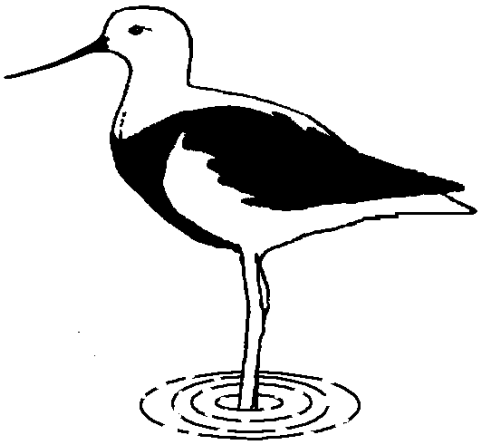
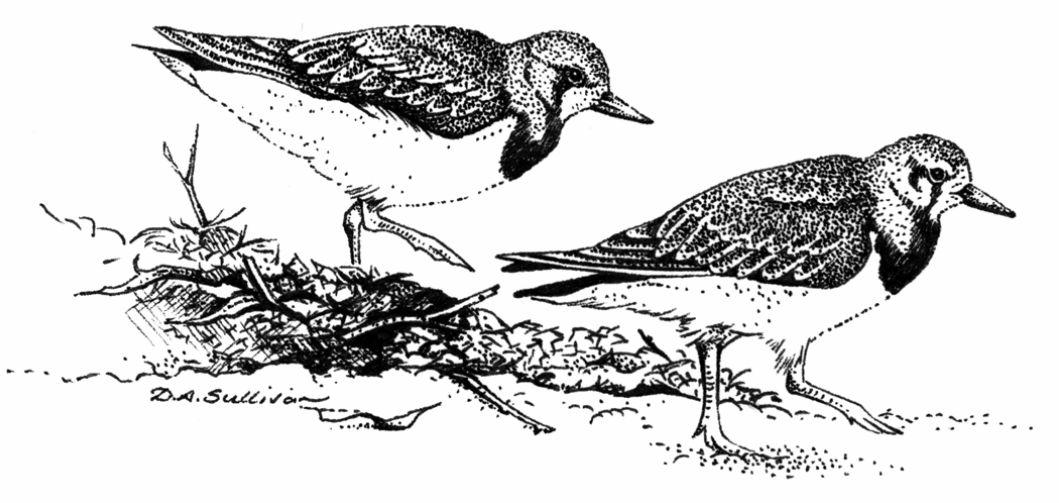
The Stilt



The Bulletin of the East Asian-Australasian Flyway



Australasian Wader Studies Group

A special interest group of Birds Australia

Number 47
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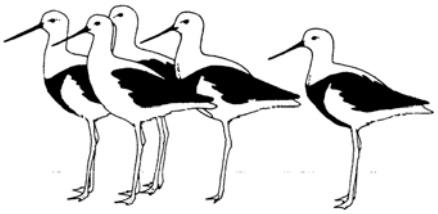

The Stilt

ISSN 0726-1888

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.

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@birdsaustralia.com.au

Annual Subscriptions:	Australia	A$35.00
	New Zealand	A$35.00
	Overseas	A$40.00
	Institutions	A$45.00

AWSG WEB SITE:
www.tasweb.com.au/awsg/index.htm

Cover Illustration: Debbie Sullivan

TREASURER'S REPORT FOR 2004

The Consolidated Accounts provided below show that income exceeded payments by $5,601.70, however this includes commitments for expenditure on contracts yet to be paid of $33,000.

Australian Wader Studies Group
Consolidated Accounts
Statement of Receipts and Payments
1 January 2004 - 31 December 2004

RECEIPTS			PAYMENTS		
Item	**2004**	**2003**	**Item**	**2004**	**2003**
	$	$		$	$
Balance B/f	59,750.54	54,435.53	Stationary/Printing	10,307.52	9,324.45
			Photocopying	34.18	27.27
Subscriptions	8,494.12	5,362.25	Insurance		220.00
			Postage/Courier	2,836.07	2,035.68
Contracts - Federal Govt	23,636.36	23,000.00	Consultants	11,434.95	16,038.66
Contracts - State Govts	7,000.00	7,000.00	Field Expenses		1,000.01
Contracts - Other	8,545.45	2,727.27	Conferences/ Meetings	1,815.24	9,799.63
Sales	600.36	317.58	Phone/Fax	266.59	193.59
Donations	1,963.00	4,509.09	Equipmt (consumable)	787.18	177.52
Conferences/ Meetings	1,242.73	9,856.79	Travel & Accomm.	12,728.27	7,475.16
			Repairs & M'tce	185.00	
			Admin Fee (BA)	1,000.00	1,000.00
			Depreciation	116.00	166.00
			Sundry Transfer (1)	4,369.32	
TOTAL INCOME	**51,482.02**	**52,772.98**	**TOTAL EXPENSES**	**45,880.32**	**47,457.97**
BALANCE AT 31/12/04	**65,352.24**				

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 2004.

Brought forward from 31/12/03	$12,051.09
Donations 2004	$1090.00
Total Research Fund 31/12/04	$9641.09 (1)

Note (1) Payment to VWSG for trailer from monies held in trust by AWSG from specific donations.

Membership Statistics for 2004

The membership as at the end of 2004 was:

Australia/ New Zealand	195
Overseas (excl. NZ)	32
Institutions	18
Complimentary	65
TOTAL	310

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

CONSERVATION VALUES OF THE SOUTH-CENTRAL COAST OF GANGES DELTA - RECORD FLOCK OF INDIAN SKIMMERS

M. SAZEDUL ISLAM[1] AND M. ANISUZZAMAN KHAN[2]

[1] House 11, Road 138, Gulshan 1, Dhaka 1212, Bangladesh: sazed@iucnbd.org. [2] Environment Department, P.O. Box. 67, Dubai, UAE: ruzukhan@yahoo.com.

The East Asian-Australasian Flyway consists of a chain of important wetlands from as far north as the Arctic Circle to more than 45ºS. At times, a large percentage of the entire population of single species may be at a single place. These wetlands provide the abundant food needed to accumulate fat to fuel their extended flights and safe resting areas for the shorebirds staging during migration. Linking the wetlands in a network of protected habitats is important for shorebird conservation. This is what the East-Asian Australasian Shorebird Reserve Network seeks to provide for our flyway. Migratory waterbirds are often of special significance, since many appear at traditional sites at almost the same time year after year and usually move through a number of countries in their migration.

Char Bahauddin is an island off the central coast of Bangladesh. It lies to the south of Hatiya Island in the estuary of the Shahbajpur River. The site accommodates several thousands of resident and migratory waterbirds. It is one of the key shorebird sites in the East Asian-Australasian Flyway. Mangroves have been planted in the centre to stabilize the island which is surrounded by extensive mud and sand flats that are criss-crossed by tidal creeks. Some migratory water birds spend the whole of their non-breeding season in the area whilst others halt in the area for very short periods of time to rest and feed using these staging areas. These are essential for migration and crucial to the birds' survival and well-being. Shorebirds start to arrive in the area from August to September on southward migration, numbers increase to a maximum from December to January, and over-wintering birds start leaving from February to March, the final ones leaving between April and May. The congregation of shorebirds on the Bangladesh coast ranges from 200,000 to 300,000 individuals. The commonest species are: Mongolian Plover *Charadrius mongolus*, Pacific Golden Plover *Pluvialis fulva*, Black-tailed Godwit *Limosa limosa*, Kentish Plover *Charadrius alexandrinus*, Eurasian Curlew *Numenius arquata*, Terek Sandpiper *Tringa cinerea*, Curlew Sandpiper *Calidris ferruginea*, and Ruff *Philomachus pugnax*. The rarest species are: Crab Plover *Dromas ardeola*, Eurasian Oystercatcher *Haemotopus ostralegus*, Great Stone Plover *Burhinus recurvirostris*, Spotted Redshank *Tringa erythropus*, Nordmann's Greenshank *Tringa guttifer*, Asian Dowitcher *Limnodromus semipalmatus*, and Spoon-billed Sandpiper *Eurynorhynchus pygmaeus* (Khan 1997).

Char Bahauddin provides good habitat for the globally threatened Indian Skimmer *Rhynchops albicollis*. In the 19th century, this species was widely distributed across the Indian subcontinent along the major rivers of Myanmar and along the Mekong River of Indo-China but there are few recent records from Myanmar where it is presumed to be declining and none from Laos, Cambodia or Vietnam (Birdlife International 2004). It has declined in India and Pakistan (Birdlife International 2004). Its population in 1994 was estimated at fewer than 10,000 individuals and possibly under 5,000 (Wetlands International 2002). It occurs regularly in Bangladesh. A total of 772 individuals was seen during 1994. In 1995 and 1996, 50 and 790 individuals were recorded (Wetlands International, 1997). At dawn on 29 February 2004, a team of ornithologists of IUCN Bangladesh (including M.S.I. and M.A.K.) was surveying the southern shore of Char Bahauddin, called locally Damar, when a single flock of 1,503 Indian Skimmers was counted. This is believed to be the largest flock of this species ever recorded anywhere. It is an important discovery that such a globally vulnerable species should occur in such big numbers.

Some other observations in this area of newly accreted islands are notable. On 25 October 2000, 79,500 Kentish Plover, including a single flock of 45,000 individuals, was observed in the south-eastern part of Char Bahauddin (Islam 2001). This species represented 61.5% of all the identified birds recorded in this location at the same counting period. Other important waterbirds were 850 Brown-headed Gull *Larus brunnicephalus*, 165 Black-headed Ibis *Threskiornis melanocephalus*, 2 Spoonbill Sandpiper, 1,033 Pacific Golden Plover, 70 Pallas's Gull *Larus ichthyaetus*, 100 Gull-billed Tern *Gelochelidon nilotica*, 11 Asian Dowitcher, 600 Black-tailed Godwit, and 16 Eurasian Spoonbill *Platalea leucorodia*.

Human disturbance is the major threat to the globally vulnerable Indian Skimmer and other species in the area. This international staging ground for migratory birds faces substantial threats from the recent land grabbers and shrimp larvae collectors. Construction of the proposed barrage over the deep Muktaria Khari channel between Hatiya and Nijhum Dweep islands will threaten the populations all waterbirds that use the area. Ideally, no human settlement should be allowed in Char Bahauddin and even human movement should be controlled properly. Many landless people are moving to the newly accreted islands; mostly these are from north and west Hatiya being forced to move by continuing river erosion. To accommodate this need, further settlement should be permitted only in the northern and western parts of Nijhum Dweep, and not the parts of the island facing Char Bahauddin. Newly accreted Islands in the Bay of Bengal need to be kept as is for at least a minimum period for natural succession of both biotic and abiotic components.

