants and is particularly famous for hosting 60% of the Lesser White-fronted Goose *Anser eruthripus* world population during the winter season.

METHODS

The estimation of the total number of shorebirds was based on identifying and counting of feeding, and sometimes flying, flocks whilst walking and occasionally from hides. Shorebird identification was relatively simple since usually less than 4 species were present in any flock.

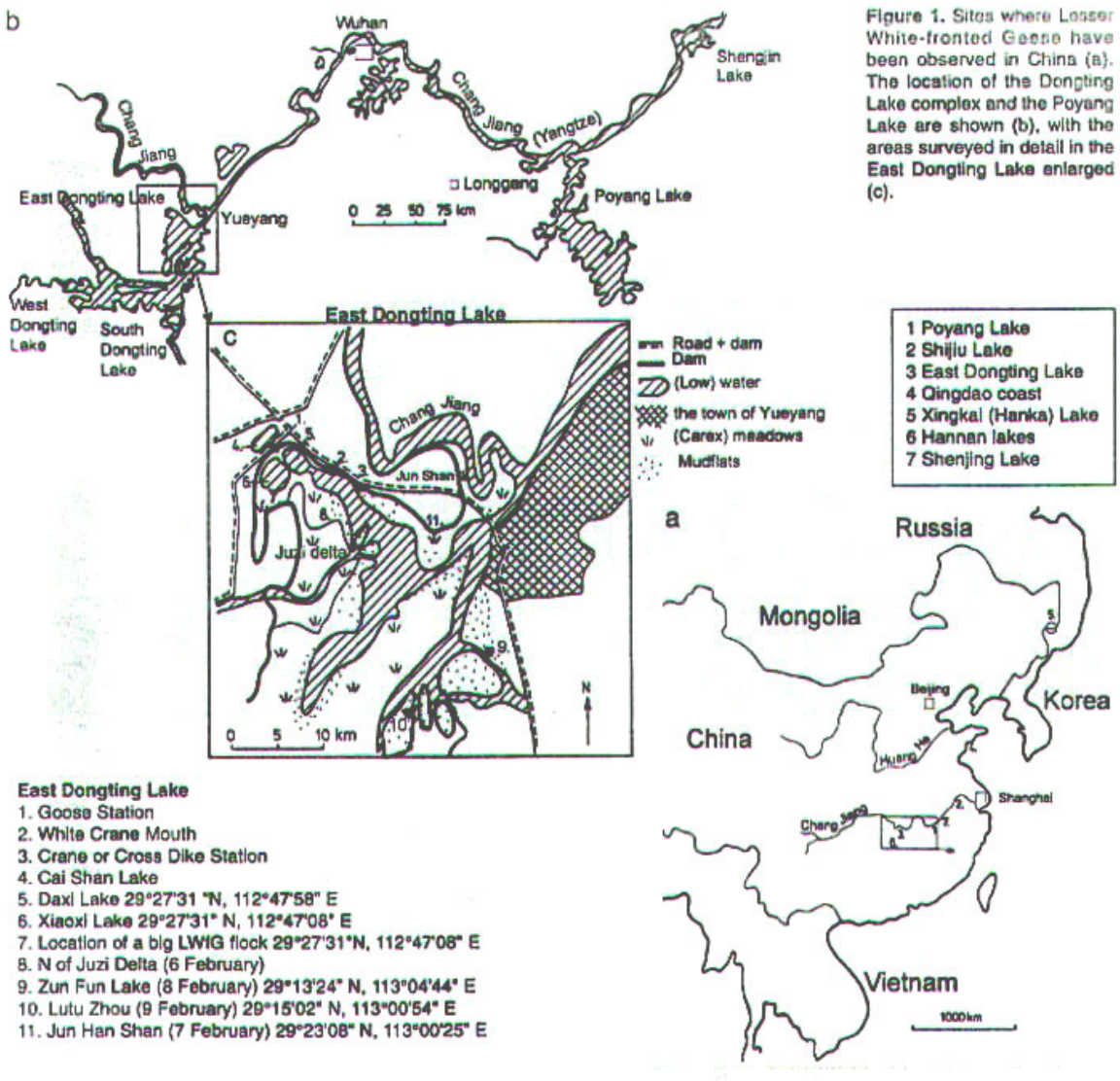

Figure 1. Sites where Lesser White-fronted Geese have been observed in China (a). The location of the Dongting Lake complex and the Poyang Lake are shown (b), with the areas surveyed in detail in the East Dongting Lake enlarged (c).

We surveyed the six most important sites: Daxi Lake, Xiaoxi Lake, Chunfeng Lake, Hongqi Lake, Zhuzhi Delta and the Cross-dyke mudflats.

RESULTS AND DISCUSSION

A total of 44 027 shorebirds were counted and comprised 17 species. The most common species were Dunlin (23 488 individuals - 53% of total shorebirds), Spotted Redshank (10 206 – 23%) and Pied Avocet (8 704 – 20%), and these three species were present in internationally important concentrations as their numbers exceeded 1% of the estimated East Asian-Australasian Flyway populations (Bamford & Watkins in prep.).

The large number of Dunlin is particularly interesting. To date only 150 000 Dunlin have been counted in the non-breeding areas out of an estimated minimum flyway population of 950 000 individuals (Bamford & Watkins in prep.). All of these birds have been found in coastal areas. It is possible that the extensive system of lakes in the middle reaches of the Chang Jiang (Yangtze River) could be supporting very large numbers of Dunlin.

The numbers of Spotted Redshank and Pied Avocet are the highest recorded at any site so far in the east Asian-Australasian Flyway (Bamford & Watkins in prep.).

CONSERVATION STATUS

Table 1. Number of shorebirds counted at each site during the 1 – 10 March 2001 period.

SPECIES	Daxi & Xiaoxi	Chunfeng	Hongqi	Zhuzhi Delta	Cross-dyke mudflats	TOTALS
Northern Lapwing *Vanellus vanellus*	312	29	2	54	34	431
Grey-headed lapwing *Vanellus cinereus*	12	6				18
Eurasian Woodcock *Scolopax rusticola*	2			2	3	7
Pintail Snipe *Gallinago stenura*	1					1
Common Snipe *Gallinago gallinago*	6	3				9
Black-tailed Godwit *Limosa limosa*	59	16			2	77
Eurasian Curlew *Numenius arquata*	7	2			4	13
Spotted Redshank *Tringa erythropus*	8 340	256	1 500	64	46	10 206
Common Greenshank *Tringa nebularia*	42	24	5	8	46	125
Green Sandpiper *Tringa ochropus*	2			6	4	12
Wood sandpiper *Tringa glareola*	4					4
Common Sandpiper *Actitus hypoleucos*	3	6	8	4		21
Dunlin *Calidris alpina*	11 000	2 200	8 360	1 800	128	23 488
Pied Avocet *Recurvirostra avosetta*	8 680		24			8 704
Grey Plover *Pluvialis squatarola*	9	6	46	58	6	125
Little Ringed Plover *Charadrius dubius*	4	8			9	21
Kentish Plover *Charadrius alexandrinus*	160	450	27	126	2	765
SITE TOTALS	28 643	3 006	9 972	2 122	284	44 027

During the survey we did not detect any hunting activities targeted at waders. Hunters prefer to hunt larger birds such as geese and ducks by poisoning. However, occasionally some waders, such as Pied Avocets are killed by poisoning since they use similar habitat to ducks. For example, 18 Avocets were poisoned at Xiaoxi Lake in November 1998. The most serious threat to shorebirds is probably food shortages caused by drying of the lakes to assist fish harvesting.

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Pied Avocet *Recurvirostra avosetta* and Black-tailed godwit *Limosa limosa* at CaishangHu. Photo by Y. Yao 2001.

PAINTED SNIPE NESTING AT TAYLOR'S LAGOON NEAR BROOME, NORTH-WESTERN AUSTRALIA

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ABSTRACT

We describe a nest record of Australian Painted Snipe near Broome, Western Australia and review the species' status in the region. A pair of Painted Snipe nested in a dense tussock of grass next to a freshwater wetland in August 1999, laying three eggs, two of which apparently hatched. Details on the habitat, eggs and behaviour of the adults are provided. Records of Australian Painted Snipe from the Kimberley region are reviewed. Twenty-six records from 17 different sites were located; these included records from all months but February and June, and records of breeding at two sites (March and Aug-Sep.). Sixteen records were from the last 20 years,; doubtless partially due to increased observer effort. This review suggests that there may be a resident population of Australian Painted Snipes in the Kimberley, although the birds are rare and seldom seen.

INTRODUCTION

The Australian Painted Snipe *Rostratula (benghalensis) australis* is a resident shorebird that has recently been proposed as being endangered (Rogers & Lane 2000). It is a bird of well-vegetated inland and sometimes near-coastal wetlands. Historically it has been most often reported from the southeast of Australia. There are few records from north-western Australia. Not very long ago, Storr (1980) considered Painted Snipes to be extinct in the Kimberley Division. Until 1999 only seven previous nests had been found in north-western Australia. These were all found and photographed near Derby by Peter Slater in 1960 and 1961. Since the nesting event reported in this paper occurred, there has been one other possible breeding record; George Swann saw and photographed an adult male and female with two fledged juveniles at Lake Gregory on 2 December 2000.

This note describes the finding of a Painted Snipe nest in August 1999 at Taylor's Lagoon, 75 kilometres north-east of Broome in north-western Australia. Habitat, nest, eggs and observations of birds' behaviour are described and the distribution and status of Painted Snipe in the Kimberley Region is discussed.

TAYLOR'S LAGOON OBSERVATIONS

Taylor's Lagoon 17° 50' 54"S 122° 44' 25"E is a small freshwater lake situated within a 404 ha government reserve (number 1510). It is gazetted as a 'watering place' and was historically on a stock route. The lake was used by the main roads department as a 'borrow pit' for gravel during the sealing of the Great Northern Highway between Broome and Derby in the 1960s. This presumably deepened the area where the water lies. The reserve is situated within the Roebuck Plains pastoral lease, 75 kilometres north-east of Broome in north-western Australia. The water level in the pit varies with the time of year and the amount of rainfall during the wet season. Taylor's Lagoon has a relatively small surface area and covers approximately 2 hectares when not in extreme flood. The two other lakes on the Roebuck Plains, Lake Eda and Lake Campion, both appear suitable as Painted Snipe habitat; there is one record from Lake Eda but none from Campion. Lake Eda has a large open body of water after rain and extensive flooded grassland, reeds and *Sesbania.* Lake Campion rarely has any open water visible as the lake is very heavily vegetated with Spiny Mudgrass being the dominant species. The other record from Roebuck Plains is from an area that regularly floods after rain events. This area is very similar to huge areas of the plains that would offer presumably suitable habitat during the wet season.

The main vegetation immediately around Taylor's Lagoon is Couch *Cynodon dactylon* with patches of Spiny Mudgrass *Pseudoraphis spinescens.* These grasses merge into much taller, dryland grasses including *Triodia bitextura, Chrysopogon pallidus* and *Aristida sp* and then into the surrounding *Acacia* dominated woodland. In some years, patches

of a tall, hard-stemmed shrub, *Sesbania erubescens*, grow on the fringes of the lake.

On 17 July 1999, local ornithological guide George Swann found a pair of Painted Snipe at Taylor's Lagoon. Adrian Boyle was at the site on 21 July 1999 but recorded no Painted Snipe. On his next visit on 4 August 1999, he flushed the pair of snipe from the patch of Spiny Mudgrass where the nest was eventually located. The male flew 200 m across the lagoon while the female only flew 30 m. She landed at the edge of the long grass and telescope views were obtained before she melted away into the vegetation.

CJH visited the site with Mavis Russell on the 5 August 1999. At 07:45 we flushed a female Painted Snipe from an oval shaped patch of shin high (*c*. 25 cm) Spiny Mudgrass *Pseudoraphis spinescens*. We were within 2 to 3 m when she flushed. The grass surrounding this patch was Couch *Cynodon dactylon*; it was only 2-5 cm tall and was the dominant plant species all around the lake edge. The patch of Spiny Mudgrass was 2 metres from the 'overflow' swampy area (Fig. 1). The female Painted Snipe flew approximately 30 m from us and disappeared into some long grass. We then flushed a male bird and he flew 60 m before also hiding in long grass. At 07:53, we flushed the female again and had great views as she flew 200 m across the lagoon. The deep chestnut brown head and breast contrasted strongly with the white belly, flanks and undertail coverts. The white of the underparts went along the sides of the breast and around the 'shoulder' and on the mantle of the bird. The long, pale pinkish drooped bill was obvious and the legs trailed in flight. At 07:55 we flushed the male for the second time and got brief, but excellent views of the beautiful golden buff spotting on the upperwing. We didn't try to flush the birds again. We retired to the shade of an *Acacia coleii* at the edge of the water. At 09:00 the female flew back across the lake and landed in waterlogged Spiny Mudgrass 30 m from us. CJH presumed that the area was a favoured

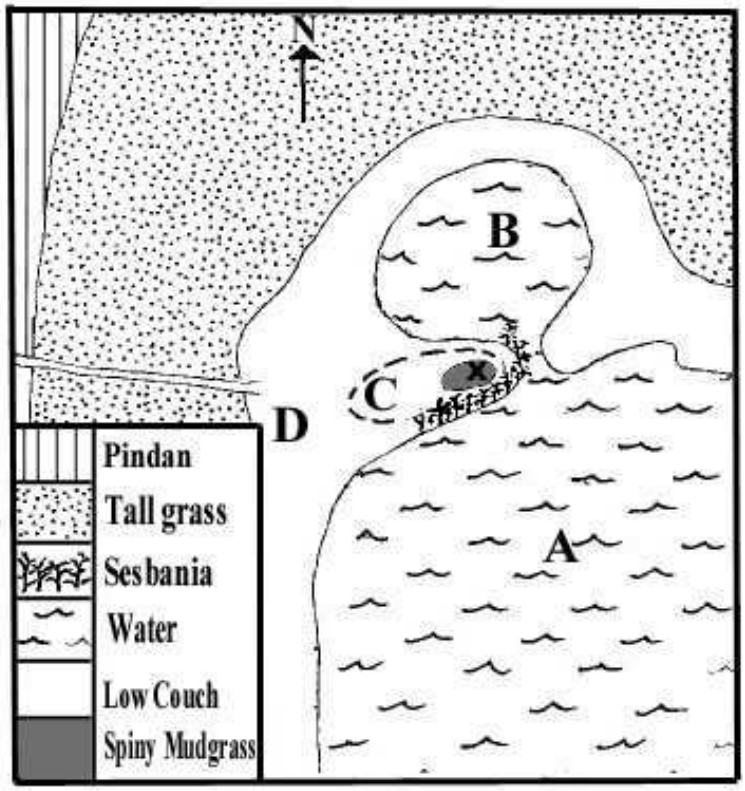

Figure 1: Map of the Painted Snipe nest site at Taylor's Lagoon, August 1999. A = Taylor's Lagoon; B = Overflow area; C = Raised spit, 1 m above water, shelving gently to overflow area and steeply to main lagoon; D = Viewing position in shade of single *Acacia coleii*; X = Painted Snipe nest, 4 m from water.

feeding location, and on his return home told partner Janet Sparrow of the sighting. She suggested the bird might be nesting as it had returned to the same area and we had flushed a pair.

On 12 August, CJH visited Taylor's Lagoon again and at 14:27 flushed a male Painted Snipe from the exact same area of tangled grass as we had flushed the female from during our previous visit. After a careful search on hands and knees, a nest was found. It contained 3 eggs heavily blotched with black/brown markings. The base colour of the eggs was a buff/light caramel; they were less heavily blotched than those on plate 19 of Johnstone & Storr (1998). The nest was a very shallow cup of grass, 14 cm at its longest point and 12cm at its widest. It was 'egg shaped', wide at the rear and tapering towards the front. The sitting position of the incubating male was used to assess the orientation of the nest; he was facing out from the taller grass patch. The nest was situated about 40 cm into the taller Spiny Mudgrass.

The nest was situated in an oval patch of grass that was on a raised 'bund' that runs for 35-40 m along a portion of the north-west edge of the lake (Fig. 1). This grass patch was 25cm tall and the surrounding Couch was only 2-5 cm tall. This area, and therefore the nest, was on dry ground. To the southeast of the nest site was a gentle 1-metre slope into dead *Sesbania erubescens* fringing the lake. This thick *Sesbania* was 4 m from the nest; it fringed the bund and therefore the nest. This 'protected' the nest site on two sides but the other two were very open. Two metres to the NE, and W of the nest was shallow water that filled a depression which takes the overflow from the main lake. This water is thickly vegetated and a small portion of the edge was fringed with *Sesbania*. Australian Pratincoles, Black-fronted Dotterels and Magpie-larks were feeding in and around this area. This flooded area petered out into denser grass about 1-1.3 m tall. This habitat was 20 m from the nest and this stretched another 130 m to Pindan woodland. Pindan is the local term for the *Acacia* dominated woodland habitat that is widespread around Broome (Kenneally *et al* 1996). The only other tree close to the nest was a large specimen of *Acacia coleii*, about 30 m SW of the nest site.

A. Boyle visited the site On 15 August 1999, the male was flushed from the nest site and 3 eggs were seen in the nest. CJH next visited to check the nest on 20 August, hoping to see some hatchlings. It is possible that the female was laying eggs on the first visit we made on 5 August and if incubation takes 15-16 days (P. Slater, pers comm.; Marchant & Higgins 1993). In Painted Snipes, it is believed that the female does not incubate the eggs, this and care of the young are apparently left to the male (Marchant & Higgins 1993) However some contrary observations have been reported by Terry Pacey at Hope Island this year (R. Jaensch, pers comm). Therefore as the female was in attendance on 5 August, we tentatively presume she was laying or was about to lay. Wading in the main lake using the *Sesbania* to shield him from the nest, CJH was able to photograph the male on the nest. The bird flushed when CJH tried to crawl through the *Sesbania* to photograph him from closer range. Three eggs were still in the nest. The eggs were not handled but none of them appeared to be pipping. After the inspection, CJH retreated to the shade of the *Acacia* tree and waited for the male to return. He duly did so. He landed in the open water of the lake and swam about 10 m through the mouth of the overflow and was lost to view amongst the *Sesbania* and below the slight slope. CJH had just waded through the same route as the bird swam and the water was up to his knees and lower thighs, so the bird was definitely swimming. The bird was not seen returning to the nest in the next 20 minutes, but could have easily have done so without being noticed because of the thick vegetation.

On a visit on 21 August 1999, A. Boyle purposely did not flush the bird from the nest due to the presumed closeness to hatching of the eggs, as he had a large group with him.

On 23 August 1999 at 08:55, George Swann flushed the male from near the nest site. The nest contained 1 egg. He did not see the chicks. This record, and mine of 3 eggs still in the nest at 11:20 on the 20 August 1999, shows the eggs hatched in a maximum period of 70 hours. This coincides with P. Slaters observations of incubation periods of 15 – 16 days, presuming the female was laying during CJH's initial observation on 5 August 1999.

The next visit to the site was on 31 August. As CJH approached the nest nothing flushed from the area, and the nest turned out to contain one unhatched egg. Shell fragments from the other two eggs were scattered in front of the nest from 2 - 40 cm away. The cover of Spiny Mudgrass was still intact above the nest and none of the area in front of the nest was disturbed; this and the later observations of the male

bird performing threat displays lead us to believe that the eggs had indeed hatched and not been predated. This is contrary to the information summarized in Marchant & Higgins (1993) that states that eggshells were not removed from nest. Painted Snipe chicks, like all shorebirds, are nidifugous so would have left the nest very soon after hatching. The nest was measured and drawn. It was calculated, conservatively, that the unhatched egg was a minimum of 23 days old and therefore had no chance of hatching, so it was collected as a specimen for Ron Johnstone at the Western Australian Museum. The edge of the lake was then scanned for 45 minutes by telescope, but no Painted Snipes were seen.

Adrian Boyle and DR made another sighting of the adult male on the 25 September 1999. The bird was seen out on the open muddy edge of the lake. This view enabled DR to see the short bill and long wing of the bird (two of the characteristics that separate the Australian species from those in Asia and Africa). It moved into a small tussock of grass and was lost to view. When Adrian was skirting the area where the bird was secreted it came out of hiding in an agitated state and performed a brief threat display. The bill was held low and the wings spread fully towards the intruder. It is presumed from this behaviour that the male was still in attendance of at least one chick. No effort was made to locate the chicks due to concern of excessive disturbance. CJH subsequently visited Taylor's Lagoon on 8 November, 12 November and 25 December that same year but had no more sightings of Painted Snipe.

OTHER KIMBERLEY SIGHTINGS

Painted Snipe records from the Kimberley are relatively few (Table 1), but there has been a relative spate of them in the last two years. Peter Slater made the only previous breeding observations from the region in the early 1960s. During March 1960, Peter recorded six nests at Munkejarra Swamp, 17 km SE of Derby. On 13 March 1960, he had one nest with four eggs. On 19 March 1960, he found a further three nests all with eggs and one nest being built. On 20 March 1960, he recorded two more nests with eggs. The nests were situated on banks of earth, dug to make a deep pit, presumably for watering of cattle, among clumps of grass. All the nests here were scrapes in the ground lined with grass. Some nests were more substantial than others with Samphire twigs used. A fringe of *Melaleuca* trees surrounds the area. The banks of earth were surrounded by water. All nests were very well hidden and situated underneath overhanging grass.

On 11 March 1961, at an unnamed claypan 400m to the NW of Munkejarra, Peter discovered one nest with three eggs and on the 17 March 1961 another nest. These two nests were at the base of samphire bushes (probably *Halosarcia sp*); photographs of a male sitting on one of these nests have been published in Pringle (1987) and Slater & Slater (1995). This nest was a sparse construction of twigs and within a metre of water and nearby 'wild rice'. The claypan is very open and flat with samphire as the dominant plant species.