The conservation of migratory waterbirds is the collective responsibility of all countries in the flyway. The conservation of non-migratory species that are resident in a

country is equally important. Therefore, the declaration of Char Bahauddin and the southern and eastern sides of Nijhum Dweep as a single shorebird reserve is of prime importance from both national and global perspectives. This is due to its pristine habitat and huge foraging and roosting grounds.

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VARIABLE OYSTERCATCHERS FEEDING ON SAND SCARAB BEETLE LARVAE

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Dovedale, R.D. 2 Wakefield, Nelson, New Zealand

On the morning of 1 August 2004 I watched two adult Variable Oystercatchers *Haematopus unicolour* foraging high on the coarse sand beech at Awaroa Inlet, Abel Tasman National Park, Nelson, New Zealand.

Both birds were probing vigorously in the sand, with their bills being inserted the full length to the feathering at the base (~90 mm). I watched the birds for about five minutes during which time one caught and ate four items which appeared to be beetle larvae. The other bird, although apparently feeding equally vigorously, caught nothing. The birds were then disturbed by a dog and moved away.

On examining the area where the birds had been foraging I found many probe marks in the sand surface. I then excavated an area where the birds had been feeding. There was a layer of clean, coarse, sand about 70-80mm deep and then a layer of decaying drift wood some 10-120 mm thick, below which was clean sand. It appeared that the drift wood had been left on a high tide and then subsequently been buried by sand. Among the decaying wood, which included well decomposed leaf matter, twigs, and larger pieces up to 150 mm long and 50 mm in diameter were several sand scarab beetle (Coleoptera; Scarabaeidae; *Pericoptus* sp.) larvae – larval *Pericoptus* cannot be identified to species (Barratt *et al*. 2002). In an area of about 0.25 x 0.25 m I found two larvae.

The sand scarab *P. truncatus* occurs in coastal dune areas, the larvae feeding on the roots of vegetation such as marram grass *Ammophila arenaria*, and on dead wood (Knox 1969, Morton and Miller 1973). It is possible that the oystercatchers first found the beetle larvae visually since larval sand scarabs wander over the sand surface at night, with a few remaining on the surface after first light (Dale 1956).

There appear to be no previous records of Variable Oystercatchers feeding on scarab beetle larvae (Marchant and Higgins 1993).

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SOME SAMPLING CONSIDERATIONS RELEVANT TO ESTIMATING THE FIRST YEAR PROPORTION

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Confidence limits of age proportions estimated from small samples are asymmetric and have higher variances than do those estimated from large samples. In consequence, summaries and plots of such data can suggest a negative association between the proportion of young birds and increasing sample size where none applies. Whether or not there is such a relationship, it usually makes little difference to the final estimate if birds from small samples are included or excluded. Due to the heterogeneous distribution of young birds in flocks, individual samples may over- or under-estimate the true first year proportion but these biases tend to cancel each other out. We know of no compelling reason for excluding data from small samples from the calculation of juvenile proportions. Samples are necessarily opportunistic and not demonstrably representative. For large populations as many birds as possible should be sampled. For small populations, a single large catch used in conjunction with a population count might be preferable to several small catches.

INTRODUCTION

Increased evidence of decreasing wader populations (Zöckler *et al*. 2003) has led to an interest in monitoring recruitment rates on the non-breeding grounds (Robinson *et al*. 2005). This has been done for many years in Australia using the proportion of first year birds in cannon net catches as an index of recruitment (Minton 2004). Recent attention has concentrated on determining the best index and how to estimate it (Rogers *et al*. 2004, Clark *et al*. 2004, Minton 2005). The data used in these studies uses samples of two types: data from cannon netting projects often conducted over many years (Clark *et al*. 2004, Minton in press) or from the more recently developed method of ageing birds from close inspection by telescope scans (Rogers *et al*. in press). Underlying most of the work to date is the assumption that birds in their first year are randomly distributed throughout the sample and that analysis using binomial theory is appropriate. Recent work has shown that the assumption of homogenous distribution of first year birds does not hold. Rogers *et al*. (in press) found that young birds tend to concentrate in small groups or bunches in some parts of flocks; this leads to a lack of juveniles in other parts of flocks. It was also found that there was often bunching of bunches and that in large scans, one half of a scanned flock often had a significantly different juvenile proportion than the other. Cannon netting often disturbs birds e.g. by gently herding, or "twinkling", them into the catching area and then by the simultaneous take-off of all birds in the target area when the net is fired. This will mask, but not eliminate, the effect of bunching on juvenile proportions estimated from different catches. This heterogeneity is in conflict with the binomial assumption and there is some as yet unresolved debate (Clark *et al*. 2004, Rogers *et al*. in prep.) as to whether or not this makes any real difference to estimates of the standard errors of juvenile proportions; we assume that it does not for the purposes of this paper. Heterogeneity makes no difference to the overall estimate of juvenile proportions.

Another sampling aspect of estimating recruitment is that both cannon net catches and telescope scans range from only a few birds – in some cases only a single bird – to over 1,000. In general cannon net catches are of more birds than are telescope scans. It is a popularly held belief that first year proportions are higher in smaller flocks but we know of little published evidence to support this view, although no exhaustive literature search has been made.

This paper examines these problems using data on one season's cannon net catches and another's telescope scans and discusses the implications for sampling and interpretation of results. Local populations will usually comprise a number of flocks. Catch and scan data cannot on their own inform on if and how age representation may vary with flock size.

METHODS

In south-east Australia, age data are collected between November and February i.e. the period after juveniles have arrived and before any adults have left on northward migration. Two ages of bird are considered. All birds in their second year or older are treated as adults. 'First year' or 'young' birds are those in post-juvenile moult or in the resultant first basic plumage. In the field, the identification of juveniles through telescope observations is not possible through most of the austral summer. For Red-necked Stints, for example, there are two ageing "windows". The first ends in the first week of December in south-east Australia when the last readily visible juvenile feathers are dropped. The second occurs at about the end of February and the start of March when adults have started moulting into breeding plumage (Rogers *et al*. in press). In the hand, accurate ageing is possible throughout the austral summer on the basis of primary moult characters and retained juvenile (especially inner median) coverts (Higgins and Davies 1996).

Two data sets are used. The cannon netting data used are of all catches in the ageing period of 2003/04 of three species in south-east Australia (SEA) and nine in north-west Australia (NWA). The telescope scan data on three species were collected in SEA in 2001/02. One species, the Red-necked Stint, occurs in both data sets.

Age representation can be estimated as a proportion or as a percentage (= proportion x 100). Both terms are used in this paper. The data are presented in two ways:

The first year proportion is calculated for birds in catches or scans of 50 or fewer birds and for those of more than 50 birds. Assuming the distribution of young birds follows the binomial distribution, the difference between the two proportions is tested for significance as follows. If there are N birds in total of which J are first year, then

First Year Proportion = P = J / N
with Standard Error = SQRT[P.(1 – P) / N]

If the N birds comprise n_1 birds with j_1 first years and n_2 birds with j_2 adults and first year proportions p_1 and p_2 ($p_1 > p_2$), then, following Snedecor & Cochran (1974), zed, equivalent to the difference between p_1 and p_2 expressed in units of the common standard deviation, is given by

$$zed = (p_1 - p_2) / SQRT[P.(1 - P) .(1/n_1 + 1/n_2)]$$

The probability of getting this value of zed or higher can be obtained from a table of the cumulative normal distribution or a spreadsheet function. This treatment assumes that the binomial assumption applies.

The juvenile percentage for each of the samples of cannon netted and scanned Red-necked Stint samples are plotted against the size of each catch or scan. The 95% confidence limits of this percentage, based on the overall juvenile proportion for each data capture method, are also shown. They are calculated from the cumulative binomial distribution. This distribution is usually available as a spreadsheet function e.g. CRITBINOMIAL in Lotus 123, CRITBINOM in Excel.

The norm in Australia for both cannon netting and telescope ageing is for sampling with replacement. The same birds may be included in catches or scans on different sampling occasions. Care is taken with telescope scans to ensure that no birds are aged more than once on the same day. This may require some scans to be discarded. This is not a problem with cannon netting as same day retraps are very rare indeed. Sampling without replacement gives the same means but lower variances but is only practicable with databases of banded birds which allow individual birds to be identified. See, for example, Cochran (1977).

RESULTS

First year proportions from catches or scans of 50 or fewer birds compared with those from more than 50 birds

Table 1 presents the breakdown of the cannon net catches in 2003/04. It gives the number of birds caught, the number of them that were first year birds, and the first year percentage and its standard error for catches of 50 or fewer (Catches <= 50) birds and in catches of more than 50 birds (Catches > 50). The percentage over all catch sizes (All Catches) is also given. The largest catch of Curlew Sandpiper in north-west Australia was of 30 birds; comparisons with catches of over 50 birds are therefore impossible.

The value of zed (testing for a difference between small and large samples; see methods) is given, as is the probability (Prob.) of obtaining this value of zed or higher in random sampling. The final column (Significant difference) indicates if the difference between the proportions is or is not statistically significant. In eight of the eleven cases the differences in first year percentages between small and large catches were not significant. In only one of the three cases where there was a significant difference was the first year percentage higher for smaller catches. Overall, the small catches gave a higher first year percentage in six cases and the large catches in five. The table also shows that little is lost if catches of 50 birds or fewer are disregarded completely. The difference between the juvenile percentage for the larger samples and all catches is less than two percentage points except for Greater Sand Plover where it is 4.3 percentage points greater and Terek Sandpiper where it is 5.0 percentage points less.

Table 2 gives similarly the data for three species which were age scanned by telescope in 2001/02. For two of the three species, the difference in first year percentage between scans of not more than 50 birds and those for more than 50 birds is higher and significantly different. This result is basically the opposite of that observed for the cannon net catches. Note that excluding data from small scans leads to underestimation by no more than 1.2 percentage points if data from scans of 50 or fewer birds are excluded.

First Year Proportion v. Catch/Scan Size

The upper part of Figure 1 shows the first year percentage of the 44 telescope scans of Red-necked Stint made in 2001/02. Also shown are the 95% confidence limits on the overall first year percentage assuming a binomial distribution. The confidence limits are not smooth curves. This occurs because binomial variates can only take integer values which are converted to percentages here. The lower part of the figure shows a similar picture for the 19 cannon net catches in 2003/04.

Two features stand out from this figure. The first is that the lower confidence level can never be less than zero yet the upper limit increases dramatically for small samples if the binomial distribution applies. Small random samples from the binomial distribution will be expected to show points with higher first year percentages than ever occur for large samples. This can give the misleading impression that smaller flocks have higher percentages of young birds.

The second feature of these figures is the large number of observations falling outside the confidence limits: 40 in the case of telescope scans when only 3 are expected and 7 in the case of cannon net catches when only 1 is expected.

Table 1. Comparing first year percentages from cannon net catches in 2003/04 of 50 birds or fewer with that of samples of more than 50 birds

	No. of Catches	Total No. of Birds	No. of 1st Yr Birds	First year %	SE{First year %}	Zed	Prob.	Significant Difference
Red-necked Stint *Calidris ruficollis* - SEA								
Catches <= 50 birds	7	136	37	27.2%	3.82%	1.175	0.240	No
Catches > 50 birds	12	5334	1222	22.9%	0.58%			
All Catches	19	5470	1259	23.0%	0.57%			
Curlew Sandpiper *Calidris ferruginea* - SEA								
Catches <= 50 birds	3	12	3	25.0%	12.50%	0.960	0.337	No
Catches > 50 birds	2	197	29	14.7%	2.52%			
All Catches	5	209	32	15.3%	2.49%			
Sharp-tailed Sandpiper *Calidris acuminata* - SEA								
Catches <= 50 birds	6	96	24	25.0%	4.42%	3.078	0.002	Yes
Catches > 50 birds	3	884	364	41.2%	1.66%			
All Catches	9	980	388	39.6%	1.56%			
Red-necked Stint - NWA								
Catches <= 50 birds	9	93	13	14.0%	3.60%	1.581	0.114	No
Catches > 50 birds	2	210	17	8.1%	1.88%			
All Catches	11	303	30	9.9%	1.72%			
Curlew Sandpiper - NWA								
Catches <= 50 birds	12	122	9	7.4%	2.37%	n.a.	n.a.	n.a.
Catches > 50 birds	0	0	0	-	-			
All Catches	12	122	9	7.4%	2.37%			
Great Knot *Calidris tenuirostris* - NWA								
Catches <= 50 birds	7	124	17	13.7%	3.09%	0.860	0.390	No
Catches > 50 birds	3	455	77	16.9%	1.76%			
All Catches	10	579	94	16.2%	1.53%			
Bar-tailed Godwit *Limosa lapponica* - NWA								
Catches <= 50 birds	7	161	17	10.6%	2.42%	1.011	0.312	No
Catches > 50 birds	2	151	11	7.3%	2.11%			
All Catches	9	312	28	9.0%	1.62%			
Red Knot *Calidris canutus* - NWA								
Catches <= 50 birds	2	7	0	0.0%	0.00%	n.a.	0.797	No
Catches > 50 birds	1	150	5	3.3%	1.47%			
All Catches	3	157	5	3.2%	1.40%			
Ruddy Turnstone *Arenaria interpres* - NWA								
Catches <= 50 birds	3	7	0	0.0%	0.00%	n.a.	0.526	No
Catches > 50 birds	1	50	5	10.0%	4.24%			
All Catches	4	57	5	8.8%	3.75%			
Greater Sand Plover *Charadrius leschenaultii* - NWA								
Catches <= 50 birds	6	147	21	14.3%	2.89%	3.414	0.001	Yes
Catches > 50 birds	3	352	101	28.7%	2.41%			
All Catches	9	499	122	24.4%	1.92%			
Terek Sandpiper *Xenus cinereus* - NWA								
Catches <= 50 birds	5	84	24	28.6%	4.93%	2.859	0.004	Yes
Catches > 50 birds	1	168	23	13.7%	2.65%			
All Catches	6	252	47	18.7%	2.45%			
Oriental Pratincole *Glareola maldivarum* - NWA								
Catches <= 50 birds	2	12	2	16.7%	10.76%	1.158	0.247	No
Catches > 50 birds	2	216	16	7.4%	1.78%			
All Catches	4	228	18	7.9%	1.79%			

These extreme points occur at all sample sizes for both methods. There are 15 above the upper limit and 25 below the lower limit for telescope scans; at a given scan size, there will be more juveniles in an overestimate than an underestimate so this imbalance is not unexpected. For cannon net catches, there are 4 overestimates and 3 underestimates. Here the two largest samples are underestimates so it is not surprising that there are more overestimates.

DISCUSSION

Many examples like those in Figure 1 could be given in which the points apparently show a negative association with sample size. Binomial confidence limits are asymmetric for small samples and probabilities less than 0.5, the lower limit never being less than zero and the upper limit being much greater than the expected population juvenile proportion. The median juvenile percentage in Australia is about 11% and 95% of annual estimates for common species are below 40%. In the absence of confidence levels, these figures can

Table 2. Comparing first year percentages from telescope scans in 2001/02 of 50 birds or fewer with that of samples of more than 50 birds

	No. of Scans	Total No. of Birds	No. of 1st Yr Birds	First year %	SE{First year %}	Zed	Prob.	Significant Difference
Red-necked Stint - SEA								
Scans <= 50	17	439	98	22.3	1.99	8.547	< 0.0005	**Yes**
Scans > 50	48	6302	599	9.5	0.37			
All Scans	65	6741	697	10.3	0.37			
Curlew Sandpiper - SEA								
Scans <= 50	16	325	39	12.0	1.80	1.910	0.028	**Yes**
Scans > 50	7	632	53	8.4	1.10			
All Scans	23	957	92	9.6	0.95			
Sharp-tailed Sandpiper – SEA								
Scans <= 50	21	494	64	13.0	1.51	0.364	0.358	**No**
Scans > 50	13	1377	170	12.3	0.89			
All Scans	34	1871	234	12.5	0.76			

lead observers to believe in an underlying causal relationship which the data do not in fact support. A much more rigorous treatment than the eyeballing of a few dubious figures is required to establish such a relationship.

The pattern of age proportion estimates outside the binomial distribution confidence limits is consistent with the bunching of young birds as described by Rogers *et al*. (in press). In a stable, local population there must be a certain number of first year birds and a certain number of older birds. Where there is bunching, a superfluity of young birds in some parts of the population implies a dearth in other parts; this is seen in Figure 1 where over- and under-estimates occur across the whole range of sample sizes. This bunching occurs in cannon net catches as well as in telescope scans but can only be directly observed in the latter. These over- and under-estimates must largely cancel each other out as the juvenile proportions within the confidence limits are close to the overall value. In these circumstances, given the apparent impossibility of defining a sample space from which random and hence representative samples can be drawn, the only way to proceed is to age as many birds as possible and to base the required estimate of first year proportion on all the birds aged. The statistical justification for this is given by the law of large numbers which effectively says that, for any distribution, the larger the sample the closer will its mean be to that of the population. For samples large enough for this to apply, it can be assumed also that the central limit theorem also applies and standard errors can be calculated as for the binomial distribution; this is equivalent to the normal distribution for large samples.

If first year proportions are truly higher in smaller flocks, representative sampling becomes even harder, and even more birds will need to be aged for the law of large numbers to kick in, depending on the size distribution of flocks aged. This would be particularly difficult for cannon netting which has only limited control over the size of catches. The intention may be to target a particular flock and the aim is usually to catch as many birds as possible for the several purposes for which birds are banded. Large catches are not, however, always achieved and the age composition of catches can be changed by the nature of catching. For example, twinkling birds to move them into the catching area can lead to the disturbance and reformation of flocks. In such a dynamic situation there can be no guarantee that the age composition of a sub-set of a disturbed flock is the same as that applying before twinkling. In practice, it makes little difference to the final estimate of juvenile proportion if data from birds in small catches (e.g. 50 birds or fewer) are, or are not, considered in the estimation.

This is less of a problem for telescope scanning but there could be other problems. It is generally easier to age birds on the periphery of large flocks because they are more visible. If young birds tend to find themselves on or near the periphery of roosting flocks as can happen (Harrington 2004), they may be over-represented in age scans as the periphery is more easily scanned. It is good practice to take scans from different parts of large flocks. Another common scenario that could lead to bias in first year proportions arises because juveniles are less efficient feeders than adults and consequently spend more time feeding (Rogers *et al* in press). Scanning flocks at about roosting time could lead to bias one way (more young birds) if feeding flocks are scanned and bias the other way if only roosting birds are scanned. Including results from scans at such times could bias age proportion estimates.

Large samples are needed to ensure that overall estimates of juvenile proportions are unbiassed. In samples with human respondents, for example, asking the same respondents the same questions more than once, i.e. sampling with replacement, would be silly. Sampling without replacement can lead to sample size approaching that of the population. In such a case, it is proper to apply a finite population correction; this adjusts (reduces) the variance. In the extreme case where the whole population is aged, the adjusted variance is zero. This does not apply in the sampling with replacement which applies in the situations considered here.