DISCUSSION

Kimberley records of Painted Snipe come from two main habitat types, well-vegetated fresh water swamps or samphire claypans, most often after fresh water flood events. The 1960 nesting records were from dense tussock grassland close to water with the nests very well concealed. The 1961 nests were from much more open samphire habitat with the nests at the base of Samphire bushes. The 1999 record was from a fresh water wetland with the nest very well hidden. These nest sites had some features in common; all were on raised ground close to or surrounded by water, and all were at the base of relatively dense vegetation. However it is difficult to make assumptions as to what is the preferred habitat of Painted Snipe from such a small sample; it may simply be that nests are easier to find in small wetland areas. Painted Snipes are secretive and difficult to see. Nearly all the habitat records have some vegetation associated with them that would be suitable for birds to hide in.

Table 1. List of Kimberley records of Painted Snipe; data come from Storr (1980), Collins (1995) and the Broome Bird Observatory bird-log, databases of the RAOU Atlas and the Threatened Bird Network Painted Snipe project, and personal communications.

Date	Observer	Site	Location	Habitat	Notes
19/071886	T.H. Bowyer-Bower	Munkejarra Swamp 17km SE of Derby	17° 26' 07" S 123° 43' 38" E	Unknown; presumably similar to below	2 females collected. Several other sightings made in the district, in parties of 4 or 5.
20/01/1896	K. Dahl	Derby	17° 19' S, 123° 38' E	Unknown	Specimen in American Museum of Natural History (Historical Atlas)
19/03/1909	J. P. Rogers	Parry's Creek	c. 15° 15' S c.128° 20' 00" E	Unknown	1 male – the type specimen of *R.a. fitzroyi* (Mathews, 1912, Austral Avian Record 1 [4]: 85), a subspecies no longer considered valid.
13/03/1960	P. Slater	Munkejarra Swamp 17km SE of Derby	17° 26' 07" S 123° 43' 38" E	Freshwater swamp surrounded with Melaleuca. Mudgrass, marshwort, lilies, Sesbania in water.	1 nest, 4 eggs. See below
19/03/1960	P Slater	Munkejarra Swamp 17km SE of Derby	17° 26' 07" S 123° 43' 38" E	As above	3 nests with eggs, 1 nest being built. See below
20/03/1960	P. Slater	Munkejarra Swamp 17km SE of Derby	17° 26' 07" S 123° 43' 38" E	As above	2 (additional nests with eggs). See below
11/03/1961	P. Slater	Claypan 17km SE of Derby	17° 25' 47" S 123° 43' 04" E	Large flat claypan with Samphire and fringing Melaleuca.	1 nest, 3 eggs.
17/03/1961	P. Slater	Claypan 17km SE of Derby	17° 25' 47" S 123° 43' 04" E	Large flat claypan with Samphire and fringing Melaleuca.	Another nest
26/07/1979	Atlas	Near Kununurra	Unknown	Unknown	Single
00/12/1979	Atlas	Near Kununurra	Unknown	Unknown	Single
04/05/1986	R. Jaensch	Parry Creek Floodplain	c. 15° 33' 00" S c. 128° 16' 00" E	Dry, claypan with samphire	Two birds, sex unknown
08/05/1986	R. Jaensch	Parry Creek Floodplain	c. 15° 33' 00" S c. 128° 16' 00" E	Shallow freshwater well vegetated swamp	Feathers found
00/11/1986	B. Wells	Lake Eda	17° 53' 24" S 122° 38' 48" E	Fresh water lake	Single male
01/03/1991	K. Coate	Dunham River Pilot Dam	16° 02' 00" S 128° 23' 30" E	Drying freshwater area fairly open with small grass clumps	2 males 1 female
00/01/1993	C. Hegarty	Coconut Well 13km N of Broome	c. 17° 49' 17" S c. 122° 12' 35" E	Unknown	single
00/04/1994	J.Hunt/BBO	Roebuck Plains	18° 02' 00" S 122° 35' 00" E	Flooded grassland	Pair

Table 1 continued

Date	Observer	Site	Location	Habitat	Notes
05/01/1995	F. O'Connor	Parry's Lagoon	c. 15° 33' 00" S c. 128° 16' 00" E	Flooded grass	2 females
18/05/1995	G. Swann	Fitzroy River (old crossing) 17 km ENE of Fitzroy Crossing	18° 09' 30" S 125° 45' 00" E	Open shallow water at floodway	Single male
29/05/1995	R. Clarke	Parry's Lagoon	15° 33' 00" S 128° 16' 00" E	Shallow freshwater well vegetated swamp	5 birds, 2 males, 2 females, 1 male or juv female?
14/10/1995	S. Halse	Lake Gregory	c. 20° 08' 30" S c. 127° 31' 30" E	Flooded samphire, dead Acacia thicket	Single bird.
01/03/1996	K. Coate	Kingstone Rest	16° 02' 26" S 128° 24' 52" E	Well vegetated freshwater swamp	Single bird
07/12/1999	J. Lewis	Roadside, 78 km west of Halls Creek	18° 35' 10" S 127° 05' 03" E	Flooded roadside ditch with dry 'islands'	Two birds sheltering beneath 2 m high thorny Acacia (?) species
04/05/1999	C. Hassell	Walyarta Lake 225km SW of Broome	19° 44' 00" S 121° 12' 30" E	Flooded Samphire	Single see below
20/07/1999	C Bennets, L. Taylor	Crab Creek saltmarsh 13km E of Broome	17° 58' 14" S 122° 22' 57" E	Dry samphire	Pair
17/07 to 25/09/1999	See this paper	Taylor's Lagoon 75km NE of Broome	17° 50' 54" S 122° 44' 25" E	Freshwater wetland	Pair, Nest, 3 eggs. See main body of text.
02/12/2000	G. Swann	Delivery Camp Plain, Lake Gregory	20° 07' 10" S 127° 10' 48" E	Freshwater flooded plain with short clumps of grass	Pair and 2 juveniles. Out in the open. Good photos obtained.

These include clumps of grasses or samphire bushes. Good views can be obtained when birds 'freeze' believing they are not able to be seen by the observer, but we suspect a lot of sightings are down to luck and often flushing the bird is the first clue to its presence. There is presumably a large amount of suitably flooded habitat of these types in the Kimberley that never or rarely get accessed, let alone by bird watchers.

There are very few records of Painted Snipes from anywhere in Australia during the late autumn and early winter (Rogers & Lane 2000), and it has been speculated that this could be because birds move north during the austral winter (Blakers *et al*. 1984). If the Kimberley region is a wintering ground for Painted Snipe, then one would expect most records to occur during the dry season, especially as at this time of year wetland access is much easier for birdwatchers. However Table 1 shows that Painted Snipe have been recorded in the Kimberley in every month except February and June. Breeding records have encompassed the months of March, August-September and possibly December. This hints at a resident population, especially as the pair at Taylor's Lagoon were present from mid-July (middle of the austral winter). Although there appears to be a resident Kimberley population, it is not strictly sedentary. No sites are known within the Kimberley where Painted Snipes can be found regularly, although there are now several wetlands of apparently suitable habitat (including Taylor's Lagoon) that are regularly visited and worked intensively by birdwatchers.

Despite the abundance of apparently suitable habitat, there are very few records of Painted Snipe from the Kimberley. Johnstone & Storr (1998) commented that there had been few Kimberley records since cattle started to degrade the swampy plains. This theory is unproven. If dry season breeding (such as the Taylor's Lagoon nest) is typical of Kimberley Painted Snipe, then cattle might be a problem. During the dry season, there is far less suitable wetland habitat for Painted Snipe, and as cattle tend to concentrate at water sources, it is quite likely that they could degrade the best Painted Snipe habitat or perhaps trample on nests. However, the only other proved nesting of Painted Snipe in the region occurred near Derby at the end of the wet season, at a time of year when wetlands are extensive and cattle may chose to avoid boggy areas. All that can be concluded at this stage is that Painted Snipe are rare in the Kimberley, as is the case in the rest of Australia.

A large proportion of the Painted Snipe records in the Kimberley come from the 1990's. While it would be nice to conclude that Painted Snipes numbers in the district are increasing, it is more likely that the increase in records during the 1990's is an effect of increased observer effort. North-western Australia has become a popular destination for visiting birdwatchers in the last 10 to 20 years and access to remote areas is becoming easier. It could also be that we are more likely to have heard of recent records than of old records. We heard of many of the Painted Snipe records in Table 1 by word of mouth. Any one who has Kimberley records of Painted Snipe that are not included in Table 1 are invited to send them to us to make the list more comprehensive.

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ABUNDANCE OF MIGRATORY SHOREBIRDS ON THE COAST OF BANGLADESH

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ABSTRACT

An ornithological survey included migratory shorebirds was conducted in the south eastern and south central coastal area of the Ganges delta in Bangladesh between 20 - 26 December, 2000. A total of 41 592 shorebirds of 34 species were counted during this mid winter count and included 5655 unidentified waders. The most abundant species was 3715 Kentish Plover at Boyer Char. Counts varied from 12432 birds at Boyer Char to 1063 at Charbata. There was a wide range of species at several sites and at least five sites had more than 10 species. The most widespread species were Kentish Plover, Common Sandpiper, Little Ringed Plover, Whimbrel, Eurasian Curlew, Black-tailed Godwit, Common Redshank, Spotted Redshank, Marsh Sandpiper, Common Greenshank, Common Snipe and Little Stint. Some of the most common species-groups were Plovers (5 species) and Sandpipers (6 species). The total counts of all Plover species were 21477 birds and 3347 Sandpipers and they contributed 52 % and almost 10 % (8 %) respectively.

INTRODUCTION

On geological time scale, the Himalayas are the youngest of the mountain ranges and at the same time the largest. The Brahmaputra-Gangetic-Meghna delta that covers most of Bangladesh is one of the youngest and again one of the largest and most active deltas. The coastal area is broadly categorized into three regions based on its physiographic characteristics (Hossain, 1989): The eastern region, known as the pacific type, is the most settled of the three regions. It has a narrow strip with a long sandy beach that interface with the sea on the western side and the hill forests of Cox's Bazar on the other. Only a few rivers, the Karnafuli, Matamuhuri, Sangu and Naf Rivers traverse this strip. The central region is the most active area of the delta, where the massive sediment load of the Ganges-Brahmaputra-Meghna river systems fall into the Bay of Bengal through the Meghna estuary. Land erosion and accretion is a continuous process in this region and land reclamation prospects are high. There are a series of offshore islands that have been formed by sediments. The western region is termed the Atlantic type as this region is characterized by a network of rivers, a relatively stable land mass, covered by the largest mangrove forest in the world, the Sundarbans. The relatively small sediment load carried by the smaller but deeper rivers limits erosion and accretion.

Historically, the Ganges and Brahmaputra Rivers have changed their course several times. The last major changes were in the late 1700s, when the Brahmaputra shifted into its present Jamuna channels. In the early 1800s, the Ganges shifted into its present lower course from an earlier course down the Arial Khan River. Such channel shifts are normal in major river deltas and they must be expected to occur again in future (Brammer, 1989). Bangladesh lies in an active tectonic zone. Historically, there have been a number of earthquakes affecting parts of Bangladesh with the last was in 1897. Apart from such catastrophic events, some areas apparently are subsiding slowly and others are rising. Sinking due to consolidation of alluvial sediments may also be taking place. One zone of subsidence apparently passes up the middle Meghna floodplain into the Sylhet Basin, another up the Jamuna floodplain. Subsidence may account for the surprisingly small outgrowth of the delta since Tennell's maps were made in the 1760s. This is despite the enormous quantities of sediments delivered to the Meghna estuary each year. The most outstanding feature of the Bangladesh coastal region is its location. It can be considered to be situated at the interface of the two rings of a figure-of-eight (Rahman, 1988). The northern ring represents the Himalayas and its river system including Nepal, Bhutan and parts of India and China. This region has enormous water discharge round the year but reaches its peak in the monsoon season and causes regular flooding in Bangladesh. Thus, the Bangladesh coastal region works as a funnel for the Himalayan water. The southern ring

of this figure-of-eight is the Bay of Bengal that again funnels water on to the Bangladesh coast.

St. Martin Island, also known as Narikel Jinjira, is a small offshore island of about 600 ha, located about 12 kms south of the Teknaf peninsula in Cox's Bazar district. This is the country's only island that has diverse coral reefs in the shallows surrounding the western side of the island. The southern tip of Teknaf peninsula is called Shahparir Dwip. Sonadia lies under Moheshkhali thana of Cox's Bazar district. Charbata located at the main land of southern Noakhali with one of the busiest fish landing center in the country. A lot of aquaculture ponds, reedbeds and mangrove forest are found in and around the area. Disturbance by passenger vessels is a significant threat to migratory shorebirds there. Nangulia Cahr and Boyer Char located south of Banshkhali contain mainly reedbeds and mangroves. A number of rivers, channels and canals circulate in and around the area. There is a channel located between Hatiya and Nijhum Dwip, called Nijhum Dwip Channel that is locally defined as Moktaria Khari. The eastern part of the Nijhum Dwip Channel is heavily silted up and during low tide, the water depth is minimal. There is another char raised at the west part of the channel and the size of the char is increasing gradually. There is huge Uri vegetation in the newly rising char between south Hatiya and Nijhum Dwip and the region is a very important feeding ground for local and migratory shorebirds (Islam 2001a).

There have been few study of migratory shorebirds in this region, but data on the abundance of migratory shorebirds on this section of the southern coast of Bangladesh, along with their importance have been presented by Islam (2000 a;b) and Islam (2001 a, b).

MATERIALS AND METHODS

The survey was conducted over a 7-day period from 20 to 26 December, 2000 and covered three south eastern and five south central coastal sites. Habitats covered intertidal mudflats, sandy beach and coral islands. Counting started in the late morning each day and extended to evening. Counts in adjacent parts were adjusted when birds moved between areas. Even at high tide, much of the intertidal mudflats were uncovered and the counting technique involved walking just inland of the tide edge and counting roosting and feeding birds. This meant that counters walked quite long distances. A fishing boat with a 26hp engine was also used. Birds flying over each site were taken into account. Weather conditions throughout the count period were generally favorable.

RESULT

A total of 41,592 shorebirds of 34 species were counted and these included 5655 unidentified birds. The percentage coverage at each site were 4.9 % of St. Martin Island, 13.7 % of Shahparir Dwip, 11.7 % of Sonadia Island, 2.6 % of Charbata, 29.6 % of Nangulia Char, 29.9 % of Boyer Char, 3.3 % of Thhuar Char and 4.4 % of Namar Bazar. The total counts at each site varied between 1063 and 12432 birds (Table 1). The most abundant species were 3715 Kentish Plover at Boyer Char and the rarest were Pied Avocet, River Lapwing and Pintailed Snipe (Table 1). Five plover species were seen during this survey. Kentish Plover was the most abundant and the total of all plover species was 21477 and they represented 51.6 % of the total count.

The greatest species diversity was 23 species at both St. Martin Island (southeastern coast) and Boyer Char (south central coast) and the lowest was 15 species at Charbata.

DISCUSSION

The notable feature of this survey is that more than 10 species were found at more than five sites. Nijhum Dwip, Kalkini, Hatailla, Jangalia, Damar Char, Dhal Char, Moheshkhali, St. Martin Island and Shahparir Dwip are very important coastal locations for wintering shorebirds because of their zoogeographical position (Islam 2000 b). At St. Martin Island during the monsoon to pre-winter period, a large shallow lagoon is located at Uttarpara. This is connected to the sea in the west by a narrow channel and serves as a fishing ground for most of the period and a harbour for winter birds like gulls and terns. The entire shoreline is

Table 1. Number of individuals and number of species of shorebird at different sites in southern Bangladesh between 20 and 26 December 2000.

Common name	Scientific name	St. Martin	Shahparir Dwip	Sonadia	Charbata	Nangulia Char	Boyer Char	Thhuar Char	Namar Bazar	Max.Count	Total Count
Common Snipe	*Gallinago gallinago*	2	3	2	22	-	5	6	-	22	40
Pintail Snipe	*Gallinago stenura*	1	1	-	4	3	-	3	-	4	12
Black-tailed Godwit	*Limosa limosa*	-	240	30	48	257	382	150	100	382	1207
Bar-tailed Godwit	*Limosa lapponica*	-	15	-	-	96	178	10	60	178	359
Eurasian Curlew	*Numenius arquata*	10	35	25	4	19	15	23	10	35	141
Whimbrel	*Numenius phaeopus*	28	110	50	7	118	98	43	25	118	479
Common Redshank	*Tringa totanus*	70	150	268	-	335	130	225	80	335	1258
Spotted Redshank	*Tringa erythropus*	12	-	-	62	135	2	42	35	135	288
Marsh Sandpiper	*Tringa stagnatilis*	45	85	182	4	132	20	40	-	182	508
Common Greenshank	*Tringa nebularia*	80	42	-	40	200	180	90	6	200	638
Wood Sandpiper	*Tringa glareola*	-	23	-	-	-	-	17	-	23	40
Common Sandpiper	*Actitis hypoleucos*	134	330	188	286	122	200	235	22	330	1517
Terek Sandpiper	*Xenus cinereus*	128	215	80	-	-	570	-	-	570	993
Ruddy Turnstone	*Arenaria interpres*	56	-	180	-	-	-	15	56	180	307
Asian Dowitcher	*Limnodromus semipalmatus*	-	112	46	-	-	-	-	-	112	158
Great Knot	*Calidris tenuirostris*	2	12	-	-	-	-	-	35	35	49
Little Stint	*Calidris minuta*	200	231	550	138	1130	890	336	238	1130	3713
Temminck's Stint	*Calidris temminckii*	-	405	380	-	60	321	-	-	405	1166
Broad-billed Sandpiper	*Limicola falcinellus*	-	55	95	12	-	-	16	-	95	178
Curlew Sandpiper	*Calidris ferruginea*	-	30	40	-	32	9	-	-	40	111
Ruff	*Philomachus pugnax*	70	-	220	-	525	430	-	-	525	1245
Greater Painted Snipe	*Rostratula benghalensis*	2	-	-	-	-	3	7	-	7	12
Black-winged Stilt	*Himantopus himantopus*	-	-	-	5	-	-	-	-	5	5
Pied Avocet	*Recurvirostra avosetta*	-	-	-	-	-	1	1	-	1	2
Stone Curlew	*Burhinus oedicnemus*	3	-	-	-	-	-	-	-	3	3
Pacific Golden Plover	*Pluvialis fulva*	127	200	392	-	-	105		80	392	904
Little Ringed Plover	*Charadrius dubius*	460	900	560	245	3700	3233	25	356	3700	9479
Kentish Plover	*Charadrius alexandrinus*	463	500	380	180	3004	3715	80	595	3715	8917
Lesser Sand Plover	*Charadrius mongolus*	72	143	-	-	517	324	-	100	517	1156
Greater Sand Plover	*Charadrius leschenaultii*	50	-	-	-	821	120	-	30	821	1021
Grey-headed Lapwing	*Vanellus cinereus*	2	-	-	-	-	-	-	2	2	4
Red-wattled Lapwing	*Vanellus indicus*	4	-	5	6	7	-	-	2	7	24
River Lapwing	*Vanellus duvaucelii*	-	-	-	-	-	1	-	-	1	1
Small Pratincole	*Clareola lactea*	-	-	-	-	2	-	-	-	2	2
Unidentified Waders		-	1870	1200	-	1085	1500	-	-	1870	5655
Total Number		2021	5707	4873	1063	12300	12432	1364	1832	12432	41592
Total Species		23	22	19	15	20	23	19	18	23	34

bordered by dense *Pandanus* stands and *Ipomea* covers sand dunes and any flat ground. (Islam *et. al.* 1999). Most of the coastal areas on the island have been heavily exploited in recent decades by human settlement and other activities. These activities include the exploitation of woodland and forest and over fishing in the rivers throughout the year (Sarker & Hossain, 1997).

The northeastern and southeastern mudflats of Nijhum Dwip are very suitable habitat for water birds and local and migratory shorebird species (Islam 2001b). Due to all the sites containing good foraging ground, Whimbrel *Numenius phaeopus* and Eurasian Curlew *Numenius arquata* are relatively abundant at all sites. During late October 2000, the count of Whimbrel *Numenius phaeopus* at Damar Char and Bandar Tila represented 51.4 % and 40.6 % of the total counts of this species (Islam 2001b).

The large number of migratory shorebirds makes it essential that monthly population counts are made in this region, in order to monitor both southward and northward migration through Bangladesh.

Plovers

Five species of plover were recorded during this survey. Kentish Plover was the most abundant species. At the southern tip of Shahparir Dwip, a large number of Kentish Plover were been recorded but no Greater Sand Plover. This is despite large numbers of Greater Sand Plover (5022) and Lesser Sand Plover (3706) at Nijhum Dwip during a boat survey in December, 1999 (Islam, 2000a). Largest plover flock size was 45000 Kentish Plover (in south eastern part of Damar Char during 22 October 2000) and a total of 79500 birds were recorded. The second largest count was of Little Ringed Plover and comprised 20400 birds (Islam, 2001b). In that survey, the regional total count of Kentish Plover, Little Ringed Plover, Lesser Sand Plover, Greater Sand Plover and Pacific Golden Plover were 105688, 43248, 2981, 1835 and 2173 birds respectively.

Pied Avocet

One Pied Avocet was observed when foraging in Boyer Char and another at Thhuar Char. During early winter 2000, one Pied Avocet was also recorded in Damar Char (Islam, 2001b).