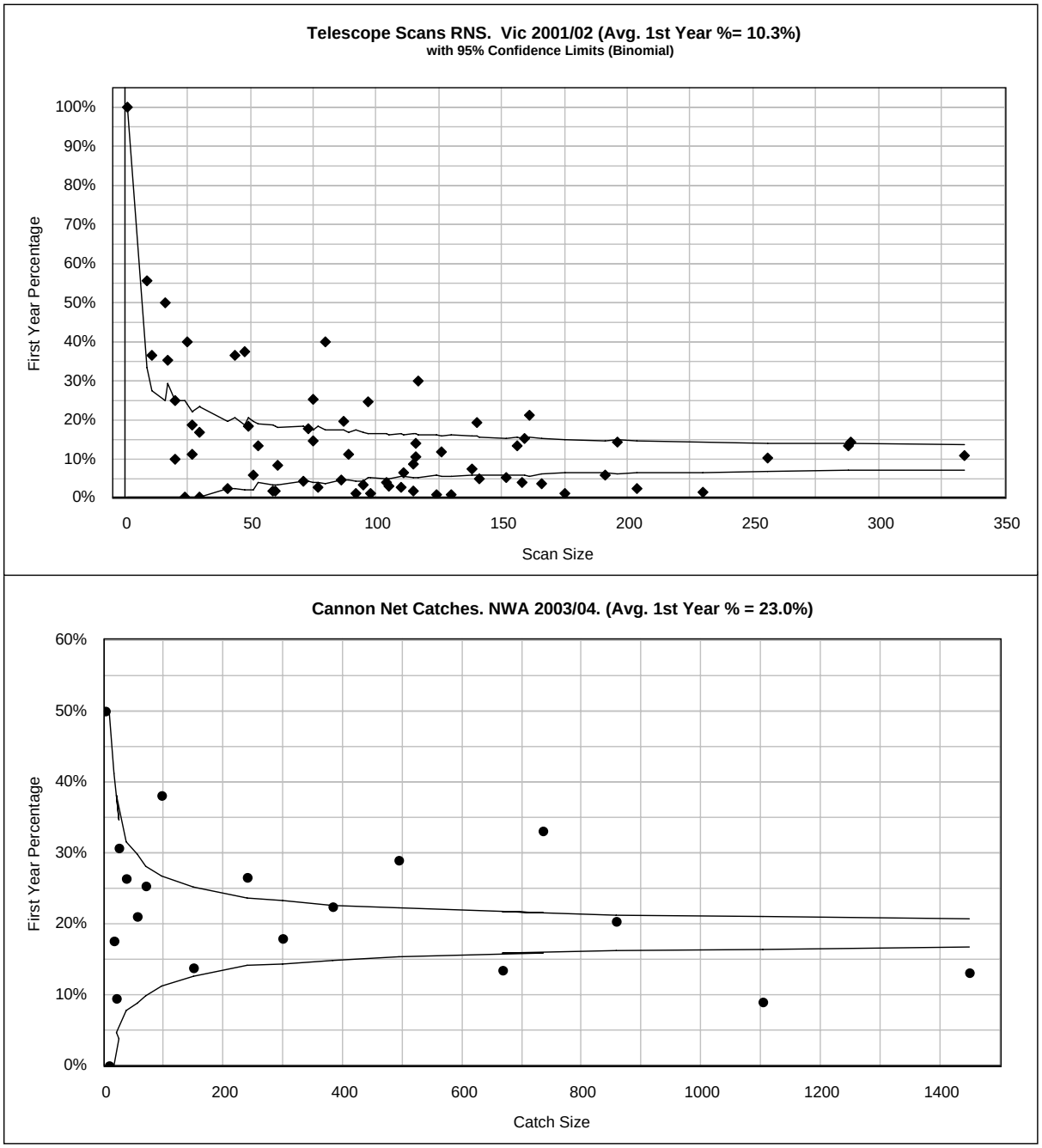

Fig 1. First Year Percentages for Red-necked Stint by Telescope Scans and Cannon Net Catches

In these cases, the population is effectively infinite and it is in fact possible to sample more birds than the population holds. If, however, individual catches or scans approach the size of the local population, it would be simpler and less labour intensive to conduct a population count in parallel with the ageing effort and to apply the finite population correction to the estimate of variance.

In summary, the sampling problem in estimating age representation is essentially the same for cannon netting and telescope scanning. The characteristics of the two methods present different practical problems. The general rule to apply is to age as many birds as possible. A similar situation was described by Harrison and Leddy (1982) who noted non-random distribution in flocks of colour dyed Red Knot. They were using these data to estimate population size and it was only when they combined samples from different flocks that they came up with an answer consistent with an earlier independently reached estimate.

Determining how many birds should be sampled presents something of a problem. There are two aspects. The first is

that we need a better quantitative understanding of the age composition of flocks and how (or if) this varies with flock size, true age proportion, between species, and with habitat and location. Catches and scans are random, but not necessarily representative, samples of flocks. If we have aged enough birds, the population age proportion can be estimated but cannot inform on age representation in flocks unless the flock size associated with each catch or scan is recorded. This has been the practice with telescope scans (Rogers *et al*. in press) but the data await detailed analysis. These data are not normally available for cannon netting due to the practical difficulty of determining what constitutes the flock in the dynamic circumstances of a cannon net catch.

In the absence of compelling evidence, we can think of no reason for not using data from small catches or scans in the calculation of juvenile proportions. Indeed, they can be indispensable as in the case of north-west Australian Curlew Sandpipers in 2003/04; discarding data from small catches in such cases would be unhelpful.

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JUVENILE PERCENTAGES OF MIGRATORY WADERS IN THE 2004/05 AUSTRALIAN SUMMER

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Data are presented on the age composition of primarily cannon-net catches in summer 2004/05 in both south-east Australia (SEA) and north-west Australia (NWA). NWA juvenile percentages were again low, with Great Knot being persistently poor and only Curlew Sandpiper doing well. In SEA juvenile percentages were extremely mixed with exceptionally high figures for Sharp-tailed Sandpiper and Bar-tailed Godwit and very low for Red-necked Stint and Red Knot. Annual monitoring of age proportions will continue in both NWA and SEA.

INTRODUCTION

Australia is the terminus of the southward migration of many wader species and is ideally located to monitor the demographics of birds using the East Asian-Australasian Flyway. Thus the fieldwork banding programmes of the Australasian Wader Studies Group (AWSG) in north-west Australia (NWA) and the Victorian Wader Study Group (VWSG) in south-east Australia (SEA) are strongly oriented, in the period of November to March each year, towards catching adequate-sized samples of as a wide variety of species as possible. The objective is to obtain annual measures of breeding success and survival. This note presents the breeding success results.

Increased emphasis worldwide is now being placed on the demographics of waders (Minton 2003, Sandercock 2003, CHASM 2004). Long-term count data is showing major changes or trends in the populations of various species (Zöckler *et al.* 2003, Wader Study Group Workshop 2003). The causes of these population changes can only be fully explained if there is a parallel knowledge of the factors which control the population, i.e. the recruitment rate of new birds into the population (strongly dependent on annual breeding success) and survival rates (or, conversely, mortality rates). Long-term data sets are necessary and consistency in the methods of gathering data, and analysing it, are prerequisites (Clark & Robinson 2004, Minton *et al.* in press).

For the past six years, the results of monitoring the percentage of juveniles in catches of waders made during the non-breeding season in SEA and NWA were published in *Arctic Birds* (e.g. Minton *et al.* 2004a); these were also printed in *Stilt* (e.g. Minton *et al.* 2004b). The results for 2004/2005 are given here and used as an indication of breeding success for the Arctic summer of 2004.

METHODS

The majority of waders are caught by cannon-netting at daytime high-tide roosts. Because mist-netting worldwide has been shown generally to catch a greater proportion of juveniles than cannon-netting (Pienkowski & Dick 1976), the mist-netting data (only available for NWA) is tabulated separately. The emphasis in this note is placed on data derived from cannon-netting.

Only catches in periods where banding and counting results have shown populations to be relatively stable are included. For NWA, this period is 1 November (by which time most juveniles have arrived) to mid-March (when adults start departing). The corresponding dates for SEA are mid-November to the third week in March (but end-February for Sharp-tailed Sandpiper and Curlew Sandpiper).

As usual, the number of catches that make up the sample for each species is shown, broken down into large (>50) and small (≤50) categories. Recent analyses have shown that there is no general tendency for a consistent relationship between the catch size and the proportion of juveniles (Clark *et al.* 2004, Rogers *et al.* 2005), and therefore the data from large and small catches are combined in the analysis.

Standard errors are again included for the cannon-netted samples. The high standard errors associated with small catches clearly show the justification for the relatively arbitrary exclusion in the past of total catch samples of less than 30 birds from the more detailed analyses of percentage juvenile figures.

There is accumulating evidence to show that the age distribution of waders may vary on a macro- and on a micro-scale (Harrington 2004, Rogers *et al.* in press). In these circumstances, the larger the catch total is for a species, the more accurate will the percentage juvenile figure be (Rogers *et al*. 2005). But the figure is only an estimate of the proportion of juveniles in the population and is perhaps better considered as an index of annual breeding success. The sources of potential bias and the measures taken to minimise these are discussed in more detail by Minton *et al.* (in press).

RESULTS

Catch details and percentage juvenile data for the seven species monitored annually in SEA are shown in Table 1. Adequate samples of all species were obtained. The total of 6,051 Red-necked Stints was the second-highest total in the monitoring period of 27 years for which data are available. Similarly, the 554 Sharp-tailed Sandpipers caught was the third highest sampling total in 24 years. The Sanderling sample of 512 was the largest ever (in 14 years of data). In

Table 1. Percentage of juvenile/first year waders in cannon net catches in south-east Australia in 2004/2005

Species	No. of Catches		Total	Juv./1st year		S.E.
	Large (>50)	Small (≤50)	Caught	(#)	(%)	(% pts)
Red-necked Stint - *Calidris ruficollis*	13	16	6051	596	9.8	0.4
Sharp-tailed Sandpiper - *C. acuminata*	5	5	554	234	42.2	2.1
Sanderling - *C. alba*	3	2	512	83	16.2	1.6
Ruddy Turnstone - *Arenaria interpres*	0	11	244	30	12.3	2.1
Curlew Sandpiper - *C. ferruginea*	1	12	156	34	21.8	3.3
Red Knot - *C. canutus*	1	3	122	36	29.5	4.1
Bar-tailed Godwit - *Limosa lapponica*	0	4	85	32	37.6	5.3

Also Great Knot – *C. tenuirostris* (19 caught, 0 juveniles), Pacific Golden Plover – *Pluvialis fulva* (7, 0), Grey Plover – *P. squatarola* (7, 0), and Whimbrel – *Numenius phaeopus* (3,0). All birds cannon-netted in period 15 November 2004 to 28 February 2005 except for Red-necked Stint, Ruddy Turnstone, and Sanderling for which catches up to 23 March 2005 are included.

contrast, considerable difficulty was experienced in obtaining an adequate-size of sample for Curlew Sandpipers – it took 13 catches to obtain an accumulated total of only 156 birds, with only one catch containing more than 50 Curlew Sandpipers. This difficulty is mainly a reflection of the overall low levels of the Curlew Sandpiper population at present compared with 15 or more years ago. The repeated attempts to catch Curlew Sandpipers is also the main reason for the high Red-necked Stint total, with 29 catches altogether, compared with 19 the previous year.

Similar data from NWA is shown in Table 2 for the seven Arctic-breeding species and the six non-Arctic breeding species for which the sample size in the 2004/2005 non-breeding season was at least 10. All these data were obtained during a special AWSG expedition to NWA (13 February 13 and 5 March) for which a principal objective was to obtain this annual percentage juvenile monitoring data. As usual, the largest sample size (1,037) was for Great Knot. They fill a similar role to Red-necked Stints in SEA, occurring in almost every catch and making it difficult sometimes to obtain adequate samples of other targeted species. This is exacerbated by the extremely hot and humid conditions encountered in the tropical environment of NWA in the November to mid-March sampling period making it necessary to limit the size of catches. In spite of these problems, good samples of eight different species were obtained, and modest samples of five others. As in SEA, Curlew Sandpipers were a problem and it took 11 separate samples of these to reach a catch total of 150 birds. The full results for all seven species of migratory waders which were sampled by mist-netting in NWA are shown in Table 3. Catch totals were of an adequate size for analysis for only three species.

Tables 4 and 5 show how the percentage juvenile figures in the 2004/2005 season compare with the figures obtained in each of the previous six years. The unweighted average of the percentage juvenile figures for these seven seasons is used as a benchmark of breeding success in recent years. Only those species in which the majority of years have been adequately sampled are included in these tables.

DISCUSSION

South-east Australia

For the second year in succession, there was a marked variability between species in their apparent breeding success. Overall however, the percentage juvenile figures for most species were rather higher in 2004/2005 than in 2003/2004. Nevertheless, the 2004 Arctic breeding season would only be classed as moderate based on the figures from SEA.

The highlight in 2004/2005 was the second successive year of high breeding productivity by Sharp-tailed Sandpipers. The 42.2% juvenile figure has only been bettered once in the 24 years for which data are available. It is twice the unweighted average level of 21% for the last seven years and that figure includes the exceptionally high percentage juvenile figures for both last year and this year. It is very noticeable that Sharp-tailed Sandpipers have been much more numerous and widespread throughout SEA during the past two non-breeding seasons, but especially during 2004/2005. After a long period of decline in numbers, these two successive years of good reproductive success will hopefully reverse the previous downwards trend in population.

Bar-tailed Godwits also had a brilliant breeding year in 2004. Banding and flagging has shown that all the Bar-tailed Godwits which visit SEA are from the Alaskan, not the Siberian, breeding grounds. The 37.6% juvenile figure was the second highest in 16 years of available data, and was more than twice the unweighted average of the last seven years. With results for three of the past four years indicating very poor breeding success, the good performance in 2004 was timely.

The first-year percentage for Curlew Sandpipers which visit SEA was higher than the unweighted average over the last seven years. Although the figure of 21.8% juveniles appears modest, it has only been bettered three times in the 26 years for which data are available. Sanderling and Ruddy Turnstone appear to have had only moderate breeding success in 2004, with percentage juvenile figures being close to the unweighted average of recent years.

The bad news relating to 2004 breeding success concerns Red-necked Stint and Red Knot. The 9.8% juveniles for Red-necked Stint is less than half the unweighted average for the last seven years. This itself is boosted by four exceptionally good years in the six years between 1998 and 2003. Thus on a long-term basis, the Red-necked Stint outcome for 2004 does not appear quite so poor with eight

Table 2. Percentage of juvenile/first year waders in cannon net catches in north-west Australia in 2004/2005

Species	No. of Catches		Total Caught	Juv./1st year		S.E. (% pts)
	Large (>50)	Small (≤50)		(#)	(%)	
Arctic Breeders						
Great Knot - *Calidris tenuirostris*	6	5	1037	33	3.2	0.5
Bar-tailed Godwit - *Limosa lapponica*	2	3	270	18	6.7	1.5
Red-necked Stint - *C. ruficollis*	1	6	152	20	13.2	2.7
Curlew Sandpiper - *C. ferruginea*	1	10	150	32	21.3	3.3
Ruddy Turnstone - *Arenaria interpres*	0	3	24	4	16.7	7.6
Red Knot - *C. canutus*	0	3	24	3	12.5	6.8
Broad-billed Sandpiper - *Limicola falcinellus*	0	1	15	6	40.0	12.6
Non-Arctic Breeders						
Greater Sand Plover - *Charadrius leschenaultii*	3	5	351	74	21.1	2.2
Terek Sandpiper - *Xenus cinereus*	1	9	231	32	13.9	2.3
Grey-tailed Tattler - *Heteroscelus brevipes*	2	8	208	22	10.6	2.1
Black-tailed Godwit - *L. limosa*	1	1	52	2	3.8	2.7
Oriental Plover - *Ch. veredus*	0	2	21	11	52.4	10.9
Little Curlew - *Numenius minutus*	0	3	10	4	40.0	15.5

Also Marsh Sandpiper - *Tringa stagnatilis* (6 caught, 0 juveniles), Common Greenshank – *T. nebularia* (5, 0), Lesser Sand Plover – *Ch. mongolus* (4, 2), Grey Plover – *P. squatarola* (3, 0), Pacific Golden Plover – *Pluvialis fulva* (2, 0), Asian Dowitcher – *Limnodromus semipalmatus* (1, 0), and Sanderling - *C. alba* (1, 1). All birds cannon-netted in period 1 November 2004 to mid-March 2005 (actually all in period 13 February to 5 March).

Table 3. Percentage of juvenile/first year waders in mist net catches in north-west Australia in 2004/2005

Species	No. of Catches		Total Caught	Juv./1st year		S.E. (% pts)
	Large (>50)	Small (≤50)		(#)	(%)	
Oriental Plover - *Charadrius veredus*	1	1	91	52	57.1	5.2
Sharp-tailed Sandpiper - *Calidris acuminata*	0	4	110	19	17.3	3.6
Marsh Sandpiper - *T. stagnatalis*	0	3	9	5	55.6	16.6
Wood Sandpiper - *T. glareola*	0	3	7	3	42.9	18.7
Long-toed Stint - *C. subminuta*	0	2	4	1	25.0	21.7
Oriental Pratincole - *Glareola maldivarum*	0	3	44	12	27.3	6.7
Pin-tailed Snipe - *Gallinago stenura*	0	1	1	0	-	-

All birds mist-netted near Broome and at Anna Plains (near 80 Mile Beach) between 30 October 2004 and 26 February 2005.

years having lower percentage juvenile outcomes in the 27 years for which data is available. However it is the second-lowest figure for Red-necked Stints in the last 12 years. In the early part of the 2004/2005 sampling period, it was feared that the data would show it to be a disastrous breeding year in 2004 for this species, comparable with the renowned universal worst-ever Arctic-breeding success year of 1992. The first major sample, two catches totalling 1,732 Red-necked Stints at one of the main monitoring locations, contained only 6.6% juveniles, the same figure as obtained at that location after the 1992 breeding season. These were the equal lowest figures in 20 years of sampling at this site. It was of particular concern also because this site normally holds a higher percentage of juveniles than other sampling locations in SEA. It is fortunate that later sampling at the other regular monitoring locations did not show quite such a poor breeding outcome for the Red-necked Stint.

The proportion of juvenile Red Knot in catches was the fourth lowest in 14 years of sampling. Again, the figure was only a little over half the unweighted average for the recent years where adequate samples have been available. The apparent high absolute figure of 29.5% for 2004/2005 needs to be looked at in context because the SEA population of juvenile Red Knots is greatly augmented each year by many of the juveniles which will ultimately spend their non-breeding season in future years in New Zealand. These juveniles remain in SEA in their first austral summer but revert to non-breeding areas in New Zealand in subsequent years. Percentage juvenile figures for Red Knot thus fluctuate more widely, and about a much higher figure, than for any other species.

North-west Australia

For waders spending the non-breeding season in north-west Australia, the 2004 northern breeding season seems to have been a poor one. Only one species, Curlew Sandpiper, had a higher percentage juvenile figure in 2004/05 than in

Table 4. Percentage of birds in wader catches in south-east Australia, 1988/1989 to 2004/2005

Species	98/99	99/00	00/01	01/02	02/03	03/04	04/05	Unweighted Average
Ruddy Turnstone - *Arenaria interpres*	6.2	29	10	9.3	17	6.7	12	13
Red-necked Stint - *Calidris ruficollis*	32	23	13	35	13	23	10	21
Curlew Sandpiper - *C. ferruginea*	4.1	20	6.8	27	15	15	22	16
Sharp-tailed Sandpiper - *C. acuminata*	11	10	16	7.9	20	39	42	21
Sanderling - *C. alba*	10	13	2.9	10	43	2.7	16	14
Red Knot - *C. canutus*	(2.8)	38	52	69	(92)	(86)	29	53
Bar-tailed Godwit - *Limosa lapponica*	41	19	3.6	1.4	16	2.3	38	17

All birds cannon-netted between late November 2004 and third week in March 2005 (ecept Sharp-tailed Sandpiper and Curlew Sandpiper to end of February only). Unweighted averages exclude figures in brackets (small samples).

Table 5. Percentage of birds in wader catches in north-west Australia, 1988/1989 to 2004/2005

Species	98/99	99/00	00/01	01/02	02/03	03/04	04/05	Unweighted Average
Arctic Breeders								
Red-necked Stint - *Calidris ruficollis*	26	46	15	17	41	10	13	24
Curlew Sandpiper - *C. ferruginea*	9.3	22	11	19	15	7.4	21	15
Great Knot - *C. tenuirostris*	2.4	4.8	18	5.2	17	16	3.2	9
Red Knot - *C. canutus*	3.3	1.4	9.6	5.4	32	3.2	(12)	11
Bar-tailed Godwit - *Limosa lapponica*	2.0	10	4.8	15	13	9.0	6.7	9
Non-Arctic Breeders								
Greater Sand Plover - *Charadrius leschenaultii*	25	33	22	13	32	24	21	24
Terek Sandpiper - *Xenus cinereus*	12	(0)	8.5	12	11	19	14	13
Grey-tailed Tattler - *Heteroscelus brevipes*	26	(44)	17	17	9.0	14	11	16
Little Curlew - *Numenius minutus*	57	33	-	36	30	-	(40)	39

All birds cannon-netted in the period 1 November 2004 to mid-March 2005. Unweighted averages exclude figures in brackets (small samples).

2003/04. In all but one of the seven species where adequate data is available in 2004/05 the percentage juvenile figure in that year was lower than the seven-year unweighted average.

No species sampled showed a percentage juvenile figure which would be classed as very good. Curlew Sandpiper had the best breeding outcome with 21.3% juveniles being the second best result in the last seven years. This is markedly better than the poor outcome in 2003/04 and significantly above the seven-year unweighted average of 15%. It is also of interest that the Curlew Sandpiper figure in NWA was similar to that in SEA (21.8%), a closer correlation than observed in most years.

Greater Sand Plover and Terek Sandpiper had breeding outcomes close to the unweighted seven-year average. The percentage juvenile figure for Bar-tailed Godwit was quite low, suggesting a poor breeding season for central northern Siberian breeding Bar-tailed Godwit especially in comparison with the excellent breeding success of those in Alaska. Grey-tailed Tattler also had a poor breeding outcome.

The worst apparent breeding performances in the 2004 Arctic summer were however Great Knot and, as in SEA, Red-necked Stint. The 3.2% figure for Great Knot is the lowest for six years and is only at a level equivalent to a third of the annual average percentage juvenile figure. Red-necked Stint were not quite as bad, with a percentage juvenile figure just under half of the unweighted average. The 13.2% figure for 2004/05 is significantly higher than the 9.8% figure for SEA.

The mist-netted samples are currently mostly too small, and the data series too short, for any significant conclusions to be drawn from percentage juvenile figures at this stage. Hopefully in future years data will continue to accumulate on species that are mainly caught by this technique so that valid annual comparisons can be made.

CONCLUSION

Fieldwork programs for the 2005/06 season have already been drawn up for SEA and NWA. This should facilitate the continuing extension of the percentage juvenile monitoring data and its use as an indication of breeding success for each species. The next expedition to NWA will be from 12 November to 3 December, so the sampling there will take place earlier, and that in SEA later, in the overall sampling period than normally.