Whimbrel

The good coverage at all eight sites has shown that this species is widely distributed in the southern coastal area. Counts at each site varied between 5 and 118 birds, with a total count of 479. The highest count was recorded at Nangulia Char (118 birds), although year round disturbance by fishing trawlers and passenger boats occurs here. Damar Char and Bandar Tila of Nijhum Dwip are very important sites for Whimbrel. During southward migration in 2000, the count of 885 at Damar Char represented 51.4 % of the total Whimrel count (Islam, 2001b). A further 266 Whimbrel were also counted at Nijhum Dwip during the 1999 mid winter count (Islam, 2000a).

Eurasian Curlew

Eurasian Curlew were found in all eight sites and counts varied from 4 to 35 birds (total = 141). The largest count was at Shahparir Dwip (24.8 %). At Sonadia Island (25 birds - 17.7 % of the total) and Thhuar Char (23 birds - 16.3 %of the total) also represented a large proportion of the total count.
One hundred and twenty-five Eurasian Curlew were also recorded at Damar Char during the 2000 mid winter count (Islam, 2001b).

Godwit species

The total count of Black-tailed Godwit and Bar-tailed Godwit were 1207 and 359 birds respectively. There was wide variation among sites: 30 - 382 for Black-tailed Godwit and 10 - 178 for Bar-tailed Godwit (Table 1). Black-tailed Godwits were found at seven of the eight sites, whereas Bar-tailed Godwit occurred at five sites. A large number of Black-tailed Godwits were also counted at Bandar Tila (2503 birds - 51.9 %) and Damar Char (1560 - 32.4 %) during early winter shorebird counts in 2000 (Islam, 2001b).

Sandpiper species

Sandpipers are of the most common shorebird species-group found in Bangladesh. A total of 3347 birds of six sandpiper species were found during the survey (8.0 % of the total birds). The species varied in abundance, with 111 Curlew Sandpiper at four sites being the most widespread. Wood Sandpiper was the least abundant with only 40 birds at two sites. The highest count was of 330 Common sandpiper at Shahparir Dwip (Table 1).

Stint species

Third most common species was Little Stint and it occurred at all sites. The total count of the two Stint species was 4879 birds and they represented 11.7 % of the total species count. Total count of Little Stint varied between 138 at Charbata and 1130 at Nangulia Char.

Lapwing

Three species of Lapwing were found during the survey, but the total count was very small. The count of seven Red-wattled Lapwings at Nangulia Char was the highest individual count.

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SHOREBIRD NUMBERS IN THE YANCHENG NATIONAL NATURE RESERVE DURING THE 2001 NORTHWARD MIGRATION

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ABSTRACT

A shorebird count of part of the intertidal areas and saltworks within the Yancheng National Nature Reserve was conducted from 22 April to 3 May 2001. A total of 111 285 shorebirds of 39 species were counted and the ten most common species in order of abundance were Dunlin, Red-necked Stint, Marsh Sandpiper, Grey Plover, Spotted Redshank, Sharp-tailed Sandpiper, Bar-tailed Godwit, Lesser Sand Plover, Black-tailed Godwit and Asian Dowitcher. Yancheng holds the highest number (24) of internationally important species at any site surveyed in the Yellow Sea and ten were present in internationally important numbers during this survey. The numbers of Spotted Redshank, Marsh Sandpiper, Red-necked Stint, Sharp-tailed Sandpiper, Dunlin and Black-winged Stilt recorded were the highest that have been counted at any Yellow Sea site. It is believed that the Reserve, including the offshore island of Dongsha, could support more than 350 000 shorebirds during northward migration. The large numbers of shorebirds using the Reserve, combined with the high species diversity and numbers of internationally important species, confirm that the region is an extremely important staging area within the East Asian-Australasian Flyway.

STUDY AREA

The Yancheng National Nature Reserve (NNR) is located in Jiangsu Province and lies between 32º 20'/34º 37' N and 119º 29'/120º 56' E. It is about 300 km long, has a maximum land width of about 25 km and extends seawards to the 3 m isobath. This makes it the largest coastal reserve in China. The actual coastline length is approximately 580 km and the Reserve has a total area of 453 000 ha (Fig. 1). The alluvial deposits in the northern part of the Reserve were supplied historically by the Huang He (Yellow River), when it flowed into the sea in this region, whilst those in the south came from the Chang Jiang (Yangtze River) before it formed an estuary further to the south. The intertidal flats south of Sheyang He are accreting at a rate of about 900 ha.y^{-1}, due to inflow of sediments from the Chang Jiang, but erosion is occurring north of this point. There are numerous offshore shoals and a large island (Dongsha) off the southern coast of the Reserve. Approximately 90 000 people live in the reserve (Yancheng NNR unpubl. data).

The reserve consists of a complex of permanent, fresh to brackish ponds and marshes, wet grasslands, extensive reed beds and intertidal flats intersected by numerous channels and creeks (Scott 1989). It contains extensive areas of mariculture ponds (fish, shrimp and shellfish) and three large saltworks. The coastal area is flat and low lying, ranging from 0 to 4 m in height, and the intertidal mud flats vary from about 1-15 km in width (Yancheng NNR unpubl. data). A number of large rivers and drainage canals flow through the reserve. The maximum tidal range is about 3.5 m.

Very large numbers of shorebirds occur in the reserve during the migration and non-breeding periods. Consequently, Yancheng NNR is one of the best surveyed coastal regions in mainland China. Counts within the reserve from 1990 to 1996 have been summarised in Wang (1997) and of Dongsha, the offshore island, from 1993 to 1997 in Wang & Barter (1998). No complete surveys of the reserve have been completed due to its large size. Most counts have concentrated on the three saltworks and their environs, the reserve core area and Dongsha. Thus, most of the intertidal flat area has not been counted.

These partial counts have resulted in maximum counts of 62 000 shorebirds on northward migration, 82 000 on southward migration and 27 000 during the non-breeding season (Wang 1997). Incomplete counts on Dongsha gave maximum counts of 73 000 on northward migration, 244 000 on southward migration and 6 000 during the non-breeding season (Wang & Barter 1998). On the basis of these data, it has been concluded that more than 80 000 shorebirds pass through the mainland portion of the reserve during each of the migration periods (Wang 1997). As well, we estimate that over 100 000 shorebirds use Dongsha on northward migration and in excess of 300 000 during southward migration (Wang & Barter 1998).

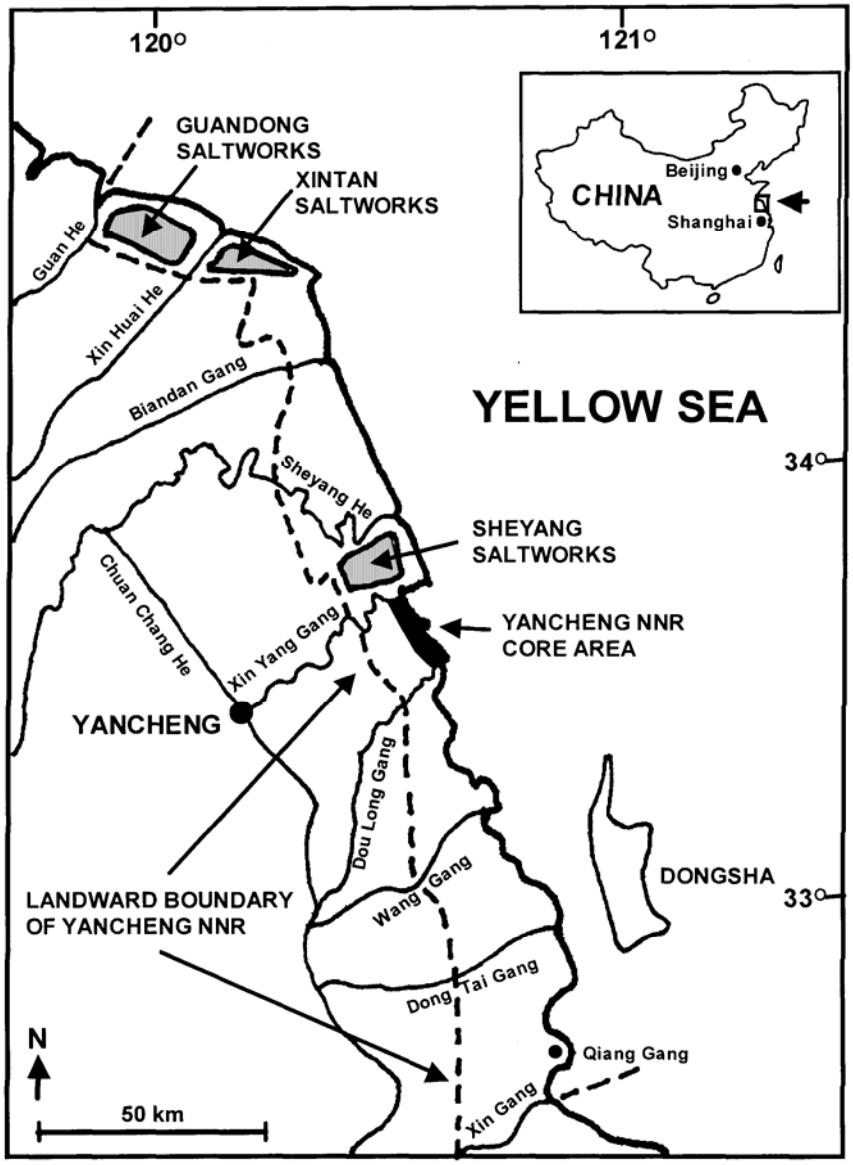

Figure 1. Location of the Yancheng National Nature Reserve in eastern China.

Twenty four species have been recorded as being present in internationally important numbers within the reserve and on Dongsha. These are Black-tailed Godwit, Eurasian Curlew, Eastern Curlew, Spotted Redshank, Marsh Sandpiper, Common Greenshank, Spotted Greenshank, Ruddy Turnstone, Asian Dowitcher, Red Knot, Sanderling, Red-necked Stint, Sharp-tailed Sandpiper, Dunlin, Broad-billed Sandpiper, Red-necked Phalarope, Eurasian Oystercatcher, Black-winged Stilt, Pied Avocet, Grey-headed Lapwing, Little Ringed Plover, Kentish Plover, Lesser Sand Plover and Oriental Plover (Wang 1997, Wang & Barter 1998). Eurasian Oystercatcher, Grey-headed Lapwing, Black-winged Stilt, Kentish Plover, Common Redshank and Oriental Pratincole breed within the reserve (pers. obs.).

Yancheng NNR also supports large numbers of cranes (including more than 1 000 Red-crowned Cranes representing >40% of the world population) and in excess of 500 000 waterfowl during the non-breeding season (Yancheng NNR unpubl. data., Perennou *et al.* 1994). More than 1 000 of the globally threatened Saunders' Gull *Larus saundersi* also breed within the reserve (G. Carey in litt.).

The importance of the reserve for migratory waterbirds is acknowledged by its membership of both the East Asian-Australasian Shorebird Site Network and the North East Asia Crane Reserve Network, which have both been established under the Asia Pacific Migratory Waterbird Conservation Strategy (Anon. 1996).

METHODS

The aim of the survey was to cover as much of the reserve as possible within the two week period that was available. The large size of the reserve meant that it would be impossible to survey all potentially suitable shorebird habitats. Therefore, counting activities were prioritized to concentrate on those areas previously identified as containing large numbers of shorebirds (Wang & Liu 1994, pers. obs.).

It had been hoped to survey the intertidal flats along the whole reserve coastline, but a rainy period made it impossible to gain access to the section between Xintan Saltworks and Sheyang He at the allocated time. Complete coverage of Guandong and Xintan Saltworks was found to be impractical in the time available.

The area surveyed included (Fig. 1):

a. Intertidal flats -
   - southwards from the Reserve core area (between Dou Long Gang and Qiang Gang),
   - in the Xin Yang Gang estuary,
   - off the Sheyang Saltworks and, to a lesser extent, off the Guandong and Xintan Saltworks,
b. the three saltworks (Guandong, Xintan and Sheyang),
c. the lake in the core area close to the Management Station.

It is estimated that about 25% of each of Guandong and Xintan Saltworks was covered and most of Sheyang Saltworks. The lake in the core area was counted on two occasions.

Counting was conducted on eleven days between 22 April and 3 May 2001, normally by a team of three. The count has been split into nine sections A to I, from north to south, although logistical considerations meant that the sections were not counted in this order (Fig. 2). Vehicle access, mostly using mud tracks, was generally good although, as mentioned above, one section was inaccessible due to rain-affected tracks. A boat was used to gain access to the Xin Yang Gang estuary.

The times of high and low tides at Xin Yang Gang (central part of coastline) during the count period are shown in Figure 3. High tide times were 1-2 hours earlier in the north of the reserve and 1½ -3 hours later in the south. Censusing shorebirds in the intertidal areas could only be carried out around the high tide. This placed a severe limitation on the effectiveness of the counts conducted in the south of the reserve. In this region, the mudflat width, length of coastline and time available meant that significant portions of the coastline were incompletely surveyed. Attempts were made to concentrate on areas either known to carry, or potentially capable of supporting, large numbers of shorebirds.

Visits were made to the intertidal flats in front of Guandong and Xintan Saltworks during the mid- to low tide period when 500 m to 1 km of shore was uncovered. This eroding shore has a maximum width of about 2 km at low tide. Although an estimated total shoreline length of about 8 km was surveyed, less than 300 shorebirds were counted. It seems that this part of the coast is unattractive to shorebirds, even though the adjacent saltworks held large numbers of birds. In contrast, the wider mudflats in front of Sheyang Saltworks supported many shorebirds. When counting this latter section, birds found roosting at high tide in the ponds closest to the shore were included in the count of the intertidal area.

Counting of Guandong and Xintan Saltworks was greatly assisted by the presence of 5 m high salt mounds, From the top of these we were able to survey for a distance of about 1 km in a 360° circle. It was estimated at the time, from observations of bird movements, that we probably counted about 70% of the shorebirds within the circle being surveyed. Those birds feeding behind pond bunds were missed unless they flew while the count was in progress. The survey process involved driving along tracks within the saltworks and counting from salt mounds that were approximately 1½ to 2

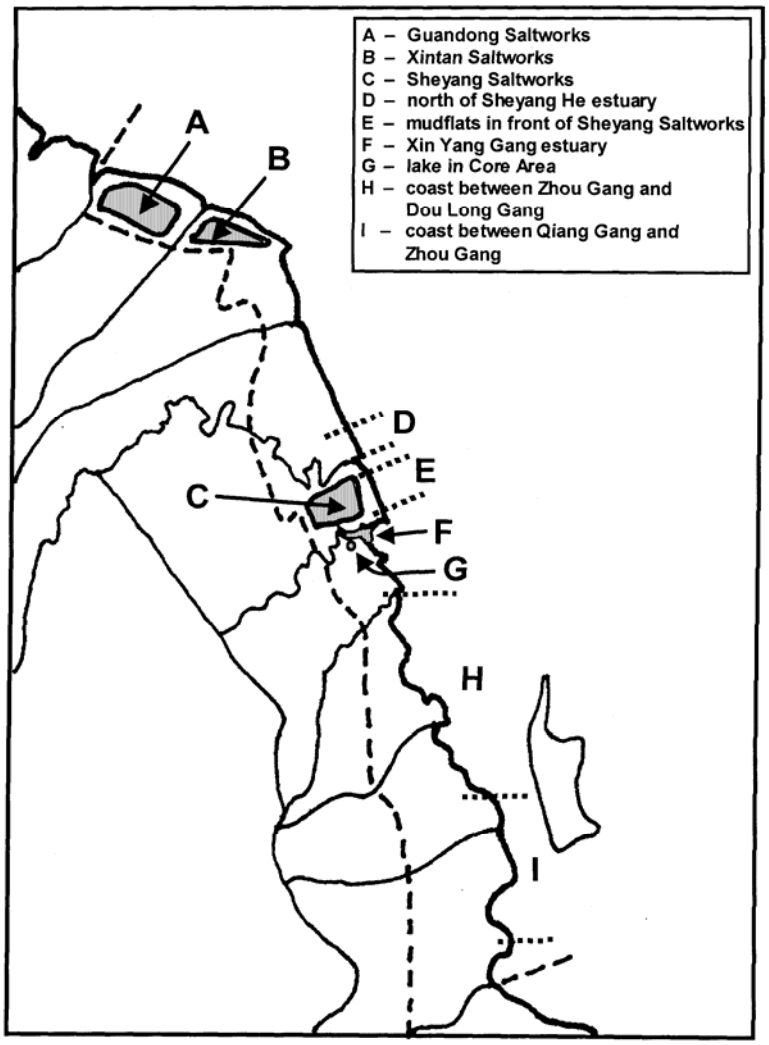

Figure 2. Locations of count sections within the Yancheng National Nature Reserve.

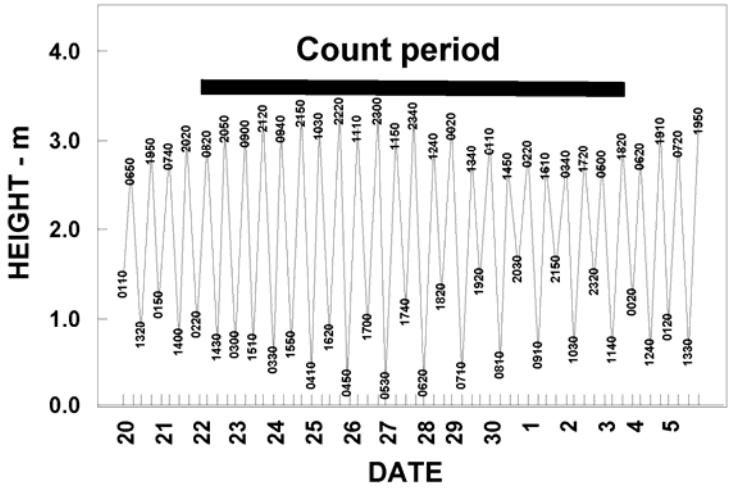

Figure 3. Heights and times of tides between 20 April and 5 May 2001 at Xin Yang Gang (33° 38’ N 120° 35’ E).

km apart. Care was taken to avoid double counting and it is unlikely that significant duplication occurred. Shorebird distribution was quite uniform at these two saltworks. There were no salt mounds at Sheyang Saltworks and counts were made from ground level. Birds were not uniformly distributed, but most occurred in large concentrations at a few locations and could be easily counted.

Weather conditions were satisfactory while counting was taking place. The general accuracy of counts is believed to be reasonable, although no check counts were carried out. Any errors would tend to lead to under-estimation of shorebird numbers. Appropriate corrections were made to counts when birds moved between adjacent sections.

The "1% of estimated flyway population" criterion from (Bamford & Watkins in prep.) was used to determine whether a species was present in internationally significant numbers.

RESULTS

Count data for individual species are listed by section in Table 1.

Numbers and general distribution

A total of 111 285 shorebirds of 39 species was counted during the survey. This number included 12 584 unidentified shorebirds (11% of the total count). Large numbers occurred in Guandong (section A – Figure 2) and Xintan (B) Saltworks and in each of the three major coastal sections counted (E, H and I).

Individual species numbers and distribution

The ten most common species counted were Dunlin (57 867 individuals – 58.6% of identified birds), Red-necked Stint (10 073 – 10.2%), Marsh Sandpiper (9 026 – 9.1%), Grey Plover (5 295 – 5.4%), Spotted Redshank (3 834 – 3.9%), Sharp-tailed Sandpiper (3 125 – 3.2%), Bar-tailed Godwit (2 984 – 3.0%), Lesser Sand Plover (1 264 - 1.3%), Black-tailed Godwit (1 097 – 1.1%) and Asian Dowitcher (945 – 1.0%). These ten species represented 96.8% of the identified shorebirds.

Ten species of shorebird were present in internationally important numbers. These included Spotted Redshank, Marsh Sandpiper, Common Greenshank, Asian Dowitcher, Red-necked Stint, Sharp-tailed Sandpiper, Dunlin, Black-winged Stilt, Grey Plover and Lesser Sand Plover. A more complete coverage of the northern saltworks and southern intertidal areas would almost certainly have resulted in additional species meeting the 1% criterion.

The survey identified the largest numbers of Spotted Redshank, Marsh Sandpiper, Red-necked Stint, Sharp-tailed Sandpiper and Dunlin yet recorded during northward migration at any Yellow Sea site (Barter in prep.).

DISCUSSION

One of the most noteworthy features of the 2001 survey is that the numbers of Spotted Redshank, Marsh Sandpiper, Red-necked Stint, Sharp-tailed Sandpiper, Dunlin and Black-winged Stilt counted were the highest recorded at any Yellow Sea site to date (Barter in prep.). Within the Yellow Sea, all these species, with the exception of Dunlin, are virtually confined to the Chinese coast. It has been suggested that these species may migrate on a broad front with significant proportions of their populations using inland migration routes and that only the most easterly part of these reaching the Yellow Sea coast (Barter in prep.).

Numbers of Asian Dowitcher were also close to the highest recorded in the region. Yet, common species that were only present in the reserve in small numbers included Bar-tailed Godwit, Whimbrel, Eurasian and Eastern Curlews, Great and Red Knots, Curlew Sandpiper and Kentish Plover. It seems likely that most Eurasian Curlew, Eastern Curlew and Kentish Plover had already passed through the region. Counts of the Huang He delta (400 km to the north west) have shown that these species pass through the delta during April, with relatively few birds occurring in May (Zhu *et al.* 2001).

Bar-tailed Godwit and Great Knot have not been found in large numbers during previous northward migration counts in the Yancheng NNR or on Dongsha. This is despite Red Knot having been recorded in internationally important concentrations in both the reserve (n = 3 169) and on Dongsha (n = 8 140) (Wang 1997, Wang & Barter 1998). However, during northward migration

Table 1. The number of shorebirds counted in each section (see Fig. 2) of the Yancheng National Nature Reserve from 22 April to 3 May 2001. *%* = the species count as a fraction of the total number of birds identified. *Int. Imp.* identifies those species that meet the accepted criteria of 1% of their Flyway population; *Crit.* = the 1% portion of the estimated species flyway population that determines site international importance.

	SECTION										%	Int.	1%
Species	A	B	C	D	E	F	G	H	I	TOTAL		Imp.	Crit.
Common Snipe *Gallinago gallinago*	-	-	-	-	-	-	2	-	-	2	<0.1		
Snipe sp.	-	-	-	-	-	3	21	-	-	24	<0.1		
Black-tailed Godwit *Limosa limosa*	61	-	900	-	-	-	120	16	-	1 097	1.1		
Bar-tailed Godwit *Limosa lapponica*	13	-	170	-	538	217	1	1 725	320	2 984	3.0		
Little Curlew *Numenius minutus*	-	-	-	-	-	-	10	-	-	10	<0.1		
Whimbrel *Numenius phaeopus*	9	-	3	3	9	9	11	24	53	121	0.1		
Eurasian Curlew *Numenius arquata*	3	-	-	2	31	4	-	7	-	47	<0.1		
Eastern Curlew *Numenius madagascariensis*	1	-	-	7	53	29	-	16	-	106	0.1		
Curlew sp.	-	-	-	-	17	-	1	11	3	32	<0.1		
Spotted Redshank *Tringa erythropus*	223	3 078	135	2	12	27	180	177	-	3 834	3.9	X	400
Common Redshank *Tringa totanus*	23	11	42	-	28	28	16	3	70	221	0.2		
Marsh Sandpiper *Tringa stagnatilis*	4 990	645	985	125	5	5	414	29	1 828	9 026	9.1	X	900
Common Greenshank *Tringa nebularia*	68	34	109	29	9	34	9	14	292	598	0.6	X	550
Green Sandpiper *Tringa ochropus*	-	-	-	-	-	-	2	-	-	2	<0.1		
Wood Sandpiper *Tringa glareola*	31	-	8	-	-	-	7	1	-	47	<0.1		
Terek Sandpiper *Xenus cinereus*	-	1	1	-	2	145	3	2	23	177	0.2		
Common Sandpiper *Actitis hypoleucos*	1	6	-	-	-	28	17	6	-	58	0.1		
Grey-tailed Tattler *Heteroscelus brevipes*	-	-	-	-	-	-	-	-	2	2	<0.1		
Ruddy Turnstone *Arenaria interpres*	3	3	10	1	-	-	-	1	6	24	<0.1		
Asian Dowitcher *Limnodromus semipalmatus*	6	-	97	-	-	-	-	840	2	945	1.0	X	230
Great Knot *Calidris tenuirostris*	-	-	-	-	55	-	-	-	-	55	0.1		
Red Knot *Calidris canutus*	-	-	-	-	1	1	-	-	-	2	<0.1		
Sanderling *Calidris alba*	-	-	-	-	-	5	-	-	-	5	<0.1		
Red-necked Stint *Calidris ruficollis*	5 848	2 014	430	40	3	350	58	310	1 020	10 073	10.2	X	3 150
Temminck's Stint *Calidris temminckii*	-	3	-	-	-	-	4	-	-	7	<0.1		
Long-toed Stint *Calidris subminuta*	-	13	2	-	-	-	5	-	-	20	<0.1		
Sharp-tailed Sandpiper *Calidris acuminata*	317	279	240	180	8	280	24	1 611	186	3 125	3.2	X	1 600
Dunlin *Calidris alpina*	1 944	3 604	1 409	310	9 660	670	-	8 270	32 000	57 867	58.6	X	9 500
Curlew Sandpiper *Calidris ferruginea*	43	5	14	-	-	-	15	6	701	784	0.8		
Broad-billed Sandpiper *Limicola falcinellus*	-	-	2	-	-	-	1	-	3	6	<0.1		
Eurasian Oystercatcher *Haematopus ostralegus*	-	-	-	3	6	-	2	18	29	<0.1			
Black-winged Stilt *Himantopus himantopus*	300	3	-	-	-	-	21	158	-	482	0.5	X	200
Pied Avocet *Recurvirostra avosetta*	-	-	17	-	-	-	-	-	-	17	<0.1		
Grey-headed Lapwing *Vanellus cinereus*	-	-	-	-	-	-	4	5	-	9	<0.1		
Pacific Golden Plover *Pluvialis fulva*	-	-	2	-	-	-	2	-	-	4	<0.1		
Little Ringed Plover *Charadrius dubius*	-	-	-	-	-	-	5	-	-	5	<0.1		
Grey Plover *Pluvialis squatarola*	86	25	116	1	3 352	128	-	947	640	5 295	5.4	X	1 250
Kentish Plover *Charadrius alexandrinus*	92	22	67	-	-	-	7	-	81	269	0.3		
Lesser Sand Plover *Charadrius mongolus*	-	-	212	-	71	-	1	530	450	1 264	1.3	X	600
Greater Sand Plover *Charadrius leschenaultii*	-	-	5	-	1	-	-	-	-	6	<0.1		
Oriental Pratincole *Glareola maldivarum*	-	-		-	-	-	20	-	-	20	<0.1		
Unidentified shorebirds	290	135	120	-	-	624	65	6 540	4 810	12 584			
TOTALS	14 352	9 881	5 096	700	13 858	2 593	1 046	21 251	42 508	111 285			

large numbers of Great Knot have been recorded in the Chang Jiang estuary, 150 km to the south of Yancheng NNR, and in the Huang He delta. Bar-tailed Godwits are common at Huang He and Red Knot is numerous further north on the Tianjin Municipality coast (Barter *in prep*.). As there is extensive suitable habitat for these three species in the southern part of the reserve, improved coverage in this region may find significant numbers of all three. Whimbrel also occurs in large numbers in the Huang He delta and in the Chang Jiang estuary and so may also have been under-counted.

Curlew Sandpipers are notable for their general absence from Yellow Sea coastal areas, apart from those in Tianjin Municipality. The small number seen in Yancheng on this and previous counts supports the view that this species mainly migrates through inland China.

The largest numbers of Terek and Common Sandpipers were recorded on the banks of Xin Yang Gang whilst travelling to the estuary by boat. It is likely that other rivers and canals hold concentrations of both these species and that their numbers have been greatly underestimated.

It is useful to make an estimate of the total numbers of shorebirds that may pass through the reserve on northward migration. As previously noted, survey coverage of the reserve was incomplete in the 2001 count. In particular:

a. only about 25% of each of the Guandong and Xintan Saltworks was surveyed,
b. the coastline between Xintan Saltworks and just north of the Sheyang He mouth was not visited, and
c. there was incomplete coverage of the intertidal areas south of Dou Long Gang.

If it is assumed that the shorebird counts at the two northern saltworks were representative, that 70% of the birds present were counted (see Methods above) and that birds were evenly distributed throughout the saltworks, it can be estimated that these two saltworks perhaps held 140 000 birds between them.

It seems unlikely that the relatively narrow mudflats of the coastline immediately south of Xintan Saltworks will hold large numbers of shorebirds, as it is suffering from erosion in a similar manner to the intertidal area offshore from the two northern saltworks that supported very few birds.

In contrast, the wide intertidal zone in the southernmost part of the reserve is benefiting from accretion and supports very large numbers of shorebirds. It is difficult to estimate the proportion of birds present that was counted but, this may be less than 50 %. Additionally, Dongsha, the offshore island, which has been shown to support large numbers of shorebirds (73 000) on northward migration (Wang & Barter 1998), was not counted in 2001. Thus, it is possible that the whole region south of Dou Long Gang could have been supporting in excess of 200 000 birds at the time of the count.

Therefore, the Yancheng NNR and the island of Dongsha may have contained more than 350 000 shorebirds at the time of the 2001 count. The total number of birds using the reserve during the whole northward migration period can be expected to be considerably higher than this when allowances are made for species which migrate early and for the "turnover" of migrating birds.

The data from this and previous surveys show that the coastal wetlands of the reserve and Dongsha support internationally important numbers of 19 shorebird species on northward migration. The number of internationally important species increases to 24 when the southward migration and non-breeding periods are also taken into account. The region holds the highest number of internationally important species of any site surveyed to date in the Yellow Sea. The large numbers of shorebirds using the reserve, combined with the high species diversity and numbers of internationally important species, confirm that the region is one of outstanding importance as a staging area within the East Asian-Australasian Flyway.

It is very important that survey coverage be improved so that satisfactory estimates can be made of total and individual species numbers passing annually through the reserve and Dongsha. This will be a major task because of the size of the reserve and the inaccessibility of the southern intertidal areas and Dongsha. However, the great importance of the reserve for shorebirds makes it important to achieve this objective.

There are another five saltworks (namely Guanxi, Xu Wei, Tai Nan, Tai Bei and Qing Kou) located to the north west of Guandong Saltworks and outside the reserve boundary. These have a total estimated area of approximately 500 km^2, compared to the

combined area of about 300 km^2 for Guandong and Xintan Saltworks. If it is assumed that the shorebird density at the five uncounted saltworks is similar to that at Guandong and Xintan, then it can be estimated that they could be supporting about 250 000 shorebirds during the count period. It is obviously important to survey these saltworks to establish how important they are for shorebirds.

Past reclamation of intertidal areas for port and industrial development, roads, saltpans and mariculture has been extensive and is continuing at a rapid rate (pers. obs.). It is highly desirable that all levels of government as well as local industry be advised of the importance of the region for shorebirds. They need to plan activities and developments to minimise habitat loss and disturbance to birds.

Local communities should also be made aware of the significance of the area through education programmes. This activity is particularly important because of the extent to which reserve inhabitants utilise wetland resources.

Fishing activities may be having a serious impact on shorebirds. Direct human disturbance of shorebirds on the mud flats occurs along the whole coastline and could be adversely affecting food intake rates at a crucial time when birds are preparing for their final flights into the breeding grounds (pers. obs.). The harvesting of large quantities of shellfish could affect the availability of food for shorebirds either by the direct removal of prey or by severe disturbance of sediments affecting shellfish productivity. A study of the fishing industry, its socio-economic importance to coastal communities and its effects on shorebirds is desirable.

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CHONGMING ISLAND: A LESS IMPORTANT SHOREBIRD STOPOVER SITE DURING SOUTHWARD MIGRATION ?

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ABSTRACT
Shorebirds were counted on the eastern intertidal areas of Chongming Island during the 2001 southward migration. Though the dominant species were similar to those present during northward migration, the total number of shorebirds was only about 10% of that recorded during the earlier period. This result indicates that the region is less important as a stopover site for shorebirds during southward migration. We consider that this is related to the geographical position of Chongming Island and the differing migration strategies of shorebirds on southward migration.

INTRODUCTION

Chongming Island is the third largest island in China and the largest alluvial island in the world. Many investigations have been carried out at Chongming Island since the 1980s. These studies showed that the intertidal areas are internationally important for shorebirds (Wang & Qian 1988, Huang *et al*. 1993, Chen *et al*. 1997, Barter *et al*. 1997a). The region can act as an important staging area for less fit birds and birds during poor weather conditions (Chen *et al*. 1997, Barter *et al*. 1997b). However, whilst much work has been conducted during northward migration, less has been carried out during southward passage. Studies in the Yangtze River estuary and at Hangzhou Bay showed that during southward migration there are fewer migrants and a longer migration period compared to northward migration (Wang & Qian 1988). In order to find out more about shorebirds on Chongming Island during southward passage, we carried out a field investigation during the 2001 southward migration.

METHODS

The characteristics of the eastern intertidal areas of Chongming Island (31°25′ ~31°38′ N, 121°50′~122°05′ E) have been described in Ma *et al.* (this issue). The study area was the same as that covered previously (Ma *et al*. this issue), that is the four regions in Dong Wang Sha (Bai Gang Canal, Bu Yu Gang South, Bu Yu Gang North and Dong Wang Sha East) as described in Barter *et al*. (1997a).

From August to October 2001, we counted shorebirds five times. However, only Bu Yu Gang South was surveyed between 27-30 August. The intertidal area has been reduced rapidly in recent years due to intensive reclamation. Currently, the main intertidal area is located in the Dong Wang Sha region where the majority of shorebirds are found (Ma *et al*. this issue).

During spring high tides, the intertidal areas were almost completely covered, with shorebirds concentrating on islands or in areas of shallow water about 100 m from the sea wall. We counted these birds by telescope from the wall. During neap tides and at spring low tide periods we counted by walking on the mudflats. For analytical purposes we added together the maximum numbers recorded of each species in the four areas counted.

RESULTS

A total of 3 175 shorebirds of 24 species were recorded during southward migration (Table 1). Kentish Plover, Dunlin and Great Knot were the dominant species comprising about 50% of the total number of shorebirds seen. Species numbers and abundance were similar during the whole southward migration period, except for the first survey on 27-30 August (which only covered Bu Yu Gang South region).

DISCUSSION

Compared with the 2001 northward migration period, the dominant species were similar but their numbers were much lower. During northward migration, about 10 000 shorebirds were recorded on each count (Ma *et al*. this issue). Whereas during southward migration, the total number recorded was less than 1 000. This result indicates that the Chongming Island intertidal areas are less important for shorebirds during southward migration.

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Table 1. Numbers of shorebirds in the eastern intertidal areas of Chongming Island during southward migration. The count on 27-30 Aug. included only Bu Yu Gang South. Species are ordered in decreasing abundance.

SPECIES	27-30 Aug.	11-13 Sept.	17-19 Sept.	26-28 Sept.	15-18 Oct.	Total	%
Kentish Plover *Charadrius alexandrinus*	68	72	155	148	185	628	19.78
Dunlin *Calidris alpina*	28	72	85	16	311	512	16.13
Great Knot *Calidris tenuirostris*	-	102	160	125	18	405	12.76
Red-necked Stint *Calidris ruficollis*	-	69	70	93	52	284	8.94
Black-tailed Godwit *Limosa limosa*	8	17	45	110	4	184	5.80
Common Greenshank *Tringa nebularia*	5	74	31	18	28	156	4.91
Sharp-tailed Sandpiper *Calidris acuminata*	22	42	35	52	-	151	4.76
Broad-billed Sandpiper *Limicola falcinellus*	8	59	29	32	21	149	4.69
Eurasian Curlew *Numenius arquata*	1	36	25	14	40	116	3.65
Terek Sandpiper *Xenus cinereus*	18	15	38	35	-	106	3.34
Eastern Curlew *Numenius madagascariensis*	1	21	16	18	46	102	3.21
Bar-tailed Godwit *Limosa lapponica*	9	10	35	33	14	101	3.18
Curlew Sandpiper *Calidris ferruginea*	-	-	32	48	-	80	2.52
Whimbrel *Numenius phaeopus*	2	15	27	17	5	66	2.08
Sand Plover sp. *C. mongolus/leschenaultii*	10	8	20	6	-	44	1.39
Common Sandpiper *Actitis hypoleucos*	7	5	5	3	8	28	0.88
Common Redshank *Totanus totanus*	-	3	5	11	9	28	0.88
Wood Sandpiper *Tringa glareola*	-	-	5	3	-	8	0.25
Snipe sp. *Gallinago sp.*	-	-	2	1	5	8	0.25
Green Sandpiper *Tringa ochropus*	-	6	-	-	1	7	0.22
Grey Plover *Pluvialis squatarola*	1	-	-	1	2	4	0.13
Little Curlew *Numenius minutus*	-	1	2	-	-	3	0.09
Marsh Sandpiper *Tringa stagnatills*	-	3	-	-	-	3	0.09
Spotted Redshank *Tringa erythropus*	-	1	-	-	-	1	0.03
Spotted Greenshank *Tringa guttifer*	-	-	-	-	1	1	0.03
Total number	188	631	822	784	750	3 175	
Species	14	20	20	20	16	24	

Wang & Qian (1988) found a similar result in their investigation in the Yangtze River estuary and Hangzhou Bay. They found the ratio of shorebird numbers during northward and southward migration was 1.37:1, compared to about 10:1 in this investigation.

The great difference between numbers during northward and southward migration is very interesting. Wang & Qian (1988) suggested that during spring, migrants travel northward along the Chinese coastline. Upon reaching the Yangtze River estuary and surrounding regions, they separate into two groups. One group continues northward to Jiangsu and Shandong, and then on to the breeding grounds in Russia. The other group appears to fly northeastwards to Korea and Japan. On southward passage, the migration flyway from the breeding grounds to non-breeding areas is diffuse. Birds are passing through the whole of China and not just along the coast. Consequently, lower numbers of migrants are recorded on Chongming Island and in the surrounding regions during this period.

However, following his observation that large numbers of shorebirds had already arrived in Australia by the middle of September, Y. Gao (pers. comm.) made the alternative suggestion that the smaller numbers are due to migrants passing through Chongming Island and surrounding regions quickly on southward migration. Gao also has not found large concentrations further south in Guangdong Province on southward migration (Gao 1991).

Counts of the Yancheng coast showed that there is no significant difference between the numbers of shorebirds during northward and southward migration (Barter *in press*). Surveys at Dong Sha even showed that the number of shorebirds during northward migration might be lower than during southward migration (Wang & Barter 1998). Thus, it seems difficult to justify the explanation that the difference in numbers during northward and southward migration at Chongming Island is due to different migration strategies.

We consider that the lower number of shorebirds at Chongming Island during southward migration is related to its geographical position. Chongming Island is believed to lie in the first important stopover region for some shorebirds on northward migration from their non-breeding grounds in Australia (Great and Red Knots, Eastern Curlew

and Bar-tailed Godwit). These species concentrate at sites such as Chongming Island during northward migration as they need to feed after the long flight of several thousands of kilometres from the non-breeding areas. In contrast, on southward migration shorebirds come first to good stopover sites to the north of Chongming Island, such as the Yellow River delta, Yancheng coast and the west coast of the Korean peninsular that have abundant food supplies for shorebirds. It is suggested that some birds fly non-stop to Australia from these sites, with few needing to stop at Chongming Island. It has also been suggested that some species (e.g. Great Knot and Bar-tailed Godwit) mostly bypass the Yellow Sea region during southward migration and fly non-stop to Australia from more northerly staging areas, such as the Sea of Okhotsk (M. Barter pers. comm.).

Studies in the Yangtze River estuary and Hangzhou Bay (Wang & Qian 1988) showed that the duration of northward migration was about 40 days shorter than for southward migration. They found northward migration occurs from the last week of March to the first week in May (about 50 days). Whereas, southward migration lasted from the middle August to the first week of November (about 90 days). In contrast, we found the difference between the migration periods to be shorter at Chongming Island. We recorded large flocks of shorebirds (such as Dunlin, 3 220; Kentish Plover, 7 880) during our counts from 12-16 March, 2001 (Ma *et al*. this issue) and only a few birds were recorded in the first week of November. We consider that the durations of the northward and southward migration periods at Chongming Island are about 60 and 80 days, respectively.

The intertidal area at Chongming Island has decreased significantly in recent years due to intensive reclamation. The width of the intertidal zone has decreased from 13 km in 1990 to about 4 km. This can be expected to have a serious effect on shorebirds, as intertidal areas are their main feeding habitat. According to our estimates, the number of shorebirds using Chongming Island during the migration periods has declined from about one million in the early 1990s (Huang *et al*. 1993) to about 200 000 birds.

In May 2001, we found people planting *Spartina anglica* in the Bu Yu Gang region to protect the sea wall and promote rapid sedimentation of the intertidal areas for future reclamation. The local government supported this activity. However, *Spartina anglica* is an invasive species in China that has spread rapidly during the last ten years and is seriously affecting intertidal areas. We consider that the planting of *Spartina anglica* at Chongming Island will probably have serious effects on the shorebirds through modification of their habitats. This problem needs more study.

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SHARK BAY WADERS AND SEAGRASS: PROBINGS BY VISITORS FROM AFAR

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INTRODUCTION

Shark Bay is a large shallow marine inlet of approximately 15,000 km^2 lying at 26^o S on the west coast of Australia. It is World Heritage listed for its seagrass based marine ecosystem that supports important numbers of dugong (Bailey 1999). In mid January 2001, we visited Shark Bay as part of a sabbatical study trip looking at terrestrial mammal conservation projects. While there, we visited several coastal sites along the central peninsula and took the opportunity to counts all waders seen and note feeding habitats.

SPECIES AND COUNTS

Time constraints and the need for vehicle access meant that we only visited seven stretches of coast all within 30 km of Denham. Together these amounted to *ca* 5 km of coastline only, yet they held nearly 1100 waders of 14 species (Table 1). The commonest species were Great Knot, Red-necked Stint, Bar-tailed Godwit and Pied Oystercatcher. Six tern species were also common. If the *ad hoc* and small sample of coast we counted is typical of the region, the *ca* 1500 km coastline of Shark Bay (Bailey 1999) must hold very large numbers of wintering waders and other birds.

The waders seen used three main feeding habitats: inter-tidal flats of fine sand up to *ca* 300 m wide, beds of dead seagrass wrack and the surf-zone of exposed sandy beaches (Sanderling only). No waders were seen on coarse shell gravel or where the coast was a rocky cliff.

WRACK BEDS AS A FEEDING HABITAT

Although the use of seagrass wrack by feeding waders is presumably common in Shark Bay, and probably elsewhere in the subtropics, we had not previously seen waders using this habitat. Superficially, these beds appeared similar to the large beds of seaweed wrack that are such a feature of beaches in the Outer Hebrides, Scotland where they are important for feeding waders. However, on close examination it was apparent that there were many differences.