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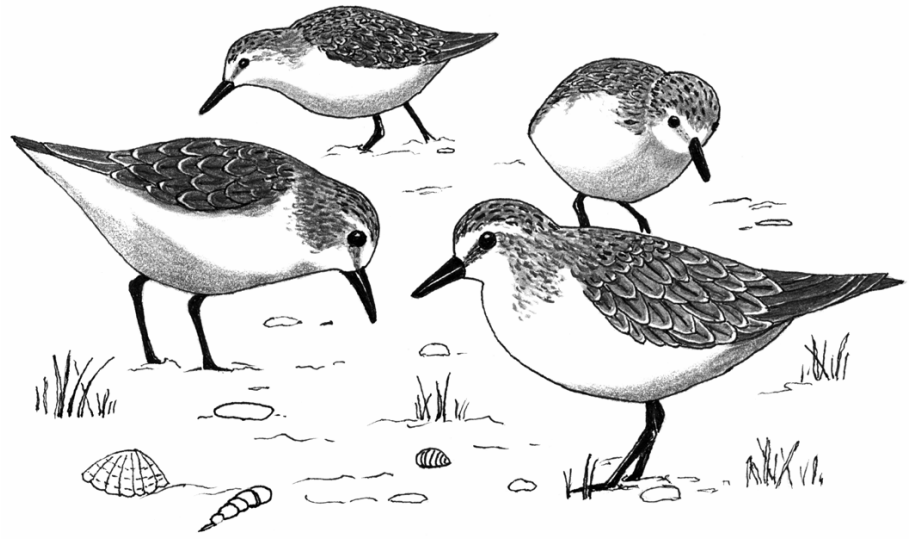

MIGRATORY SHOREBIRD BANDING WORKSHOP, CHONGMING DONGTAN NATURE RESERVE, SHANGHAI, CHINA, 30 AUGUST – 7 SEPTEMBER 2004

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INTRODUCTION

Waders have been banded at Chongming Dao sporadically since the 1980s. In recent years banding has been undertaken more regularly with 1,355 birds of 30 species banded during 2003 and some 1,500 birds banded on northward migration in 2004. Mark Barter had visited the site and held discussions with local reserve staff and Professor Wang Tianhou, East China Normal University about the high proportion of juveniles caught on southward migration 2003. Some concern was expressed as to whether the birds were being correctly aged – there being no suitable guide or reference book available in Chinese. Wang Tianhou held discussions with the Shanghai Forestry Bureau and I was invited to visit Chongming Dao during the southward migration 2004 to run a training workshop on ageing waders.

CHONGMING DONGTAN NATURE RESERVE

The Reserve (provincial status) is a Ramsar Site and a Flyway Network Reserve. It supports internationally important numbers of five species on northward migration, but lower numbers on southward migration (Barter 2002). The present headquarters building was opened in April/May 2004 and is a four storey 'European' style structure. It includes living quarters for about 20 staff and offices and meeting rooms. The building is well supplied with computers, photocopier, etc., and the room used for lectures had curtains and air conditioning. As Wang Tianhou noted, in relation to both his university and the Reserve, hardware is not a problem, what they lack is software (i.e. they need capacity building/training).

PREPARATION FOR THE WORKSHOP

There is currently no text available for aging waders in China other than Prater *et al*. (1977). In 2002 and again in 2004 Peter Collins and I had discussed with staff of the China National Bird Banding Center regarding the idea of modifying and updating the BTO Guide for use in China. Subsequently I obtained agreement from the BTO for use of their material. Work on the revision is currently at a very early stage. The volume of *Fauna Sinica* on waders is reported to be in preparation but, based on other volumes in the series, is unlikely to contain much information on ageing characters.

For the Training Workshop I developed five PowerPoint presentations on the following topics:

- Wader biometrics
- Moult
- Ageing waders
- Ageing and sexing waders – species examples
- Curlew Sandpiper migration

I also took two other PowerPoint presentations on aspects of avian influenza.

The Reserve provided tide details; see Figure 1.

A list of participants is given in the Appendix. Contact details are available from the author. A total of 21 people registered and the initial class work was well attended, but field work was usually restricted to one reserve staff member (Zhang Kejia) and the participants from the two universities.

TIMETABLE

28 August	Fly New Zealand – Shanghai.
29 August	a.m. East China Normal University, discussion with post-graduate students p.m. Transfer to Chongming Dongtan Nature Reserve.
30 August	a.m/p.m. Lecture sessions in Reserve HQ – biometrics, moult, ageing and Curlew Sandpiper migration.
31 August	a.m. Visit to saltmarsh and tidal area in Reserve Core Area. p.m. Seminar with staff from country Forestry Offices with Shanghai Municipality. Presentations on the East Asian-Australasian Flyway (using part of a PowerPoint prepared by Mark Barter) and on avian influenza and the 2003/2004 H5N1 outbreak.
1 September	a.m. Heavy rain so no trapping. Lecture on 'Ageing and sexing – species examples', followed by practical session on flag making led by the Reserve staff. p.m. Practical banding in the field.
2 September	a.m Banding. p.m. Practise measurements on a casualty (Far Eastern Curlew). Recap on moult recording.
3 September	a.m. Banding. p.m. Heavy rain. Recap session on Ruff sizes, band sizes for Terek Sandpipers and tattler identification in the hand. Discussion about 'carrying capacity' and how it might be studied, and presentation on avian influenza in waders.

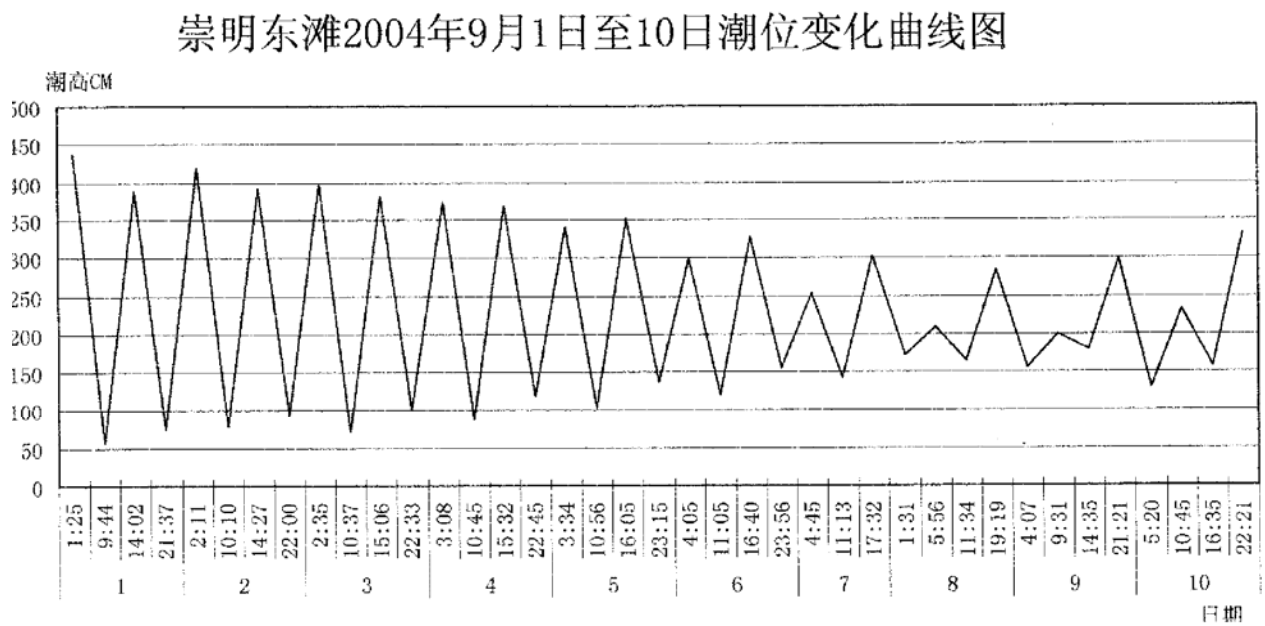

Figure 1. Tide predictions for Chongming Dao, September 2004 (supplied by Nature Reserve). Ordinate is tide height in centimetres. Abscissa gives time of high and low tides on each day of the survey with 30 August as Day 1.

4 September a.m. Banding.
p.m. Presentation on how to count waders using a Mark Barter PowerPoint and preparation for count the following day.

5 September a.m. Survey of the core area of the reserve. Workshop participants split into 4 teams.
p.m. Discussion about survey results. Discussion about proposed studies of waders on Jiuduansha – a mudflat/island area *c.*10 km off the coast of Pudan near the new airport. East China Normal (ECNU) and Fudan universities are jointly due to start a 3 year project for the local Government.

6 September a.m. Banding. Introduction to benthos sampling with Jing Kai of Fudan University.
p.m. Discussion about (a) benthos sampling and (b) why we caught so few adult birds. After dinner discussion about radio tracking and stable isotope studies of waders.

7 September a.m. Banding. Visit by reporter and photographer from *Jiefang Daily*, a Shanghai newspaper.
p.m. Visit to the recently developed 'Wetland Park'. Transfer to ECNU.

8 September a.m. Examine specimens with ENCU post-graduate students.
p.m. Examination of study skins at Fudan University.

9 September a.m. Drive to Huangzhou with Wang Tianhou.
p.m. Examine wader specimens Zhejiang Museum of Natural History.

10 September a.m. Sightseeing Hangzhou.
p.m. Return to Shanghai. Meeting with ECNU post-graduate students.

11 September Sightseeing Shanghai.

12 September Return to New Zealand.

BANDING ACTIVITIES

Trapping

Birds were caught by two professional trappers: Jin Weiguo and Zhang Dajin. They each operated one clap net which was placed beside a small, shallow pool in the saltmarsh in which were placed some six decoy mounts (mostly Whimbrel and Great Knot). They usually had one live Whimbrel or Common Greenshank attached to a small bamboo frame which could be lifted by pulling a string. On one occasion a Greenshank was tethered in front of the net, its eyes sewn closed with a fine nylon string passing through the lower eyelids and over the crown. Both trappers were very good at calling in birds using a bamboo 'whistle'. Once caught birds were taken from the net and placed in a large bamboo basket with a coarse fishing net top – this prevented damage to the heads of birds as they jumped up.

I was impressed by the depth of knowledge of the trappers with respect to both the species and age of the birds that they were catching. Whilst their handling of birds appeared rough to someone used to the 'bander's grip' in fact they were aware of the need to keep birds in good condition (when trapping for the food market people would want to buy live rather than dead birds). There are however some improvements which could be made. I suggested placing some shade cloth over the top of the baskets to keep the birds quiet and reduce water loss on hot days –on several occasions birds immediately started drinking once released after banding. Also the use of more than one basket would enable birds to be separated according to size. Whilst I was

there, Red-necked Stints were mixed with Whimbrels in the same cage.