In both cases, the beds consist of areas of up to a hectare or more, of mainly waterlogged masses of decaying marine vegetation up to 0.5 m deep. These were left stranded by the tide on shallow-shelving beaches, often in association with sandbars and shallow pools. In the case of seaweed wrack in Scotland, the parent material is mostly brown algae such as *Laminaria* spp. and *Fucus* spp.; plants notable for their high polysaccharide (slime) content and lack of fibres. Even though daytime temperatures seldom exceed 10-15^o C in west Scotland, seaweed wrack there normally decomposes quickly, becoming unpleasantly 'smelly' and 'slimy'; often it oozes a veritable soup of coloured bacteria. Decaying seaweed wrack usually supports huge numbers of invertebrates especially small dipteran larvae and annelid worms (tens of animals < 5 mm long per handful). In turn, this provides rich opportunities for waders such as Dunlin and Ruddy Turnstone, and these commonly feed on wrack in dense flocks.

The nature of the seagrass wrack at Shark Bay was very different. The parent material was dead leaves *ca* 20 mm wide and up to 300 mm long of the seagrass *Posidonia australis*. This is a shallow water species with leaves that commonly break off due to wave action in windy weather (David Holley pers. comm.). Despite daytime temperatures over 35^{o}C, this material appeared not to be decaying quickly. It was neither 'smelly' nor 'slimy' nor in any way 'unpleasant'. On the contrary, adjectives like 'clean' and 'sterile' were more appropriate. The wrack was reminiscent of the leaf-mould that develops on the floor of damp-temperate deciduous woodlands. This is not surprising because, like those of the deciduous broad-leaved trees, the leaves of seagrass are tough and fibrous and consist mostly of cellulose. Areas of the wrack beds that were not waterlogged had a surface of tinder dry

Table 1. Waders seen at seven stretches of coast accessible by vehicle at Shark Bay, WA.

Site name	Gouler Bluff	Eagle Bluff	Little Lagoon beach	Big Lagoon	Bottle Bay	Monkey Mia	Shell Beach	
Date counted	27/01/01	24/01/01	25/01/01	26/01/01	26/01/01	24/01/01	27/01/01	TOTAL
Length of coast walked (approx.)	1 km	0.5 km	1km	0.5 km	0.5 km	1km	0.5 km	5 km
Main feeding habitat	Seagrass wrack bed	Cliffs	Intertidal sand flat	Sandy lagoon shore	Exposed sandy beach	Intertidal sand flat	Coarse shell gravel	
Bar-tailed Godwit	0	0	c100	0	0	20	0	120
Common Greenshank	1	1	6	0	0	2	0	10
Common Sandpiper	0	0	1	0	0	1	0	2
Grey-tailed Tattler	2	0	10	c4	0	2	0	18
Ruddy Turnstone	20	0	1	0	0	0	0	21
Great Knot	0	0	c300	0	0	9	0	309
Sanderling	0	0	0	0	15	0	0	15
Red-necked Stint	c250	0	c100	c10	0	30	0	390
Curlew Sandpiper	0	0	c20	0	0	0	0	20
Pied Oystercatcher	0	0	c100	0	0	10	0	110
Black-winged Stilt	0	0	2	0	0	0	0	2
Grey Plover	5	0	1	c4	0	1	0	11
Red-capped Plover	10	0	c25	0	0	0	0	35
Greater Sand Plover	10	0	15	0	0	2	0	27
Total	c298	1	c681	c18	15	77	0	1090

leaf-litter up to 20 cm deep and were not used by waders.

The commonest species feeding on the wrack beds at Shark Bay was Red-necked Stint. These stints were taking small (invisible to binoculars) items from at or close to the surface (no deep probing). The stints were quite sparsely spread on the wrack with typical nearest-neighbour distances of about 1 – 5 m. The frequent squabbles witnessed between some neighbouring birds suggest that some were defending small feeding territories. Ruddy Turnstone also fed on the wrack beds though these were 'digging' into wrack in characteristic fashion.

We spent 20 minutes carefully examining many handfuls of wrack taken from where birds were feeding. The only items found were three amphipods (probably gammerids) *ca* 5 mm long. It is likely that these are what the birds were feeding on. Our quick investigation suggests that seagrass wrack at Shark Bay is not an especially rich wader-feeding habitat, at least in comparison to the seaweed wrack used in Scotland.

CONCLUSION

Our very limited and *ad hoc* counts suggest that Shark Bay probably holds large numbers of wintering waders. An important habitat for some of these waders is wrack beds derived from the huge areas of seagrass in Shark Bay. A very quick investigation at one site suggested that the food resources for waders in seagrass wrack may be relatively poor.

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IMPORTANT WADER SITES IN THE ASIAN-AUSTRALASIAN FLYWAY: OYSTER HARBOUR AND PRINCESS ROYAL HARBOUR, ALBANY, WESTERN AUSTRALIA

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INTRODUCTION

The use of Albany's harbours by palaearctic waders was recognized as long ago as the mid-sixties (Serventy & Whittell, 1967), but counts of waders, albeit erratic at times, have been regularly carried out only since the mid-eighties with regard to Oyster Harbour particularly (Alcorn, 1987). Ken Mills caught and banded some of the smaller species with mist nets in the early 1980s, but Smith (1993), in relating how the occurrence of passage waders was influenced by the prevailing winds, also used small cannon nets to catch larger species, like Great and Red Knots.

RECENT HISTORY AND TOPOGRAPHY

The relationship of these two harbours to each other is shown in Figure 1. Both are estuarine tidal harbours in the vicinity of Albany (35° S 117° 55' E) and support some 3000 migratory waders. As annual counts of waders have been erratic, their relative abundance is shown in Table 1. They start arriving each year in September and depart during March. A few young birds overwinter in most years in the more protected waters of Oyster Harbour.

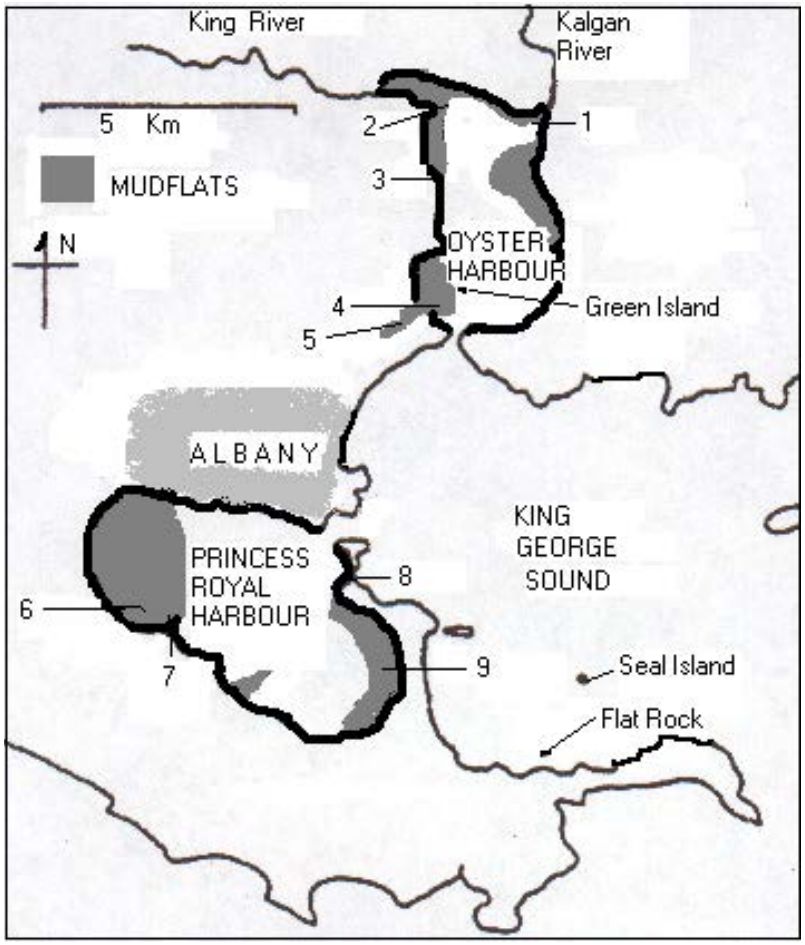

Figure 1. Map of Albany region of southern Western Australia showing the main wader feeding areas (2, 4 and 6), roost sites (1, 3, 5, 7, 8, 9). The most convenient wader viewing sites are at sites 1, 2, 4 and 7.

Table 1. The relative abundance of waders seen in both harbours at Albany, WA. This is illustrated by the following scale: 1 – 3 birds = +; 10s = ++; 50s = +++; 100s = ++++; 1000s = +++++.

Common name	Scientific name	Relative abundance
Migratory waders		
224 Bar-tailed Godwit	*Limosa lapponica*	++
226 Whimbrel	*Numenius phaeopus*	+
227 Eastern Curlew	*Numenius madagascariensis*	+
232 Common Greenshank	*Tringa nebularia*	+++
235 Terek Sandpiper	*Xenus cinereus*	+
236 Common Sandpiper	*Actitis hypoleucos*	+
237 Grey-tailed Tattler	*Heteroscelus brevipes*	++
239 Ruddy Turnstone	*Arenaria interpres*	++
241 Great Knot	*Calidris tenuirostris*	++++
242 Red Knot	*Calidris canutus*	+++
245 Red-necked Stint	*Calidris ruficollis*	+++++
250 Sharp-tailed Sandpiper	*Calidris acuminata*	++ *
252 Curlew Sandpiper	*Calidris ferruginea*	+++ *
271 Pacific Golden Plover	*Pluvialis fulva*	+++
272 Grey Plover	*Pluvialis squatarola*	++++
278 Lesser Sand Plover	*Charadrius mongolus*	++
279 Greater Sand Plover	*Charadrius leschenaultii*	+++
Resident waders		
266 Pied Oystercatcher	*Haematopus longirostris*	+++
267 Sooty Oystercatcher	*Haematopus fuliginosus*	++
269 Banded Stilt	*Cladorhynchus leucocephalus*	+++ #
270 Red-necked Avocet	*Recurvirostra novaehollandiae*	++ #
276 Red-capped Plover	*Charadrius ruficapillus*	+++

* Generally arrive late (in December) as lakes further north dry up.

\# Not consistently seen every year.

Limited recaptures of banded birds suggest these young birds are displaced to Princess Royal Harbour by the arrival of breeding flocks in September. Although each harbour seems to support distinct flocks of birds, there is some mingling of the two groups at high tides.

THREATS

Two rivers flow into north Oyster Harbour, the King River with a restricted catchment and the Kalgan River that rises some 80 km to the north. One creek, but no rivers, flows into southeast Princess Royal Harbour. Both harbours open into King George Sound. Effluent from a superphosphate factory draining into the northwest corner of Princess Royal Harbour caused high levels of heavy metal pollutants in the mud on the west side (west of a line north from Rushy Point - see Fig. 1, locality 7). From 1984 to 1992, the harvesting of fish and shellfish for human consumption from that area of mudflats was banned. The drain was closed and the ban on fishing and shellfish harvesting was lifted in 1992.

Concurrent with this, high nutrient levels (nitrogen and phosphorus) were detected by the West Australian Environmental Protection Authority (EPA). These resulted in algal blooms that smothered large areas of the seagrass beds in both harbours. Mist netting excursions at that time (Table 1) involved slithering about in ankle-deep algae on the foreshore, an unpleasant experience at night. The EPA recommended the establishing of the Albany Waterways Management Authority (AWMA) in 1991, which supervised the harvesting of algae. A total of 2700 tons of dry algae were harvested during the period from 1991 to 1997. Nutrient levels in the catchment of both harbours were monitored and remedial measures also resulted in a reduction in the amount of algae. The Water and Rivers Commission (WARC) was set up in 1996. Through AWMA it, played an important role in supervising the health of the two harbours and their catchments, in collaboration with the newly-formed Albany Harbours Planning Committee (AHPC). Islands in the Sound and Oyster Harbour came under the jurisdiction of the WA Department of Conservation and Land Management (CALM), now replaced by the W. A. Department of Conservation. Currently, mussel and oyster farming

leases take up a considerable part of Oyster Harbour below the high tide mark and to a lesser extent in Princess Royal Harbour.

WADER VIEWING

Except for the eastern side of Oyster Harbour, where land tenure is to high water mark, around most of both harbours a narrow foreshore reserve (<50 m) exists. In some areas, the reserve is ill defined or not readily accessible because of encroaching residential development. This reserve is made up of sandy or rocky beach, some extensive patches of rushes not favoured by migratory waders except at high tide, sparse salt-tolerant paperbark trees (*Melaleuca* species) and small patches of samphire in a few places. No mangroves are present. The benthos of the two harbours has been studied only superficially.

Sites of interest referred to in the text are numbered on Figure 1. Mudflats provide the main wader feeding areas (2,4,6). Roost sites (1,3,5,7,8,9) chosen by waders generally provide shelter from prevailing winds that tend westerly during spring and strong easterly during late summer/autumn (Smith, 1993). When tides are exceptionally high at night, larger waders have been known to roost on Flat Rock.

Public access for viewing waders near high tide is most convenient at: (a) Rushy Point (7) on the south side of Princess Royal Harbour where there is a small hide, (b) north of the Fishing Boat Harbour in the southwest corner of Oyster Harbour (4), and (c) in the vicinity of the Lower King (2) and Lower Kalgan (1) Bridges.

MIGRATORY PATTERNS

Limited netting and banding over fifteen years has provided some morphometric data that is summarized in Table 2. Of interest are the mean weights of birds during their time in the region. This has been divided into three periods: early (September – October), mid-season (November – January), when the demands of moult preclude much weight gain; late (February – March) which is shortly before departure. As expected, the mean weights of most species show some appreciable pre-migratory weight gain. The exception is Red Knot, most of which are young birds. Some Red Knot banded in Princess Royal Harbour have been caught in New Zealand or Victoria, whereas Great Knot from Albany pass through the northwest of Western Australia to China and Korea. Some 10% of Red-necked Stint and Great Knot have been recaptured in subsequent years at their initial capture sites. Thus showing these species have fidelity to their non-breeding winter quarters in the vicinity of Albany.

DISCUSSION

The increase in aquaculture activities in the two harbours, but particularly Oyster Harbour, suggests that the water quality is still good, but heavy rain in the Kalgan River catchment does cause silting.
The main threats to waders would come from increased human interference around the foreshores and increased aquatic activities on the water itself. The creation of Reserves in the southwest quadrants of both harbours offer waders some protection from such interference.

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Table 2. Morphometric measurements of the more abundant waders caught at Albany. Bird weights are separated into early (September – October), mid-season (November – January) and late (February – March) non-breeding season.

Species	Morphometric measurements									Weight (g)								
	Wing length (mm)			Bill length (mm)			Head-Bill (mm)			Early			Mid-season			Late		
	n	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.
Grey Plover	13	202	8.3	12	30	1.2	13	69	2.3	4	212	5.4	1	218	-	8	280	47.8
Bar-tailed Godwit	17	215	14.6	17	102	12.9	17	143	13.1	14	231	111	-	-	-	3	333	61.1
Curlew Sandpiper	62	128	3.6	62	38	2.2	60	62	2.4	-	-	-	23	56	3.5	35	60	7.3
Red-necked Stint	351	102	3.3	358	18	1.1	355	40	1.1	92	28	2.1	124	29	2.5	348	30	2.8
Sharp-tailed Sandpiper	16	128	4.4	16	25	1.6	16	50	1.5	-	-	-	4	58	3.1	14	67	10.3
Red Knot	94	156	5.6	94	32	1.9	94	60	2.1	27	105	22.8	7	105	11.2	43	109	8.1
Great Knot	167	185	9.9	164	43	2.1	163	75	2.3	57	146	11.5	12	166	14.6	45	173	29.3

OCCASIONAL COUNT NO 6. SHOREBIRD COUNTS IN THE NE SOUTH AUSTRALIA-SW QUEENSLAND REGION IN SEPTEMBER-OCTOBER 2000

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INTRODUCTION

Information on the distribution and abundance of shorebirds in central Australia is limited because of the difficulty of locating and surveying the ephemeral and often extremely remote wetlands that they may use. However, this information is particularly important if an understanding is to be gained of how shorebirds use these wetlands and of the interaction of inland and coastal wetlands during the drought-flood cycle in inland Australia.

Successful planning of shorebird counting activities at inland sites requires:

- knowledge of significant rainfall events that could lead to flooding of local or downstream wetlands.
- subsequent monitoring of water levels and identification of wetlands with potentially suitable shorebird habitat.
- establishing land tenure of wetlands and obtaining permission from land owners and managers to enter their properties.
- availability of suitable vehicles and equipment to enable surveying to be conducted efficiently and safely in remote areas.
- an understanding of the periods when migratory birds could be present during passage.

Following good early rains in the November 1999 – January 2000 period, very heavy rainfalls in mid February in parts of the Cooper Creek, Diamantina and Georgina River-Eyre Creek systems (Fig. 1) caused major flooding. The water levels in some systems approaching the highest on record. Floods peaked in the Cooper on 3 March at Windorah and on 17 March at Durham Downs, in the Diamantina on 23 March at Birdsville and in Eyre Creek at Glengyle, close to Lake Machattie, on 22 March (BOM 2001a). Water from the Diamantina-Warburton Rivers system caused flood peaks in Lake Eyre North in March and May, after some initial flooding in February from local flows entering from rivers and creeks to the west (J. Costelloe pers. comm.).

The extensive flooding meant that there was an excellent chance that large areas of suitable shorebird habitat would occur in the NE South Australia – SW Queensland region during the following 3-9 months. This water would also probably be present until at least the next flood season. Thus, we decided to visit a selection of wetlands in this region during late September-early October 2000 to survey particularly for migratory shorebirds returning from the Siberian breeding grounds.

The wetlands chosen were Lake Machattie, which is fed by the Georgina River – Eyre Creek system and Lake Yamma Yamma, which fills from the Cooper Creek. Extensive, accessible shorebird habitat is less prevalent on the Diamantina system. Lake Gregory, which had filled via runoff from local catchment north of the Flinders Ranges, and Lake Harry were also surveyed.

Before leaving Melbourne, we used 1:250 000 Auslig maps to identify the properties where the wetlands were located and contacted the relevant owners or managers for permission to go on their land. We either telephoned again or visited them just prior to entering the property.

METHODS

The survey method involved driving by vehicle as close as we could to the lake shore and then counting shorebirds while walking along those parts of the shoreline that were reasonably accessible. Normally, we were able to get to within 100 - 200 m of the water's edge. In most cases, the limiting factor was the need to avoid flushing birds rather than wet ground conditions. Most shorelines had

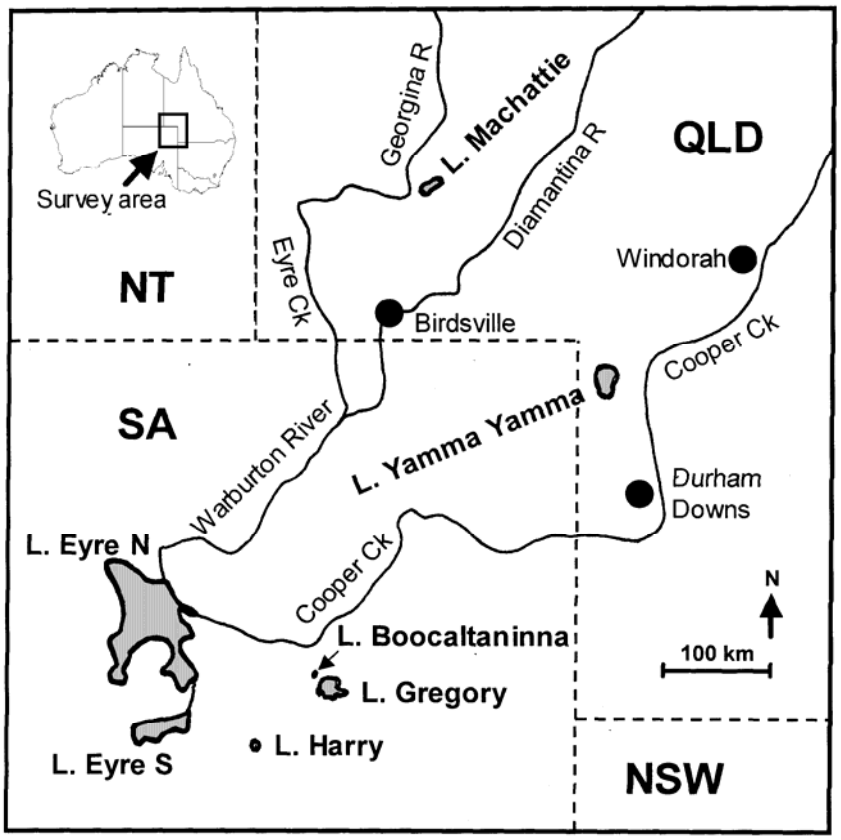

Figure 1. NE South Australia – SW Queensland region showing lakes visited and the three river systems (Key: QLD – Queensland, SA – South Australia, NT – Northern Territory, NSW – New South Wales)

short emergent vegetation that made accurate counting of shorebirds difficult.

Information on lake basin size (estimated from Auslig 1:250 000 maps), prevailing water conditions, estimated area covered with water and shoreline length surveyed, with comments on the degree of count coverage, are detailed below for each lake visited:

L. Harry*:* 10 km long, 2.5-5 km wide. Saline, about half full. Counted from one point, close to the Birdsville Track. Incomplete count, made difficult by heat haze on far shore, but probably reasonably good for Banded Stilt and Red-necked Avocet.