The two trappers were paid by the weight of the birds they caught – ¥ RMB 40 per kg. This meant that they concentrated on larger birds such as Whimbrel. In contrast, for a different study Wang Tianhou had paid trappers per bird (¥ RMB 10 per bird) and his samples were predominantly stints!

Banding

Most workshop participants had at least some previous banding experience. As in earlier workshops at Yalu Jiang (2002 and 2004), I acted as 'advisor' rather than instructor to most participants.

Banding was done using Chinese National Bird Banding Center (CNBBC) bands. These generally are of poor quality – an issue that the Banding Center is aware of but currently seems to be unable to resolve. The smaller sizes were of a hard metal but were difficult to close properly. The larger sizes (for curlews and Whimbrel) were aluminium and poorly stamped so probably will become illegible in a short time. I proposed that all large birds be banded above the 'knee' to reduce saltwater corrosion on the bands and this was agreed. Terek Sandpipers have rather variable tarsi and some birds certainly benefited from a larger size band (I had a similar situation in Hong Kong with British Trust for Ornithology bands). The need to check tarsus diameter when deciding on bands was emphasised.

Flags

The Reserve had previously run out of black and white Darvic and so had made some flags using locally obtained PVC. In the hand this appeared to be a bit softer than Darvic. It is not known whether the white Chinese PVC will discolour in the same way that Japanese material invariably seems to. Future reports of CREAM/YELLOW over BLACK should be considered probably to be from Shanghai. The Reserve seemed to be well used to flag making and Yuan Xiao ably led the flag making session during the Workshop. The Reserve had run out of solvent cement and was using 'superglue' to glue flags. I provided two types of solvent cement from New Zealand.

Totals

During the workshop, 167 birds of 23 species were banded and flagged – see Table 1. The capture of four Ruff is notable as these are the first records of this species for the reserve. There were two casualties – a Far Eastern Curlew which was very weak and a Terek Sandpiper with a broken leg (both were destroyed).

Of the 167 birds caught, all but seven were juveniles. The non-juveniles were four Common Greenshank (three adults and one in its second year) and three adult Whimbrel. One adult Greenshank was in active primary moult ($5^4 4^1 0^5$) as was the second year bird ($5^4 4^2 3^1 V^1 0^2$); the others had all old primaries (0^{10}), as did the Whimbrels.

The high proportion of juvenile birds captured during the Workshop supports the results of previous studies of waders on southward migration at this site. Whilst it is likely that naive juvenile birds are more likely to be trapped than experienced adults, it seems unlikely that this alone can account for the near total lack of adults in the catch. There is very little known about age ratios of waders on the Chinese coast during southward migration, thus it is unclear whether or not the Chongming Dao situation is typical. It is possible that adults departing the breeding grounds may overfly Chongming Dao or use a different migration route to

Table 1. Birds banded during Workshop, September 2004

Species	01-Sep	02-Sep	03-Sep	04-Sep	06-Sep	07-Sep	Total
Oriental Pratincole *Pratincola maldivarum*				1			1
Lesser Sandplover *Charadrius mongolus*						1	1
Great Knot *Calidris tenuirostris*				3			3
Red Knot *Calidris canutus*		2					2
Red-necked Stint *Calidris ruficollis*						10	10
Log-toed Stint *Calidris subminuta*				2		3	5
Sharp-tailed Sandpiper *Calidris acuminata*				1			1
Broad-billed Sandpiper *Limicola falcinellus*	4		1		3		8
Ruff *Philomachus pugnax*		2			1	1	4
Common Snipe *Gallinago gallinago*				1			1
Black-tailed Godwit *Limosa limosa*	1				4	1	6
Bar-tailed Godwit *Limosa lapponica*					2		2
Whimbrel *Numenius phaeopus*	1		5	8	6	5	25
Eurasian Curlew *Numenius arquata*		3					3
Far Eastern Curlew *Numeius madagascariensis*					1		1
Common Redshank *Tringa totanus*		2	2			1	5
Marsh Sandpiper *Tringa stagnatilis*		2					2
Common Greenshank *Tringa nebularia*	9	5	2	23	6	3	48
Green Sandpiper *Tringa ochropus*	1						1
Wood Sandpiper *Tringa glareola*	1			7		1	9
Terek Sandpiper *Xenus cinereus*			8	11		3	22
Grey-rumped Tattler *Tringa brevipes*		1				3	4
Turnstone *Arenaria interpres*		2			1		3
Totals	17	19	18	57	24	32	167

juveniles. Chongming Dao lies at the southward limit of the predominantly 'soft' coasts with extensive tidal flats bordering the Bo Hai (Barter 2002), the coast of Zhejiang Province to the south being predominantly rocky. Thus if juveniles cruised along the coast they might accumulate around the mouth of the Yangtze before having to undertake a longer flight. Studies of weights of birds at Chongming Dao could be useful in elucidating this matter.

WATERBIRD COUNT

At the request of the Reserve, Workshop participants undertook a survey of the 'Core Area' of the Reserve on 5 September. The whole length of coast, with the exception of *c*.2 km, was covered by four teams. A total of 1,113 waders was counted. The results are given in Table 2. At the time of the survey it is likely that most of the exposed tidal flats were counted but the wide area of saltmarsh was largely omitted – this area probably would have held a number of birds, at least along the margins of tidal creels where a wide variety of waders fed. The record of Chinese Crested Tern was the first for the Reserve (Zhang *et al.* 2004).

Table 2. Survey of Chongming Dongtan National Nature Reserve, 5 September 2004.

Species	**Group A**	**Group B**	**Group C**	**Group D**	**Total**
Grey Heron *Ardea cinerea*	9	14	24	17	64
Great Egret *A. alba*	-	35	2	-	37
Intermediate Egret *A. intermedia*	-	1	31	19	51
Purple Heron *A. purpurea*	-	-	1	-	1
Cattle Egret *A. ibis*	-	5	13	26	44
Striated Heron *Butorides striatus*	-	-	1	-	1
Little Egret *Egretta garzetta*	-	323	22	104	449
Yellow Bittern *Ixobrychus sinensis*	-	-	3	3	6
Unidentified egret	500	-	243	-	743
Unidentified duck	-	-	-	3	3
Grey Plover *Pluvialis squatarola*	2	13	-	-	15
Kentish Plover *Charadrius alexandrinus*	6	23	31	28	88
Lesser Sandplover *C. mongolus*	2	1	-	11	14
Greater Sandplover *C. leschenaultii*	7	4	-	-	11
Whimbrel *Numenius phaeopus*	25	8	3	58	94
Eurasian Curlew *N. arquata*	1	-	3	3	7
Far Eastern Curlew *N. madagascariensis*	5	-	6	16	27
Black-tailed Godwit *Limosa limosa*	-	6	6	1	13
Bar-tailed Godwit *L. lapponica*	12	-	6	4	22
Spotted Redshank *Tringa erythropus*	11	9	-	-	20
Common Redshank *T. totanus*	18	7	-	-	25
Marsh Sandpiper *T. stagnatilis*	-	-	-	1	1
Common Greenshank *T. nebularia*	114	77	57	24	272
Green Sandpiper *T. ochropus*	-	3	-	2	5
Terek Sandpiper *T. cinereus*	3	18	14	14	49
Common Sandpiper *T. hypoleucos*	-	2	-	1	3
Ruddy Turnstone *Arenaria interpres*	-	-	-	1	1
Great Knot *Calidris. tenuirostris*	-	-	31	1	32
Red Knot *C. canutus*	-	4	3	-	7
Sanderling *C. alba*	1	-	6	7	14
Red-necked Stint *C. ruficollis*	31	42	62	50	185
Long-toed Stint *C. subminuta*	-	-	3	11	14
Sharp-tailed Sandpiper *C. acuminate*	-	3	-	-	3
Dunlin *C. alpina*	11	60	53	5	129
Curlew Sandpiper *C. ferruginea*	-	1	-	-	1
Broad-billed Sandpiper *Limicola falcinellus*	-	-	20	1	21
Unidentified curlew	-	-	8	-	8
Unidentified godwit	-	-	3	-	3
Unidentified sandplover	-	-	2	-	2
Unidentified other shorebird	8	-	16	2	26
Herring Gull Larus argentatus	-	-	11	-	11
Common Black-headed Gull L. ridibundus	72	3	70	-	145
Saunder's Gull L. saundersi	-	-	2	-	2
Gull-billed Tern *Sterna nilotica*	48	3	-	-	51
Chinese Crested Tern *S. bernsteini*	1	-	-	-	1
Common Tern *Sterna hirundo*	20	5	5	9	39
Little Tern *S. albifrons*	5	-	-	3	8
Whiskered Tern *Childonias hybridus*	-	3	-	5	8
White-winged Black Tern *C. leucopterus*	9	25	90	5	129
Unidentified tern	297	-	10	-	307
Totals	1218	698	861	435	3213

Note: Nomenclature follows Wetlands International (2002).

It is well established that Chongming supports many more birds (greater by an order of magnitude) on northward than southward migration.

FOLLOW-UP

Since returning to New Zealand I have received updates on catching at Chongming Dao and have been sent several photographs of birds which I was asked to help age – the wonders of modern technology allow for such speedy communication and it has proved valuable in allowing timely follow up especially on species which were not handled during the Workshop (e.g. Curlew Sandpiper).

I have also received requests for information/advice from some of the postgraduate students regarding their studies.

FUTURE TRAINING POSSIBILITIES

Chongming Dao is an important site for migrating shorebirds in the East Asian – Australasian Flyway and has the potential to continue as a regular banding/flagging site. As is often the case in China, personnel changes are likely, but this cannot be helped.

The Reserve is planning to run training courses in wetland ecology, research and management in future and it is possible that banding and flagging might be included – my understanding is that this would be subject to agreement by the National Banding Center. Whilst the Reserve staff seem to be reasonably competent the Reserve is probably not yet ready to take the lead on bander training and AWSG could usefully consider further involvement in this. The site has the advantage that professional trappers can catch birds and thus emphasis can be on 'bird in the hand' training. This was generally lacking during the Yalu Jiang courses in 2002 and 2004.

Future training at Chongming would need to consider training people in mist-net extraction (elsewhere the employment of commercial bird trappers would not be an option). There appear to be opportunities for passerine banding at Chongming which would provide some training opportunities. Mist netting of waders at Chongming has previously been attempted by Doug Watkins and Mark Barter but with very limited success and the Reserve staff think that mist-netting waders is not viable. The apparent lack of any high tide roost certainly would make mist netting difficult but I think it would be worthy trying in future. Together with clap netting waders and mist-netting passerines, mist-netting even a few waders would be of value in the overall context of a banding course.