L. Boocaltaninna: Approximately oval, 2 km x 0.5 km. Fresh and full. Walked about 3.5 km of shoreline. Complete count.

L. Gregory: Complex shape. 20 km x 25 km. Saline, but impossible to estimate overall water extent. Counted about 13.5 km of shoreline in NW corner of lake. Incomplete count of area surveyed, made difficult by heat haze on far shore. Percentage of suitable shorebird habitat surveyed unknown, but probably much less than 50%.

L. Machattie: Approximately oval, 20km x 12.5 km. Fresh, nearly full. Counted about 25 km of shoreline. Reasonably thorough count of area surveyed. Percentage of suitable shorebird habitat surveyed unknown, but probably greater than 50%.

L. Yamma Yamma: Approximately circular, 35 km x 30 km. Fresh, drying back but still extensively inundated. Counted about 25 km of shoreline. Reasonably thorough count of area surveyed. Percentage of suitable shorebird habitat surveyed unknown, but probably less than 50%.

RESULTS AND DISCUSSION

The shorebird count results are given in Table 1. A total of 36 990 shorebirds of 13 species was counted. Eight species are Australian residents (Black-winged Stilt, Banded Stilt, Red-necked Avocet, Red-capped Plover, Black-fronted Dotterel, Red-kneed Dotterel, Banded Lapwing and Masked Lapwing), whilst four are long-distance migrants (Black-tailed Godwit, Marsh Sandpiper, Common Greenshank and Sharp-tailed Sandpiper) and part of the population of another (Australian Pratincole) undertakes a short-distance annual migration.

The Banded Stilt, which was by far the most common shorebird encountered (77% of total), was found only on the two salt lakes visited (Lake Harry and L. Gregory). At L. Gregory, 59.9% of birds in an aged sample (n = 446) were juveniles. Whilst no sampling was carried out at L. Harry, it was noted at the time that the overwhelming majority of birds were juveniles. These young birds had resulted, presumably, from the successful third breeding attempt in July 2000 at L. Eyre North, which is only some 100 km to the west of these two lakes. It was estimated that potentially 30 000 chicks hatched from that event (Anon 2000) and it appears that the majority of these were using Lake Harry and L. Gregory at the time of our visit.

The next most common shorebird was Sharp-tailed Sandpiper, which occurred in good numbers at Lakes Gregory, Machattie and Yamma Yamma. Unlike Banded Stilt, this species occurred in both saline and fresh water habitats. We believe that Sharp-tailed Sandpipers were significantly under-counted because of the difficulty of finding them in the emergent vegetation around the lake edges. The fortuitous passage of a raptor often exposed many previously uncounted birds that were forced to fly. However, we have no estimate of the degree of under-recording. As only a small fraction of potentially suitable shorebird habitat was surveyed, it is possible that tens of thousands of Sharp-tailed Sandpipers were present on the three lakes at the time of the survey and that the region, as a whole, could have been supporting a significant proportion of the total Sharp-tailed Sandpiper population. On the other hand, aerial surveys of inland lakes have revealed that the distribution of this species within apparently suitable lake habitat is often patchy and extrapolation must be used cautiously and results heavily qualified (R. Jaensch pers. comm.). In the December 2000-January 2001 period, major flooding of the Georgina River-Eyre Creek system and minor to moderate flooding of Cooper Creek occurred, and major flooding took place in lake systems in inland parts of the Northern Territory and northern Western Australia (BOM 2001b, R. Jaensch pers. comm.). This caused refilling and thus loss of shorebird habitat at some inland wetlands, but creation of new shorebird habitat at others (e.g. on drying margins of sheet flows on floodplains: R. Jaensch pers. comm.) Thus, large numbers of Sharp-tailed Sandpipers could have remained in the inland during the non-breeding period. This suggestion is supported by the results of surveys of coastal wetlands in Victoria and South Australia in January-February 2001, which resulted in the lowest numbers of Sharp-tailed Sandpipers recorded since counts began in 1981 (Wilson 2001a,b). Thus, monitoring the Sharp-tailed Sandpiper population or estimating its population size is a challenging task because of the species propensity to use remote inland wetlands.

It is very interesting that no Red-necked Stints or Curlew Sandpipers were seen. We surveyed approximately 70 km of apparently suitable shoreline habitat during the southward migration period, in an area over which trans-continental migrants could be expected to fly. While Red-necked Stints, and to a lesser extent Curlew Sandpipers, have been recorded at inland wetlands (Lane 1987, Higgins & Davies 1996), the evidence from this survey supports the view that their strong preference is for coastal wetlands, even when large wetland areas are available inland.

Good numbers of Australian Pratincole were encountered around the two fresh water wetlands. Their behaviour indicated that they were in the courtship phase prior to breeding. Many pratincoles were also seen along the roadsides whilst driving around the region.

During our survey we encountered 23 Inland Dotterels *Charadrius australis* in four groups. These were first noticed when individuals were seen on the road ahead of the vehicle. It is likely that many birds were missed throughout the region driven because of their highly cryptic nature and dispersed occurrence over extensive habitat rather than being concentrated at focal points such as wetlands.

ACKNOWLEDGEMENTS

We wish to thank the landowners and managers for giving permission to enter and camp on their properties and leases. Without their assistance the survey would have not been possible. We also thank them for providing advice on how best to access the lakes.

Thanks also to the ARIDFLO Project team for providing very useful advice, particularly concerning prospective wetlands and names of landowners and managers.

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Table 1. Details of shorebird counts at five lakes in the NE South Australia – SW Queensland region, September-October 2000. Counts of international significance (Watkins 1993) are shown with an asterisk.

SPECIES	L. Harry 24 September	L. Boocaltaninna 25 September	L. Gregory 26 September	L. Machattie 28-30 September	L. Yamma Yamma 1-3 October	TOTAL
Black-tailed Godwit *Limosa limosa*	-	-	-	-	6	6
Marsh Sandpiper *Tringa stagnatilis*	-	-	-	-	24	24
Common Greenshank *Tringa nebularia*	-	-	-	22	26	48
Sharp-tailed Sandpiper *Calidris acuminata*	5	-	511	2 517*	2 329*	5 362
Black-winged Stilt *Himantopus himantopus*	-	-	-	60	165	225
Banded Stilt *Cladorhynchus leucocephalus*	14 000*	12	14 300*	-	-	28 312
Red-necked Avocet *Recurvirostra novaehollandiae*	30	3	-	44	266	343
Red-capped Plover *Charadrius ruficapillus*	5	-	102	4	30	141
Black-fronted Dotterel *Elseyornis melanops*	-	2	-	9	-	11
Red-kneed Dotterel *Erythrogonys cinctus*	-	-	-	7	-	7
Banded Lapwing *Vanellus tricolor*	-	-	-	14	31	45
Masked Lapwing *Vanellus miles*	-	3	-	82	258	343
Australian Pratincole *Stiltia isabella*	7	-	100	859*	1 157*	2 123
LAKE TOTALS	14 047	20	15 013	3 618	4 292	36 990

WHIMBREL *NUMENIUS PHAEOPUS* ON KAMCHATKA, RUSSIA

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METHODS

This paper has been prepared from data collected by the authors from 1965-2001, from published data and, as the Whimbrel is very popular hunting quarry during southward migration, from data made available by hunters, rangers and officers of the hunting service.

A significant amount of the data was obtained during northward migration counts of ducks (Anatidae), under the direction of the authors, during the period 1975-2001 (Gerasimov & Gerasimov 1995, 2000a).

All locations mentioned in text are shown in Figure 1. The term "Kamchatka" covers the Kamchatka region, which includes both the Kamchatka peninsula and the associated continental region.

RESULTS

Northward migration

West coast

Six flocks of Whimbrel, each containing 15–25 individuals, were counted on May 22 1990 on the sea coast between Ozernovsky Settlement (51° 30′ N 156° 30′ E) and Lopatka Cape (50° 52′ N 156°40′ E) (S. Pudovnin & Yu. Sizrantsev pers. comm.). During the evening, they observed active migration of Whimbrel at Lopatka Cape (most southern point of Kamchatka).

In 1994 at the Opala River mouth (52° 00′ N 156° 30′ E), the period of Whimbrel migration was very brief from May 20–21, but intense, totalling 5340 birds. Most of the birds – more than 5200 – passed through during the evening of May 21 in the three hours before darkness. The migration consisted mainly of large flocks (up to 340 birds) flying over the sea and along the coast. All birds passed without stopping (Gerasimov & Kalyagina 1995).

Data on northward migration were collected in 1980 and 1993 from the Bolshaya River mouth (52° 32′ N; 156° 17′ E). In 1980, migration occurred from May 17 - 24, with about 300 birds being counted. In 1993, Whimbrel migrated from May 13 (earliest date of observation for western Kamchatka) to May 26. Only 137 birds were counted; in some instances we observed flocks approaching from over the sea almost perpendicular to the coast. Some flocks flew past, whilst others stopped on the Bolshoe Lake mudflats (Gerasimov 1998).

Near Levashova Cape (52° 47′ N 156° 10′ E) in 1990, A.Kochetkov (pers. comm.) noted some Whimbrel flocks on May 17. At the same place in 2001, we observed a few Whimbrel on May 16 and May 21.

Summarised data on northward migration of Whimbrel in South-West Kamchatka are shown in Table 1.

The best information on northward migration has been obtained from the Moroshechnaya River mouth (56° 50′ N 156° 10′ E) (Gerasimov 1988; Gerasimov *et al.*1992; Gerasimov & Gerasimov 1997, 1998, 1999, 2000b). During 15 years of observations (from late 1950's to early 1970's), N.Mironov (pers. comm.) has observed first arrivals of Whimbrel from May 17–25. Our data are summarised in Table 2.

The maximum number of birds we counted during any northward migration was less than 2 000. Flock sizes varied mostly from 6–60 individuals, rarely up to 150 individuals. Birds migrated both above the spit, separating the Moroshechnaya Estuary from the Sea of Okhotsk, and further inland. Few birds flew over the sea. Sometimes flocks stopped for a short time on the estuary mudflats or in adjacent wetlands, but birds mostly passed without stopping.

In 1977, A. Novopashin (pers. comm.), whilst observing northward migration of waterfowl in the lower reaches of the Kvachina River (57° 46' N 157°10′ E), saw the first Whimbrel on May 22, with active migration occurring up to May 27. In 1976, in the lower reaches of the Tigil River (57° 57′ N 158° 20′ E) he observed arrival of the first birds on May 22. A. Kuznetsov (pers. comm.)

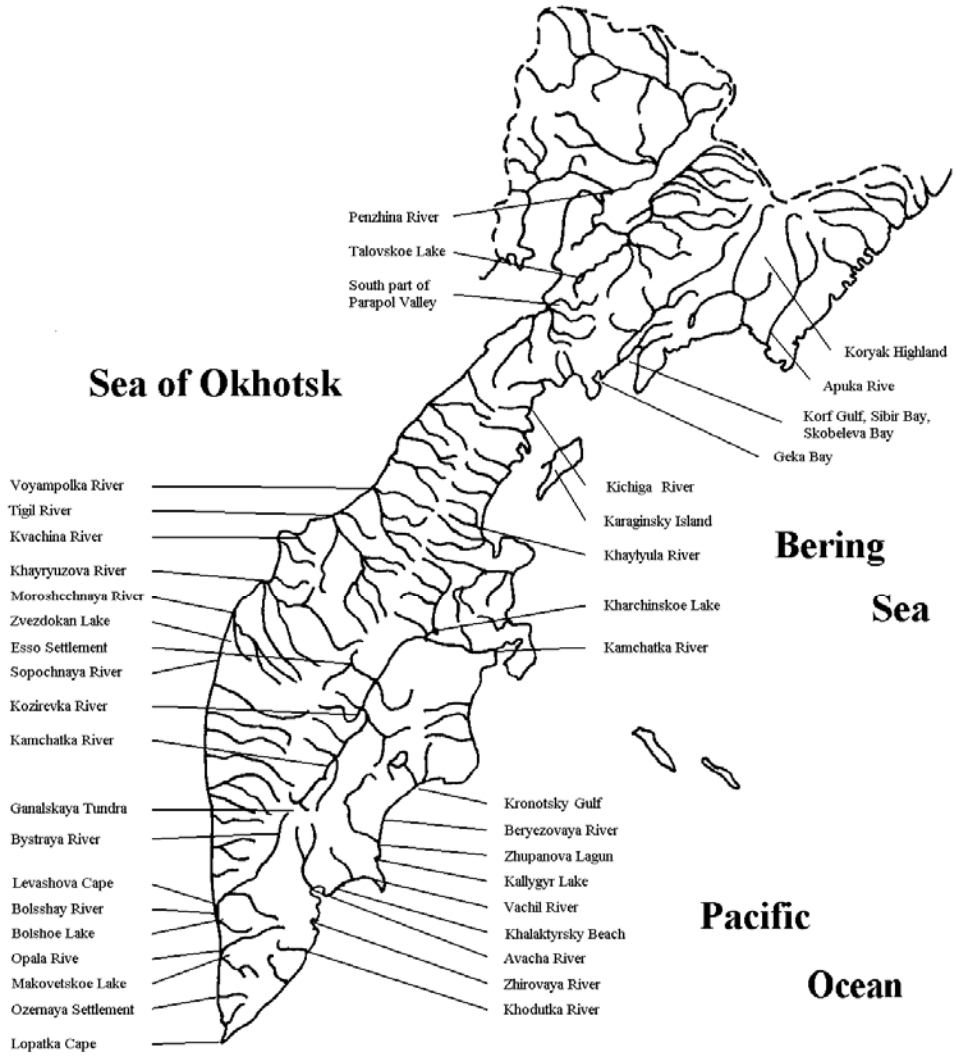

Figure 1. Location of Kamchatka Peninsula and the places mentioned in the text.

recorded the beginning of migration in the lower reaches of the Voyampolka River (58° 28′ N 159° 15′ E) on May 21 1977.

Central Kamchatka

Very few Whimbrel were observed in central Kamchatka during northward migration. M.Yaskin (pers. comm.) saw Whimbrel on May 20 1976 and May 18 – 20 1977 at the mouth of the Kozirevka River (55° 48′ N 159° 40′ E). During long term observations (1975–1990), rangers and officers of the hunting service have not seen Whimbrel at Kharchinskoe Lake (56° 32′ N 160° 11′ E) during northward migration. In 1999, we saw only one Whimbrel (May 26) during a month of observations at the same place (Gerasimov 2001).

East coast

Whimbrel are rare during northward migration on the east coast south of Petropavlovsk-Kamchatsky. We did not see this species during waterfowl migration observations at the Khodutka River mouth (52° 47′ N 158° 02′ E) in 1995 or on Khalaktirsky Beach (52° 57′ N 158° 49′ E) in 2000. E.Malinovsky (pers. comm.) observed only single Whimbrels between May 19 and June 2 during long term research at the Avacha Delta (53° 02′ N 158° 30′ E).

Table 1. Northward migration of Whimbrel in southwest Kamchatka

Year	Commencement of migration	Period of active migration
1980	17 May	-
1990	17 May	22–23 May
1993	13 May	-
1994	20 May	21 May
2001	16 May	-

Table 2. Northward migration of Whimbrel in the Moroshechnaya estuary.

Year	Commencement of migration	Period of active migration
1975	23 May	23–25 May
1976	22 May	23–24 May
1977	22 May	24–26 May
1979	17 May	20–21 May
1980	22 May	23–24 May
1983	20 May	21–23 May
1989	19 May	-
1990	15 May	22–26 May

The most southern point of the east coast where it is possible to observe migration is at the Vakhil River mouth (53° 15′ N 159° 34’ E). In 1991, we observed the arrival of the first birds (6 individuals) on May 19. During the next three days we counted 2536 Whimbrel. Migration occurred along the coast but up to 1.5–2 km inland. As our observations finished on May 22, we could not determine when migration ceased. In 1992, the first Whimbrel appeared in the mouth on May 20. By the middle of the next day, when we left, we had counted 135 birds. It should be noted that 1 500 unidentified shorebirds that flew past at some distance in the late evening of May 18 could have been Whimbrel (Gerasimov *et al*. 1998).

In 1990, some migrating Whimbrel were observed on May 25 (3 individuals) and May 27 (7 individuals) at Kalliger Lake (53° 30′ N 159° 50′ E). In the same year, at the Berezovaya River mouth (53° 50′ N 159° 51′ E), two flocks of 15–20 individuals each were observed on May 28 (K.Kudzin, pers. comm.).

Averin (1948) recorded the occurrence of the first Whimbrel on the Kronotsky Gulf coast (Kronotsky Reserve; 54° 30′ N 160° 30′ E) on May 18 1944 and May 18 1946. In the same area, Lobkov (1980; 1986) observed first arrivals from May 11–27, the 11-year average being May 22. May 11 (1975) is the earliest observed date of arrival of Whimbrel on Kamchatka, but the advent of spring was very early in 1975. However, the number of Whimbrel observed in the Kronotsky Gulf, as well as flock sizes, are much smaller than in the Vakhil River mouth.

In the Khaylyula River mouth (58° 02′ N 162° 00′ E), E.Serebryanikov (pers. comm.) saw some Whimbrel on May 28 1990.

V. Kollegov (pers. comm.) notes that "many" Whimbrels arrived on Karaginsky Island (58° 40′ N; 163° 30′ E) on May 23 1973. On May 25 1973, he counted 120 Whimbrel along 12 km of coast line. A.Kuznetsov (pers. comm.) recorded the arrival of Whimbrel on Karaginsky Island on May 21 1979, May 20 1980 and May 18 1982.

North Kamchatka

Data about northward migration of Whimbrel in the southern part of Parapol Valley (60° 56′ N 163° 50′ E) (pers. obs.) are given in Table 3.

A limited amount of information about the northward migration of Whimbrel is contained in “Birds of the Koryak Highland” (Kistchinski 1980). Kistchinski gives only three records: on June 1 1960 at the Apuka River mouth (60° 25′ N 169° 40′ E) (1 individual), on May 23 1961 in the northern part of Korf Gulf (60° 20′ N; 166° 30′ E) (8 individuals) and on May 30 in Geka Bay (60° 05’ N 165° 10′ N) (1 individual). However, there is evidence that Whimbrel are common during northward migration in the northern part of Korf Gulf. A. Martynov (pers. comm.) saw the first Whimbrel there on May 18, 1990. In 1998, we made special observations of shorebird migration in this area (Gerasimov 1999). From May 21–22, at a coastal site between Tilichiky Settlement and Sibir Bay, during eight hours of observations we counted 7 flocks, totalling 151 individuals, which arrived from the south (from the Gulf) and then continued flying northwards. In the adjacent region to the east – Skobeleva Bay (60° 24′ N 166° 20′ E) - we

Table 3. Northward migration of Whimbrel in the southern part of the Parapol Valley.

Year	Commencement of migration	Period of active migration
1975	23 May	-
1977	21 May	-
1980	28 May	-
1981	19 May	22–23 May
1982	20 May	22–23 May
1998	20 May	-

observed migration of Whimbrel from May 25 - 29, with most activity taking place on May 28. Our observations showed that at least a few hundred Whimbrel migrate northwards through the northern part of the Korf Gulf.

Breeding

Whimbrel are absent for about one month between the two migrations.. However, some unconfirmed information is available that indicate that Whimbrel may have nested in the northwest part of the peninsula, at least in the past. Whimbrel nests have been reported to have been found during the 1940s – 1960s in an area between the Sopochnaya River (56° 00′ N 156° 00′ E) and Khayryuzova River (57° 00′ N 156° 50′ E), some tens of kms from the Sea of Okhotsk coast (Gerasimov 1988). Averin (1948) observed an alarming pair of the Whimbrel on June 18 1941 in a suitable nesting area on the east coast of Kamchatka in the Kronotsky Gulf region. This observation indicates that Whimbrel may nest casually outside their normal breeding range.

Whimbrel are likely to breed in the northern part of the peninsula. Although nests and chicks have not been seen, the region is very poorly surveyed. Whimbrel nest in hummocky tundra with vegetation consisting of grass, moss and lichen, located on flat slopes of low mountains covered by dwarf trees *Pinus pumila*. In suitable nesting habitat, breeding density is 1–2 pairs / km^2 (in the lower reaches of the Penzhina River; 62° 25′ N 165° 30′ E) and as high as 3–5 pairs / km^2 (Talovskoe Lake in the Parapol Valley; 61° 20′ N 164° 40′ E). Small flocks (4–9 individuals) of non-breeding birds occur in similar habitat during the breeding season (Lobkov 1986). However, Whimbrel are not found breeding to the east of this area in the southern part of the Koryak Highland (Kistchinski 1980).

Southward migration

North Kamchatka

Whimbrel migrate southward through the Koryak Highland in large numbers. In 1959, in the lower reaches of the Apuka River, the first birds were observed on August 15. Active migration began the following day with flocks of 15–40 individuals being observed. The last birds were seen on September 7. In 1976, migration commenced on July 31. At the top of Korf Gulf, Whimbrel were observed from August 10–22, 1957. Near Geka Bay, migration took place at the end of July in 1977 (Portenko 1964, Kistchinski 1980).

East Kamchatka

At the Kichiga River mouth (59° 45’ N 163° 10′ E), we recorded the beginning of migration on August 7 1969 and August 1 1970. We observed thousands of Whimbrel migrating from August 14–18 1969. By August 19 1969, migration had mostly stopped and we counted only about 100 birds along 10 km of sea coast, but on August 20 we again observed active migration during both day and night (Gerasimov 1988).

A summary of southward migration data for Karaginsky Island is presented in Table 4. During the active migration period, A.Kuznetsov (pers. comm.) saw several hundred migrating Whimbrel daily.

South of the Kamchatka River mouth (56° 10′ N 162° 10′ E) we observed many flocks of Whimbrel on August 5 1971. On August 8, we counted about 2 000 Whimbrel on a 32 km stretch of sea coast, with flock sizes up to 300 individuals.

Whimbrel are also numerous during southward migration on the coast of the Kronotsky Gulf, though numbers can differ appreciably from year to year. Southward movement begins in early July, sometimes even in late June. The period of active migration is from late July to early September. During this period, 1 000 – 1 500 Whimbrel migrate daily in flocks of up to 250 individuals. Even more intensive migration occurs at night. In mountainous areas, Whimbrel have been seen up to 1300 metres above a sea level (Lobkov 1980; 1986).

In the Zhupanova Lagoon region (53° 35′ N 159° 50′ E), we recorded migration during the period from August 20 (the date on which observations commenced) to September 17, 1993. Migrating flocks passed without stopping.

Whimbrel are numerous near Petropavlovsk-Kamchatsky with two main places of concentration at Khalaktyrsky Beach and in the Avacha Delta. The first birds occur after July 20 and active migration takes place during August and the first

Table 4. Southward migration of Whimbrel on Karaginsky Island.

Year	Commencement of migration	Start of active migration	Last migration date
1969	2 August	9 August	-
1970	28 July	-	-
1972	22 July	-	-
1980	1 August	8 August	13 September
1981	1 August	4 August	-
1982	16 July	9 August	11 September
1983	28 July	6 August	18 September

half of September. Date of the latest record is September 26 (1973).

We saw Whimbrel on August 21 2001 feeding in mountain tundra at the source of the Zhirovaya River (52° 32′ N 158° 16′ E), about 1000 metres above sea level.

Central Kamchatka

Numbers of Whimbrels migrating through the central areas of Kamchatka are much higher during southward migration than northward. At Kharchinskoe Lake we heard them flying past on July 23 1976. In 1977, at Esso (55° 54′ N 158° 43′ E) Whimbrel migrated through a narrow mountainous valley during the night from August 12 onwards. An especially large number flew through the valley during the nights of August 18 and 19.

R. Dekolyado (pers. comm.) observed active migration of Whimbrel from the upper reaches of the Kamchatka River to the Bystraya River and further down the southwest coast of Kamchatka during the nights of August 30 and 31 and September 1 1979. Some Whimbrel stop each year to feed in the upper reaches of the Bystraya River in the Ganaly Tundra (54° 00′ N 157° 50′ E).

West Kamchatka

On the north-west coast of the Kamchatka Peninsula, the best information about southward migration of Whimbrel has been obtained from the lower reaches of the Voyampolka and Kvachina Rivers, at the mouth of the Khayryuzova River, in the Moroshechnaya Estuary and near Zvezdokan Lake.

At the Voyampolka River in 1977, A.Kuznetsov (pers. comm.) first saw Whimbrel on August 2. The most active migration took place from August 8–16. Birds migrated during both day and night and thousand of birds migrated daily. The last flock was seen on September 28.

We observed the beginning of migration on the tundra in the lower reaches of the Kvachina River in both 1984 and 1985. In 1984 we arrived on July 16 and observed single birds from July 16–18. The number of Whimbrel increased on July 19–20, and on July 21–22 we counted 700–800 birds daily. Numbers had greatly declined when we left on July 24. The next year we arrived on July 19 and saw one Whimbrel that day and few other birds before we left on July 26.

At the Khayryuzova River mouth in 1972, the most active Whimbrel migration took place from August 17–25. Some 10 km from the mouth, up to 1 000 birds were counted flying along a strip about 100 metres wide over a period of four hours in the evening of August 29 1972 (E.Voinov pers. comm.). In the same year from August 30 to September 3, we observed continuous active migration during the day and heard many flocks flying past at night.

On September 4, we arrived at the Moroshechnaya Estuary (80 km to the south of the Khayryuzova River) and counted about 2 000 Whimbrel over a distance of 12 km. Migration continued during September 5–6, but had decreased considerably by September 7–8. In 1984, the first Whimbrel arrived on July 9. Observations at the Moroshechnaya Estuary over several years have shown that active migration takes place during August and early September. Birds feed on the spit separating the estuary from the sea. In 1989, the density of birds on the spit exceeded 500 individuals/km^2 for several days. At the same time we saw flocks numbering up to 3 000 individuals flying at the tip of the spit. Based on our count data, we believe that 15 000–20 000 birds were feeding on the spit (> 20 km long and 1.5–2 km wide) (Gerasimov & Gerasimov 1997, 1998, 1999, 2000b).

Our observations at Zvezdokan Lake (56° 22’ N 156° 00′ E) in 1988, 1989, 1991, 1995 and 1999 have shown that Whimbrels migrate over the western Kamchatka plain at least up to 15 km from the sea coast. The migration begins in the middle of July and is most intensive in the third week of July.

On southwest Kamchatka, Whimbrel migration begins in the middle of July. The first flocks were observed on July 19 1967 near the Ozernovsky Settlement, on July 26 1978 at the Bolshaya River, and on July 17 1988, July 15 1992, July 20 1994 and July 16 2000 at Makovetskoe Lake (51° 56′ N 156° 38′ E).

As in more northern areas, active migration takes place during August and the beginning of September. At the end of August 1971 near the Bolshaya River, A.Stefankov (pers. comm) observed Whimbrels daily making evening flights from the tundra feeding areas to the sea coast, where they roosted all night with gulls and terns. The flights continued up to darkness and a total of 1 000–1 300 Whimbrel roosted on seven km of coast. The return flight to the tundra began before dawn. In 2000, we observed migration at Bolshoe Lake (near the Bolshaya River mouth) on August 6–7. In two days, about 1 000 Whimbrel flew past. By the

middle of September the number of Whimbrel in southwest Kamchatka are considerably reduced. South of the Ozernovsky Settlement, G.Yusova (pers. comm.) saw the last Whimbrel on September 27 1990. We observed the last birds on the Lopatka Cape on September 17 1996.

The main food for Whimbrel during southward migration is berries. In the Apuka Valley, in the continental part of Kamchatka, Whimbrels feed on the berries of *Arctostaphylos uvaursi* and *Vaccinium uliginosum*, and along the sea coast also on *Empetrum sibiricum* (*E. nigrum*) (Kistchinski 1980). On the peninsula the main berry food is *Empetrum sibiricum*. Additionally, we found in the stomachs of collected Whimbrel the remains of berries of *Vaccinium uliginosum* and *Rubus chamaemorus* and also the leaves of *Ledum palustre* and parts of several beetles (Coleoptera) (Gerasimov 1988).

A male Whimbrel that was shot in the Parapol Valley breeding area on 21 May 1982, weighed 320 g. Adult Whimbrels in August are heavier than juvenile birds, which in the first two weeks of August seldom reach a weight of 400 g. Females, with rare exceptions, weigh more than males during southward migration. The weights of 21 males, collected in different areas of Kamchatka in August, varied from 275 – 417.5 g and averaged 344.6 ± 8.9 g. The weights of nine females varied from 318 – 460 g and averaged 387 ± 5.7 g. The weights of birds collected at the Khayryuzova and Moroshechnaya Rivers in 1972 were very high: five males weighed 350 – 550 g, averaging 482 ± 35.1 g and six females weighed 500–620 g, averaging 571 ± 17.2 g. Some measurements of Whimbrels collected in different areas of Kamchatka are given in the Table 5.

Whimbrel are a popular hunting quarry during southward migration. The hunting season commences at the beginning of the last week of August, one week prior to the opening of the season for waterfowl. It continues until birds have departed on southward migration. We estimate that about 1 000 birds are shot annually.

DISCUSSION

The large amount of data for northward migration enables us to make generalisations about arrival dates for different parts of Kamchatka (Table 6).

Based on the data available, we believe that the duration of northward migration along the west coast of the Kamchatka Peninsula is about five days. The majority of birds migrate along the Western Kamchatka Plain. Perhaps 10 000 individuals use this route. Whimbrel reach the east coast by crossing the peninsula, but we do not know where they stop, if at all, in central Kamchatka. The number of Whimbrels migrating along the east coast is probably around 3 000.

Whimbrel are absent from the peninsula for about one month during the breeding season. It is possible that small numbers nest on the peninsula and, therefore, it is difficult to make conclusions about when southward migration begins.

In the northern half of the east coast of Kamchatka,

Table 5. Length of wings and bills of Whimbrels on Kamchatka.

Males		Females	
Adults (n=4)	Juveniles (n=10)	Adults (n=7)	Juveniles (n=8)
Wing length (mm)			
230–242	220–235	236–257	220–243
235.2 ±2.5	227.4 ±1.4	246.0 ±3.1	235.1 ±2.7
Bill length (mm)			
70.5–83.3	51.3–65.3	78.0–93.0	55.3–77.5
74.8 ±2.9	59.2 ±1.3	83.5 ±2.1	67.0 ±2.9

Table 6. Average arrival dates for Whimbrel in different parts of Kamchatka. * Yu. Averin (1948), E. Lobkov (1986) and our data of 1991 and 1992.

Area	Number of years of observation	Average date of start of migration
South-west Kamchatka	5	17 May
West Kamchatka (Moroshechnaya Estuary)	8	20 May
North-west Kamchatka (Parapol Valley)	6	22 May
South-east Kamchatka	15*	21 May
East Kamchatka (Karaginsky Island)	3	20 May

southward migration begins in the first half of July, and in the southern half in the second half of July. We believe that birds cross the peninsular to the west coast. Some of the birds probably fly via the Parapol Valley to the western Kamchatka plain.

There is little difference between migration start dates from north to south on the west coast. Migration begins in mid- to second half of July. Compared to northward migration, southward passage is very long taking 2–2.5 months. The total number of Whimbrel migrating southwards through Kamchatka Peninsula is estimated to be more than 100 000 individuals. The large difference between numbers during the two migrations indicates that Whimbrel use different routes on northward and southward migration.

Breeding data on Whimbrel on Kamchatka are very limited and more information is required. However, we believe that the southern limit of the breeding range is located in the continental part of Kamchatka.

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REPORT ON THE 2001 POPULATION MONITORING COUNTS

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Before departing the Chair of the AWSG, Jim Wilson published an overview of the Population Monitoring Project (Wilson 2001), describing its development to the present, discussing problems and challenges for the future and suggesting some analyses which this extensive data set can facilitate. He emphasised the importance of establishing repeatable counting methods, and of expanding the number of sites regularly counted.

Jim asked me to take over the co-ordination of the PMP, which principally involves collecting and publishing the summer and winter count data. The population monitoring counts for 2001 are presented here. Many thanks are due to all those who participated in the counts and to the regional organisers who collated the data.

Unfortunately a number of sites which have been long-established in the count project are not now being counted, as counters have moved away or are otherwise unable to continue. There is a pressing need to recruit new counters for these core sites in order to continue the good work already done.

In contrast, some new sites are being counted. Summer counts in a number of South Australian sites are published here, as well as a Winter count of the Hastings estuary in NSW. While all counts are interesting and useful, regular and consistent counting over many years is the primary aim of the population monitoring project.

Threats to the survival of wader populations continue to appear both in the Flyway and locally, and monitoring of numbers as accurately and consistently as possible is vital to conservation efforts.

The count database which AWSG has been involved in developing for Environment Australia is near completion now, and most of the PMP count data up to 1990 has already been transferred to it. Other regular and occasional counts will also be incorporated, making it a comprehensive nation-wide record. The database will be invaluable for research and for conservation decision-making. It can produce a wide range of reports at varying spatial scales.

This highlights the importance of continuing and developing the PMP counts so that we continue to provide good long-term data on population numbers and trends. Effective arguments for conservation must be supported by useful information. Hundreds of volunteers have contributed to the PMP over the past 21 years, and its continued development depends on further commitment by volunteer counters and organisers all around Australia.

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SUMMER 2001	**QUEENSLAND**								**NEW SOUTH WALES**						
	Cairns	Townsville	Mackay	Gladstone	Moreton Bay	Lockyer Valley	Bowen	Tweed	Richmond	Clarence	Hunter	Tuggerah	Parra	Botany Bay	Shoalhaven
Date															
Latham's Snipe	N	-	N	N	-	N	-	2	N	N	-	N	N	N	N
Black-tailed Godwit	O	6	O	O	302	O	3	-	O	O	106	O	O	O	O
Bar-tailed Godwit	T	70	T	T	11102	T	57	205	T	T	1400	T	T	T	T
Little Curlew		-			-		-	-			-				
Whimbrel	C	28	C	C	470	C	15	65	C	C	12	C	C	C	C
Eastern Curlew	O	43	O	O	2623	O	12	109	O	O	438	O	O	O	O
Marsh Sandpiper	U	-	U	U	40	U	2	-	U	U	38	U	U	U	U
Common Greenshank	N	-	N	N	150	N	12	21	N	N	156	N	N	N	N
Wood Sandpiper	T	-	T	T	-	T	-	-	T	T	-	T	T	T	T
Terek Sandpiper	E	-	E	E	23	E	-	-	E	E	61	E	E	E	E
Common Sandpiper	D	-	D	D	-	D	1	-	D	D	3	D	D	D	D
Grey-tailed Tattler		65			794		-	43			23				
Wandering Tattler		-			-		-	-			-				
Tattler Spp		-			-		-	-			-				
Ruddy Turnstone		2			125		-	-			-				
Great Knot		3365			770		-	-			4				
Red Knot		-			2		-	-			31				
Sanderling		-			2		-	-			-				
Red-necked Stint		12			1144		24	-			5				
Pectoral Sandpiper		-					-	-			-				
Sharp-tailed Sandpiper		-			151		108	-			22				
Curlew Sandpiper		-			1766		89	2			122				
Bush Stone-curlew		-			-		-	-			-				
Beach Stone-curlew		-			-		-	2			-				
Pied Oystercatcher		18			586		12	5			-				
Sooty Oystercatcher		-			3		3	3			-				
Black-winged Stilt		2			290		52	8			552				
Banded Stilt		-			-		-	-			-				
Red-necked Avocet		-			-		-	-			-				
Pacific Golden Plover		-			322		-	14			209				
Grey Plover		-			83		-	-			-				
Red-capped Plover		66			264		45	-			1				
Double-banded Plover		-			-		-	-			-				
Lesser Sand Plover		90			488		-	-			-				
Greater Sand Plover		301			198		-	-			-				
Oriental Plover		-			-		-	-			-				
Black-fronted Dotterel		-			-		-	-			4				
Hooded Plover		-			-		-	-			-				
Red-kneed Dotterel		-			-		-	-			-				
Banded Lapwing		-			-		-	-			-				
Masked Lapwing		-			53		1	4			62				
Long-toed Stint		-			-		-	-			-				
Redshank		-			-		-	-			-				
Broad-billed Sandpiper		-			-		-	-			-				
Ruff		-			-		-	-			-				
Swinhoe's Snipe		-			-		-	-			-				
Asian Dowitcher		-			-		-	-			-				
Unidentified small		-			-		-	-			-				
Unidentified medium		-			-		-	-			-				
Unidentified large		-			-		-	-			-				
Unidentified wader		-			1842		-	-			-				
Unidentified Sand Plover		-			1688		-	-			-				
TOTAL	0	4068	0	0	21751	0	436	483	0	0	3249	0	0	0	0
No SPECIES	0	13	0	0	24	0	15	13	0	0	19	0	0	0	0

SUMMER 2001	**VICTORIA**									**TASMANIA**			
	Corner Inlet East	Corner Inlet West	Total Corner Inlet	Westernport	East Pt Phillip**	East Pt Phillip	Altona	Wrrbee/ Avalon	BllmeP/Mud Is	EDerw/Pittwater	Marion Bay	North-west	Cape Portland/ NNE
Date	7.02	8.02		24.02	1.01	1.02	17.02						
Latham's Snipe	-	-	-	-	38	20	-	-	88	-	-	-	-
Black-tailed Godwit	-	-	-	-	-	-	-	-	-	-	-	-	-
Bar-tailed Godwit	7400	851	8251	280					856			2	5
Little Curlew	-	-	-	-	-	-	-	-	-	-	-	-	-
Whimbrel	33	34	67	33	-	-	-	-	14	4	-	-	6
Eastern Curlew	953	1018	1971	872	1	-	-	1	110	78	1	120	46
Marsh Sandpiper	-	-	-	-	-	-	7	16	218				
Common Greenshank	43	29	72	149	1	5	21	161	589	40			25
Wood Sandpiper	-	-	-	-	-	1	-	1	-	-	-	-	-
Terek Sandpiper	-	-	-	-	-	-	-	-	-	-	-	1	-
Common Sandpiper	-	-	-	-	1	1	-	1	2	-	-	-	-
Grey-tailed Tattler	-	-	-	6	-	-	-	3	-	-	-	2	1
Wandering Tattler	-	-	-	-	-	-	-	-	-	-	-	-	-
Tattler Spp	-	-	-	-	-	-	-	-	-	-	-	-	-
Ruddy Turnstone	25	-	25	82	-	-	-	6	94	-	-	890	167
Great Knot	100	-	100	-	-	-	-	-	45	-	-	-	-
Red Knot	600	1200	1800	40	-	-	-	-	576	-	-	16	-
Sanderling	50	-	50	-	-	-	-	-	-	-	-	5	-
Red-necked Stint	21420	1300	22720	5764			4359	10189	10004	1547	495	1840	1052
Pectoral Sandpiper	-	-	-	-	-	-	-	1		-	-	-	-
Sharp-tailed Sandpiper	15	-	15	52	90	103	60	1436	1835	-	-	5	2
Curlew Sandpiper	781	150	931	1659			514	1285	2412	130		480	43
Bush Stone-curlew	-	-	-	-	-	-	-	-	-	-	-	-	-
Beach Stone-curlew	-	-	-	-	-	-	-	-	-	-	-	-	-
Pied Oystercatcher	655	180	835	344	-	-	-	44	72	809	112	175	38
Sooty Oystercatcher	103	278	381	2	-	-	-	-	1	59	-	155	42
Black-winged Stilt	-	-	-	-	12	166	270	540	901	-	-		-
Banded Stilt	-	-	-	-	--	-	208	561	2274	-	-		-
Red-necked Avocet	-	-	-	-	-	-	30	210	227		-		-
Pacific Golden Plover	-	-	-	46	-	-	-	71	59	50	-	264	176
Grey Plover	171	-	171	-	-	-	-	-	29	-	-	1	-
Red-capped Plover	20	12	32	118	-	-	88	65	413	38	21	7	78
Double-banded Plover	-		-	29	1	2	-	-	4	3	3	6	1
Lesser Sand Plover	-		-	-	-	-	-	-	2	-	-	1	1
Greater Sand Plover	-		-	-	-	-	-	-	-	-	-	-	
Oriental Plover	-		-	-	-	-	-	-	-	-	-	-	-
Black-fronted Dotterel	-		-	-	2	4	-	4	13	-	-	-	-
Hooded Plover	6		6	-	-	-	-	-	5	2	4	4	16
Red-kneed Dotterel	-		-	-	-	-	-	-	11	-	-	-	-
Banded Lapwing	-		-	-	-	-	-	-	-	-	-		21
Masked Lapwing	-	14	14	207	112	275	84	232	710	432	33	22	123
Long-toed Stint	-	-	-	-	-	-	-	-	-	-	-	-	-
Redshank	-	-	-	-	-	-	-	-	-	-	-	-	-
Broad-billed Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-	-
Ruff	-	-	-	-	-	-	-	-	-	-	-	-	-
Swinhoe's Snipe	-	-	-	-	-	-	-	-	-	-	-	-	-
Asian Dowitcher	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified small	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified medium	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified large	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified wader	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	32375	5066	37441	9683	258	577	5641	14827	21564	3192	669	3996	1843
No SPECIES	16	11	17	16	9	9	10	19	27	12	7	19	18

** eks Seaford Swamp

SUMMER 2001	**SA**								**WEST AUSTRALIA**				**NT**	**TOTAL**	
	SE coast SA	SE coast SA	The Coorong	Penrice Saltfields	Price Saltfields	Clinton Conservation Park	Sandy Point	Greenfields	Albany	Swan	80 Mile	Broome	Darwin		% of Aust population*
Date	15-16.2	23- 28.2		11.2.	25.2	11.3	11.2	9.2							
Latham's Snipe	-	-	-	-	-	-	-	-	-	-	N	N	N	148	0.4
Black-tailed Godwit	1	-	115	1	1	-	-	-	-	-	O	O	O	535	0.7
Bar-tailed Godwit	1	4	-	-	253	3	1	-	25	7	T	T	T	22518	13.6
Little Curlew	-	-	-	-	-	-	-	-	-	-				0	0.0
Whimbrel	-	-	-	1	6	-	-	-	-	-	C	C	C	721	7.2
Eastern Curlew	2	-	16	36	15	23	5	-	-	-	O	O	O	6522	34.3
Marsh Sandpiper	-	-	-	11	21	-	-	4	-	-	U	U	U	357	4.0
Common Greenshank	50	31	305	292	232	112	2	8	50	8	N	N	N	2461	12.3
Wood Sandpiper	-	-	-	-	-	-	-	8	-	-	T	T	T	10	0.2
Terek Sandpiper	-	-	-	1	1	-	-	-	-	-	E	E	E	87	0.5
Common Sandpiper	-	-	1	3	3	-	-	1	3	-	D	D	D	20	0.7
Grey-tailed Tattler	20	10	-	-	-	-	1	-	13	-				971	2.7
Wandering Tattler	-	-	-	-	-	-	-	-	-	-				0	
Tattler Spp	-	-	-	-		-		-	-	-				0	
Ruddy Turnstone	636	683	-	9	451	-	10	-	6	-				2503	17.9
Great Knot	1	-	-	-	450	-	5	-	490	47				5277	1.7
Red Knot	-	-	-	-	600	100	100	-	115	-				3380	2.2
Sanderling	850	109	53	-	-	-	-	-	-	-				960	12.0
Red-necked Stint	1308	1382	18368	6650	2900	2720	500	-	370	20				91991	26.1
Pectoral Sandpiper	-	-	-	-	-	-	-	-	-	-				1	
Sharp-tailed Sandpiper	22	50	5718	1830	870	7	550	40	-	-				12916	7.8
Curlew Sandpiper	79	130	4309	998	1040	450	320	-	80	45				16754	8.9
Bush Stone-curlew	-	-	-	-	-	-	-	-	-	-				0	
Beach Stone-curlew	-	-	-	-	-	-	-	-	-	-				2	
Pied Oystercatcher	21	20	9	-	15	-	-	-	47	8				3150	31.5
Sooty Oystercatcher	7	7	3	-	-	-	-	-	3	-				662	16.6
Black-winged Stilt	-	-	183	226	20	-	-	160	-	22				3404	1.3
Banded Stilt	-	-	15611	15400	15400	800	-	1	-	-				50255	24.4
Red-necked Avocet	-	-	260	19	79	-	-	3	-	-				828	0.8
Pacific Golden Plover	86	79	103	2	-	1	1	-	21	-				1425	15.8
Grey Plover	3	-	-	68	169	100	20	-	62	17				723	6.0
Red-capped Plover	97	59	1288	490	158	625	100	12	4	-				4010	4.2
Double-banded Plover	3	9	-	-	-	-	2	-	-	-				54	0.2
Lesser Sand Plover	1	-	-	-	-	-	-	-	-	-				583	2.9
Greater Sand Plover	-	-	-	-	-	-	-	-	19	-				518	1.4
Oriental Plover	-	-	-	-	-	-	-	-	-	-				0	
Black-fronted Dotterel	-	-	-	-	-	-	-	25	-	-				52	0.3
Hooded Plover	7	9	4	-	-	-	-	-	-	-				48	1.0
Red-kneed Dotterel	-	-	-	17	-	-	-	20	-	-				48	0.2
Banded Lapwing	-	-	-	-	-	-	-	-	-	-				21	0.1
Masked Lapwing	230	93	355	130	-	-	-	12	-	-				3091	1.2
Long-toed Stint	-	-	-	-	-	-	-	-	-	-				0	
Redshank	-	-	-	-	-	-	-	-	-	-				0	
Broad-billed Sandpiper	-	-	-	-	-	-	-	-	-	-				0	0.0
Ruff	-	-	-	-	-	-	-	-	-	-				0	
Swinhoe's Snipe	-	-	-	-	-	-	-	-	-	-				0	
Asian Dowitcher	-	-	-	-	-	-	-	-	-	-				0	
Unidentified small	-	-	1724	-	-	-	-	-	-	-				1724	
Unidentified medium	-	-	-	-	-	-	-	-	-	-				0	
Unidentified large	-	-	-	-	-	-	-	-	-	-				0	
Unidentified wader	-	-	-	5000	-	-	-	-	-	-				6842	
TOTAL	3425	2675	48425	31184	22684	4941	1617	294	1308	174	0	0	0	245572	
No SPECIES	20	15	17	19	20	11	14	12	15	8	0	0	0	50	

* population estimates as per Watkins 1993

WINTER 2001	**QUEENSLAND**								**NEW SOUTH WALES**							
	Cairns	Townsville	Mackay	Gladstone	Moreton Bay	Lockyer Valley	Bowen	Tweed	Richmond	Clarence	Hunter	Tuggerah	Parramatta Est	Botany Bay	Hastings Est	Shoalhaven
Date	24/6	20/6	18/6		22/6			20/6		25/6	23/6		24/6		23/6	
Latham's Snipe	-	-	-	N	-	N	N	-	N	-	-	N	-	N	-	N
Black-tailed Godwit	-	-	-	O	3	O	O	-	O	-	1	O	-	O	-	O
Bar-tailed Godwit	10	75	97	T	818	T	T	35	T	82	300	T	75	T	15	T
Little Curlew	-	-	-		-			-		-	-		-		-	
Whimbrel	16	40	6	C	155	C	C	20	C	6	30	C	-	C	8	C
Eastern Curlew	10	24	73	O	385	O	O	11	O	30	167	O	-	O	3	O
Marsh Sandpiper	-	-	-	U	1	U	U	-	U	-	-	U	-	U	-	U
Common Greenshank	-	-	-	N	1	N	N	-	N	-	5	N	-	N	-	N
Wood Sandpiper	-	-	-	T	-	T	T	-	T	-	-	T	-	T	-	T
Terek Sandpiper	-	-	-	E	1	E	E	-	E	-	-	E	-	E	-	E
Common Sandpiper	-	-	-	D	-	D	D	-	D	-	-	D	-	D	-	D
Grey-tailed Tattler	35	66	125		526			8		14	6		-		-	
Wandering Tattler	-	-	-		-			-		-	-		-		-	
Tattler Spp	-	-	-		-			-		-	-		-		-	
Ruddy Turnstone	-	-	-		7			-		-	-		-		-	
Great Knot	92	-	-		300			-		2	-		-		-	
Red Knot	-	-	-		5			-		-	-		-		-	
Sanderling	-	2	-		-			-		-	-		-		-	
Red-necked Stint	6	132	-		288			-		-	-		-		-	
Pectoral Sandpiper	-	-	-		-			-		-	-		-		-	
Sharp-tailed Sandpiper	-	-	-		1			-		-	-		-		-	
Curlew Sandpiper	-	25	-		24			-		-	-		-		-	
Bush Stone-curlew	-	-	8		-			-		-	-		-		-	
Beach Stone-curlew	2	3	3		-			-		-	-		-		-	
Pied Oystercatcher	-	10	2		177			6		7	-		-		2	
Sooty Oystercatcher	-	-	2		-			-		-	-		-		-	
Black-winged Stilt	-	3	-		2458			347		-	445		200		-	
Banded Stilt	-	-	-		-			-		-	-		-		-	
Red-necked Avocet	-	-	-		214			8		-	1611		-		-	
Pacific Golden Plover	-	10	-		16			-		-	-		-		-	
Grey Plover	-	-	-		2			-		-	-		-		-	
Red-capped Plover	-	90	6		218			-		5	5		2		8	
Double-banded Plover	-	-	-		239			8		26	-		-		8	
Lesser Sand Plover	-	-	-		30			-		-	-		-		-	
Greater Sand Plover	-	5	-		-			-		-	-		-		-	
Oriental Plover	-	-	-		-			-		-	-		-		-	
Black-fronted Dotterel	6	-	-		7			4		-	26		44		-	
Hooded Plover	-	-	-		-			-		-	-		-		-	
Red-kneed Dotterel	-	-	-		16			3		-	11		1		-	
Banded Lapwing	-	-	-		-			-		-	-		-		-	
Masked Lapwing	36	-	22		83			13		10	24		-		6	
Long-toed Stint	-	-	-		-			-		-	-		-		-	
Redshank	-	-	-		-			-		-	-		-		-	
Broad-billed Sandpiper	-	-	-		-			-		-	-		-		-	
Ruff	-	-	-		-			-		-	-		-		-	
Swinhoe's Snipe	-	-	-		-			-		-	-		-		-	
Asian Dowitcher	-	-	-		-			-		-	-		-		-	
Unidentified small	-	-	-		-			-		-	-		-		-	
Unidentified medium	-	-	-		-			-		-	-		-		-	
Unidentified large	-	-	-		-			-		-	-		-		-	
TOTAL	213	485	344	0	5975	0	0	463	0	0	182	2631	0	322	0	9	0
No SPECIES	9	13	10	0	25	0	0	11	0	0	9	12	0	5	0	182	0

WINTER 2001	**VICTORIA**							**TASMANIA**				**SA**
	Corner Inlet East	Corner Inlet West	Westernport	East Pt Phillip	Altona	Wrbee/Avalon	BllmeP/Mud Is	EDerw/Pittwater	Marion Bay	North-west	Cape Portland/NNE	SE cst SA
Date	21/6	8/6	7/7	10/6	5/7	5/7	1/7					6-8/7
Latham's Snipe	-	-	-	-	-	-	-	-	-	-	-	-
Black-tailed Godwit	-	-	-	-	-	1	-	-	-	-	-	-
Bar-tailed Godwit	1670	-	60	-	-	-	8	34	-	43	-	-
Little Curlew	-	-	-	-	-	-	-	-	-	-	-	-
Whimbrel	-	-	11	-	-	-	-	-	-	-	-	-
Eastern Curlew	67	30	260	-	-	-	-	-	-	8	-	1
Marsh Sandpiper	-	-	-	-	-	5	-	-	-	-	-	-
Common Greenshank	-	-	5	-	-	1	-	-	-	-	-	1
Wood Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-
Terek Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-
Common Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-
Grey-tailed Tattler	-	-	-	-	-	-	-	-	-	-	2	2
Wandering Tattler	-	-	-	-	-	-	-	-	-	-	-	-
Tattler Spp	-	-	-	-	-	-	-	-	-	-	-	-
Ruddy Turnstone	-	-	9	-	-	3	5	-	-	80	-	101
Great Knot	20	-	-	-	-	-	-	-	-	-	-	-
Red Knot	330	-	55	-	-	-	-	-	-	39	-	-
Sanderling	-	-	-	-	-	-	-	-	-	-	-	-
Red-necked Stint	270	200	331	-	405	821	166	94	60	360	117	14
Pectoral Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-
Sharp-tailed Sandpiper	-	-	-	-	-	-	6	-	-	-	-	-
Curlew Sandpiper	-	50	2	-	-	10	89	-	-	22	-	-
Bush Stone-curlew	-	-	-	-	-	-	-	-	-	-	-	-
Beach Stone-curlew	-	-	-	-	-	-	-	-	-	-	-	-
Pied Oystercatcher	545	141	157	-	-	38	59	999	66	275	64	9
Sooty Oystercatcher	144	203	2	-	-	-	1	50	-	84	51	7
Black-winged Stilt	-	-	-	181	61	250	71	-	-	-	-	-
Banded Stilt	-	-	-	-	67	360	777	-	-	-	-	-
Red-necked Avocet	-	-	415	-	419	209	238	-	-	-	-	-
Pacific Golden Plover	-	-	-	-	-	-	-	-	-	-	-	-
Grey Plover	9	-	-	-	-	-	-	-	-	-	-	-
Red-capped Plover	6	-	100	5	154	67	320	237	80	110	127	47
Double-banded Plover	50	210	357	-	48	110	381	147	5	450	152	119
Lesser Sand Plover	-	-	-	-	-	-	-	-	-	-	-	-
Greater Sand Plover	-	-	-	-	-	-	1	-	-	-	-	-
Oriental Plover	-	-	-	-	-	-	-	-	-	-	-	-
Black-fronted Dotterel	-	-	-	176	-	40	13	-	-	-	-	-
Hooded Plover	1	-	-	-	-	-	3	10	7	12	58	2
Red-kneed Dotterel	-	-	-	32	-	29	12	-	-	-	-	-
Banded Lapwing	-	-	-	-	-	-	-	1	-	-	9	-
Masked Lapwing	-	3	162	97	16	177	250	428		8	21	125
Long-toed Stint	-	-	-	-	-	-	-	-	-	-	-	-
Redshank	-	-	-	-	-	-	-	-	-	-	-	-
Broad-billed Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-
Ruff	-	-	-	-	-	-	-	-	-	-	-	-
Swinhoe's Snipe	-	-	-	-	-	-	-	-	-	-	-	-
Asian Dowitcher	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified small	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified medium	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified large	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	3112	837	1926	491	1170	2121	2400	2000	218	1491	601	428
No SPECIES	11	7	14	5	7	15	17	9	5	12	9	11

WINTER 2001	**WA**				**NT**	**TOTAL**
	Albany	Swan	80 Mile beach (km0-25)	Broome	Darwin	
Date			17/6	18/6		
Latham's Snipe	N	-	-	-	N	0
Black-tailed Godwit	O	-	15	91	O	111
Bar-tailed Godwit	-	-	533	583	T	4,438
Little Curlew	B	-	-	-		0
Whimbrel	I	-	8	109	C	409
Eastern Curlew	R	-	120	39	O	1,228
Marsh Sandpiper	D	-	-	-	U	6
Common Greenshank	S	-	5	-	N	18
Wood Sandpiper	-	-	-	-	T	0
Terek Sandpiper	-	-	120	35	E	156
Common Sandpiper	-	-	-	-	D	0
Grey-tailed Tattler	-	-	180	332		1,296
Wandering Tattler	-	-	-	-		0
Tattler Spp	-	-	-	-		0
Ruddy Turnstone	-	-	26	24		255
Great Knot	-	-	443	1896		2,753
Red Knot	-	-	444	640		1,513
Sanderling	-	-	3	-		5
Red-necked Stint	-	-	1072	182		4,518
Pectoral Sandpiper	-	-	-	-		0
Sharp-tailed Sandpiper	-	-	-	-		7
Curlew Sandpiper	-	-	230	41		493
Bush Stone-curlew	-	-	-	-		8
Beach Stone-curlew	-	-	-	-		8
Pied Oystercatcher	-	2	1	47		2,607
Sooty Oystercatcher	-	-	-	2		546
Black-winged Stilt	-	14	3	4		4,037
Banded Stilt	-	-	-	-		1,204
Red-necked Avocet	-	-	-	-		3,114
Pacific Golden Plover	-	-	-	-		26
Grey Plover	-	-	1	-		12
Red-capped Plover	-	-	98	-		1,685
Double-banded Plover	-	-	-	-		2,310
Lesser Sand Plover	-	-	2	-		32
Greater Sand Plover	-	-	145	4		155
Oriental Plover	-	-	-	-		0
Black-fronted Dotterel	-	-	-	-		316
Hooded Plover	-	-	-	-		93
Red-kneed Dotterel	-	-	-	-		104
Banded Lapwing	-	-	-	-		10
Masked Lapwing	-	-	-	-		1,481
Long-toed Stint	-	-	-	-		0
Redshank	-	-	-	1		1
Broad-billed Sandpiper	-	-	-	4		4
Ruff	-	-	-	-		0
Swinhoe's Snipe	-	-	-	-		0
Asian Dowitcher	-	-	1	11		12
Unidentified small	-	-	-	-		0
Unidentified medium	-	-	-	-		0
Unidentified large	-	-	-	-		0
TOTAL	0	16	3450	4045	0	34,971
No SPECIES	0	2	20	18	0	263

AUSTRALASIAN WADER STUDIES GROUP

BIRDS AUSTRALIA CENTENARY CELEBRATION

WADER AND TERN SYMPOSIUM, BROOME, W.A.

28 OCTOBER 2001

TIME	SPEAKER	TITLE
9.00	Clive Minton	Introduction
Chair	*Clive Minton*	
9.15	David Price	Wader counts at 80 Mile Beach
9.45	Peter Collins	Visible migratory departures of waders from Roebuck Bay
10.15	Grant Pearson	Invertebrate studies in NW Australia
10.45	Coffee	
11.15	Dick Veitch	40 years of wader counting in New Zealand
11.45	David Melville	Curlew sandpipers in China, especially Hong Kong
12.15	Vladamir Morozov	Waders and geese in Russia
12.35	Eugeny Strelnikov	The taiga zone
1.00	Lunch	
Chair	*Chris Hassell*	
1.45	Robin Ward	Terning to moult
2.15	Ruth Croger	Operation Black-tailed Godwit
2.45	Andre Duiven	Waders breeding on Dutch farmland
3.15	Tea	
3.45	Bala Balachandran	Wader studies in India
4.15	Peter Fullagar	Exploring the sounds of waders
4.45	Clive Minton	Tundra Ecology ’94 Expedition
5.15	Dick Veitch	Closing comments

RULES OF THE AUSTRALASIAN WADER STUDIES GROUP OF BIRDS AUSTRALIA

1. NAME

The Group shall be known as "The Australasian Wader Studies Group", hereafter called "the Group" or "the AWSG".

2. MISSION STATEMENT

To ensure the future of waders and their habitats in Australia through research and conservation programmes and to encourage and assist similar programmes in the rest of the East Asian-Australasian Flyway.

3. OBJECTIVES

- Monitor wader populations through a programme of counting and banding in order to collect data on changes on a local, national and international basis.
- Study the migrations of waders through a programme of counting, banding, colour flagging and collection of biometric data.
- Instigate and encourage other scientific studies of waders such as feeding and breeding studies.
- Communicate the results of these studies to a wide audience through *The Stilt*, the *Tattler*, other journals, the internet, the media, conferences and lectures.
- Formulate and promote policies for the conservation of waders and their habitat, and to make available information to local and national governmental conservation bodies and other organisations to encourage and assist them in pursuing this objective.
- Encourage and promote the involvement of a large band of amateurs, as well as professionals, to achieve these objectives.

4. MEMBERSHIP

Membership of the Group shall be open to anyone interested in waders. Members of the Group shall be encouraged to join Birds Australia.

The committee, at its own discretion, may elect honorary members.

5. PUBLICATION

The Group shall publish a journal called *The Stilt* twice per year in April and October.

6. FINANCE

There will be a membership fee which is payable on 1st January each year. The Committee of the Group shall determine the amount of the membership fee.

The AWSG Funds are reported as a cost centre within the Birds Australia Accounts and assets included in the consolidated Balance Sheet. The AWSG cost centre will be reported annually to the membership via the Treasurer's Report in the April edition of *The Stilt*. The AWSG Research Fund is incorporated within the BA Accounts and a separate statement of this fund will be provided annually with the Treasurer's Report.

7. MANAGEMENT

The group shall be managed by a Committee consisting of the following:
Chair, Vice-Chair, Secretary-Treasurer, Scientific Committee Chair. Editor, Assistant Editor, Conservation Officer, Liaison Officer and up to six committee members. Committee members shall be members of Birds Australia and therefore indemnified under the Articles of Association of that body.

Chairs of State and Regional Wader Study Groups, or their nominated representative, shall have ex-officio representation on the Committee.

Committee meetings shall be convened by the Chair as required and at least once every twelve months. In the interim period meetings can be conducted, as necessary, by email.

The quorum for a Committee meeting shall consist of five elected members.

8. ELECTION OF COMMITTEE

A new committee shall take office on 1st June of each even-dated year and shall have a term of two years.

Announcement of the committee election shall be made in the October edition of *The Stilt* of the year before the committee is to begin its term.

Written nominations for Committee positions, seconded by a member of the Group, shall be sent to the Chair by 31st January in the year that the new committee is to begin its term. Notice of elections, nominations and a ballot paper shall be sent to all members of the Group via the April edition of *The Stilt*, or individually by mail, no later than 30th April.

9. SUB-COMMITTEES

The Committee may appoint sub-committees to deal with aspects of its affairs. Members of these sub-committees must be members of the Group but need not be members of the Committee.

10. REPORTS

The Chair, Secretary-Treasurer and Scientific Committee Chair shall furnish the membership with annual reports in *The Stilt*.

The Group shall report annually on its activities in the Birds Australia Annual Report.

11. AMENDMENT OF RULES

The rules can be amended by a majority of members responding to a postal ballot, provided that notice of intention to make such amendment is given in *The Stilt* preceding that in which the ballot paper will appear and provided that such amendments shall only be made with approval of or by the direction of the Birds Australia Council.

12. TERMINATION OF THE GROUP

If the Group ceases to function any money or property held by the Group shall become the property of Birds Australia.

EDITORIAL TEAM

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Vignettes: Stephen Davidson

Please note:

- Views and opinions expressed in *The Stilt* are those of the author(s) and not necessarily those of the AWSG or RAOU.
- Publication of data in *The Stilt* does not constitute permission for the commercial use of those data. All such inquiries should be directed to the Editor.
- The AWSG holds copyright to *The Stilt*.
- The Editorial Team does its best to ensure the accuracy of information published in the *Stilt*, but it is recommended that anyone wishing to cite material within the *Stilt* contact the relevant authors.

Back Issues:

All volumes of *The Stilt* are available as back issues. Costs including postage, are as follows. Payment should be forwarded as a bank draft or money order in Australian currency or by *Visa/Bankcard* etc (*not American Express*). All enquiries should be directed to the Secretary- Treasurer.

	Australia and New Zealand	**Other countries**
Single copies	$Aus 6.00	$Aus 7.00
Complete set		
Vols 1–28	$Aus 90.00	$Aus 125.00
Vols 29 and later	$Aus 12.50	$Aus 15.00

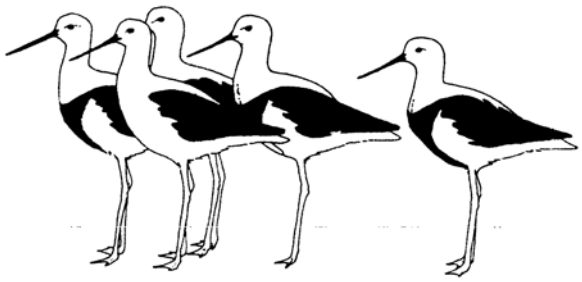
Indexes:

Author and species indexes have been published within *The Stilt* to volume 30.

Volumes Indexed	Volume containing Index
1-6	7
7-12	13
13-18	19
19-24	25
25-30	31

Deadlines:

The closing dates for submission of material have been revised. They are **1 March** and **1 September** for the April and October editions respectively. **Extensions to these dates must be discussed with the Editor.** Contributors are reminded that they will probably have some comments to consider, and possibly incorporate, at some time after submission. It would be appreciated if this could be done promptly.



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