OVERALL ASSESSMENT

The Training Workshop was successful in training participants in ageing birds and the correct methods for collecting moult and biometric data. My visit allowed an assessment of the suitability of the Reserve for possible future bander training activities and identified some potential training activities.

ACKNOWLEDGEMENTS

The Australasian Wader Studies Group covered my travel costs. Local on-ground costs whilst at the Reserve were covered by the reserve/Shanghai Forestry Bureau, and by East China Normal University for the rest of my stay. I am grateful to these organisations for their support and to all who participated in the course, especially Wang Tianhou and Zhang Kejia.

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APPENDIX. List of Workshop participants, September 2004

School of Life Sciences, East China Normal University

Tianhou Wang	Hui Zhou	Liehen Zhou
Wenyu Shi	Zhenming Ge	

School of Life Sciences, Fudan University

Zhijun Ma	Xiaojing Gan	Kai Jing

Monitor Center for Wildlife and Wetland Resources, Fujian Province

Xi Yu	Zhonglan Yang	Jianquan Chen

Wai Gao Qiao Power Factory

Jiyi Wang

Chongming Dongtan National Nature Reserve

Haiwei Yan	Kejia Zheng	Dongliang Niu
Chendong Tang	Saijun Yuan	Boxing Liu
Zhizong Geng	Wei Shi	Xiao Yuan

SURVEY OF THE SHOREBIRDS OF PORT STEPHENS, FEBRUARY 2004

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The population of migratory and resident shorebirds in Port Stephens in NSW was surveyed using boats at high tide on 8 February 2004. The total population was 2,053 shorebirds, with 13 species present. Two species, Eastern Curlew and Pied Oystercatcher, were present in numbers representing >1% of their total world population, 2% of the Australian population of Whimbrel were present, and around 0.5% of the Australian populations of Bar-tailed Godwit and Sooty Oystercatcher. The results, and the data available for Port Stephens between 1970 and 1990, demonstrate that Port Stephens has been an important shorebird habitat over the long term. The 2004 survey is the first complete survey of the area and it provides baseline data that can be used to manage shorebirds and their habitat in Port Stephens.

INTRODUCTION

Port Stephens in NSW, approximately 200 km north of Sydney, is nowadays a popular tourist and recreational area. The south-eastern part of Port Stephens has undergone substantial development especially over the past 20 years or so and the north-eastern area has also seen considerable growth in holiday and retirement housing. Boating, swimming and other water-based activities are very popular particularly during weekends and school holidays.

The utilisation of Port Stephens by migratory and resident shorebirds is well known albeit not very systematically studied or documented. The key available information is reviewed below.

In 1980, consideration was being given to the establishment of a nature reserve (to be named Pipeclay Creek N.R.) encompassing large tracts of the western side of Port Stephens and several nearby islands (Bartram 1980). The importance to shorebirds was a factor in the deliberations. One area in particular was noted as being a prime roosting site for shorebirds with 13 species mentioned as occurring there (10 of these being migratory species). Especially noteworthy were counts of up to 400 Eastern Curlew in summer and up to 150 Double-banded Plover in winter. Although the Pipeclay Creek proposal did not proceed, the main roosting site has more recently been proclaimed as the Worimi Nature Reserve. This Nature Reserve continues to be important for roosting (and feeding) shorebirds, with 21 species (14 migratory) having been recorded there over 2000-2004 (Stuart 2004).

During the summer of 1979/1980, an ebb-tide survey of the northern side of Port Stephens identified nine distinct locations for feeding shorebirds (Pegler 1980). Sixteen species were recorded (13 migratory) in this survey, with a total count of at least 689 birds and potentially up to 978 birds (not all areas were able to be surveyed on the same day, thus allowing for the prospect of some double counting). Of particular interest was a count of 235 Grey-tailed Tattler around the shoreline of Pindimar Bay – this is substantially larger than any other known count for this species in the area.

Over 1982-1984, members of the Hunter Bird Observers Club (HBOC) participated in the twice yearly national shorebirds surveys conducted by the Australasian Wader Studies Group. Some locations around Port Stephens were visited in these surveys, thus giving a partial insight into the populations then present. The three summer surveys revealed 707-1,700+ birds, and 339-450 birds in the winter surveys (Stuart 2004). The variability in the counts especially for the summer surveys is possibly due to the incompleteness of coverage of the full Port Stephens habitat. A total of 23 species (15 migratory) were recorded in the six surveys over 1982-1984.

Smith (1991) described Port Stephens as the most important site in NSW for Whimbrel and one of the two most important sites for Eastern Curlew. He noted that both these species and the Pacific Golden Plover had been recorded in Port Stephens in numbers above 1% of their national population. Smith nominated Port Stephens as a Priority 2 site for NSW – one of only 5 such sites in NSW (and with the only nominated Priority 1 site being the Hunter estuary).

Since the mid 1980s there has been no systematic surveying of Port Stephens for shorebirds, apart from monthly high tide visits to the Worimi Nature Reserve since September 2000 (Stuart 2004). To redress this and establish a current understanding of the relative importance of Port Stephens, a survey was undertaken at high tide on Sunday 8 February 2004. Several members of Hunter Bird Observers Club participated in the survey as did officers from NSW National Parks & Wildlife Service (NPWS) and NSW Waterways.

METHODS

The survey was done on 8 February 2004 by boat, with counting done from the boats using binoculars. Five boats were used, allowing five sub-areas of Port Stephens to be surveyed simultaneously. The five survey routes are indicated in Figure 1. The south-east was not surveyed, because on Sundays in summer this area is full of people and no shorebirds are present.

HBOC supplied 13 bird observers, with 2-4 people allocated to each boat. NPWS and NSW Waterways officers skippered each boat thus allowing the observers to concentrate on identification and counting. Weather conditions were warm, sunny and calm initially, with a gentle breeze building towards the end of the survey. Port

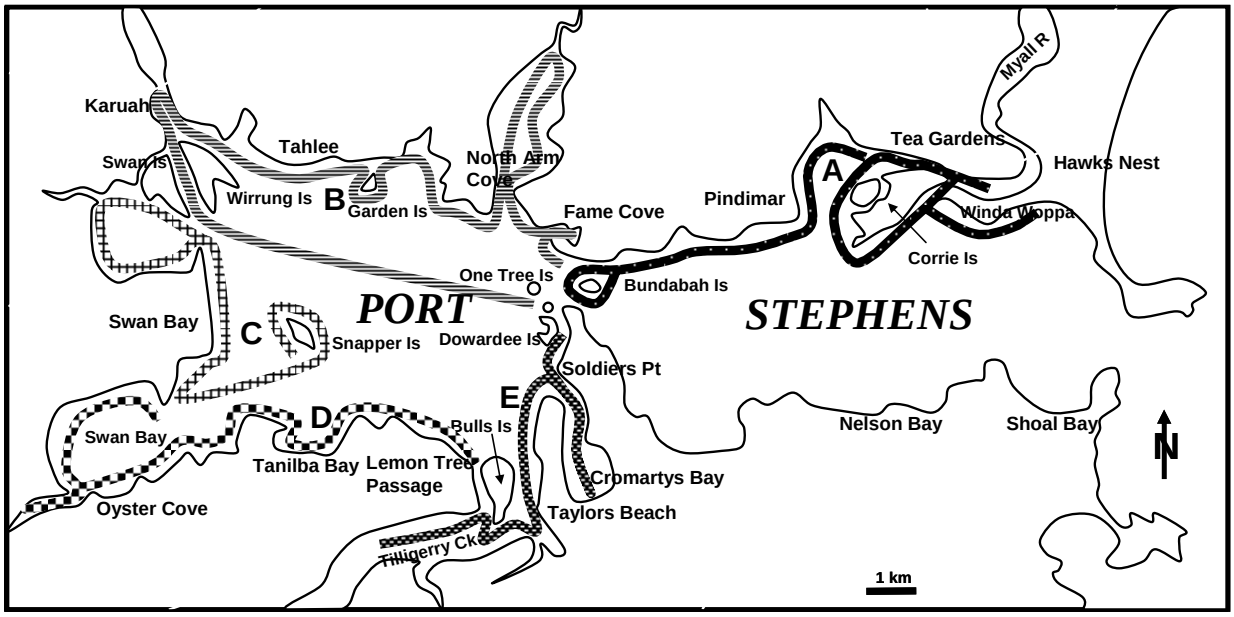

Figure 1. Areas of Port Stephens Surveyed February 2004

Stephens is subject to strong north-easterly sea breezes, particularly in the afternoon, so an early high tide was chosen to take advantage of the morning calm. The survey boats departed from Nelson Bay Marina at 10 a.m. and returned 2½ to 3½ hours later, depending on the route required and how far away it was from the marina.

RESULTS

In total, 2,053 shorebirds were recorded, comprising 13 species as detailed in Table 1. Although the survey's main concern was shorebirds, all of the waterbirds that were seen were counted. An additional 2,417 waterbirds from 24 species were present giving a total of 4,470 birds from 37 species. Information about the non-shorebirds is presented elsewhere (Stuart 2004).

Main Roost Areas

There were 13 areas where shorebirds were roosting in numbers of >20 (considering all the shorebird species present). These areas are detailed in Table 2; generally the birds were at a single site within each area but on Corrie Island and along Tilligerry Creek the birds were spread over three to four places within a relatively short distance. The 13 areas altogether hosted 90% of the shorebirds found on the survey.

Most birds were roosting on land, but one factor identified by the survey was the importance of emergent posts as roost sites. Emergent posts were mainly but not exclusively associated with oyster leases. In addition to the shorebirds, many other waterbird species also roosted on

Table 1. Shorebirds Recorded at Port Stephens on 8 February 2004

Species	Total	Route A	Route B	Route C	Route D	Route E
Black-tailed Godwit	51	50	-	-	-	1
Bar-tailed Godwit	888	410	53	105	289	31
Whimbrel	218		25	1	33	159
Eastern Curlew	649	156	28	455	8	2
Terek Sandpiper	6	-	-	-	6	-
Common Sandpiper	1	-	-	-	1	-
Grey-tailed Tattler	44	-	-	-	-	44
Ruddy Turnstone	8	-	-	-	8	-
Red-necked Stint	20	-	-	-	20	-
Pied Oystercatcher	112	57	18	27	2	8
Sooty Oystercatcher	18	4	10	2	-	2
Lesser Sand Plover	5	-	-	-	5	-
Masked Lapwing	33	-	8	-	1	24
TOTAL	**2,053**	**677**	**142**	**590**	**373**	**271**

(See Figure 1 for the survey routes A-E)

Table 2. Significant Locations in Port Stephens for Roosting Shorebirds

Location	Total Shorebirds	% of total	Shorebirds Present
Winda Woppa Point	121	5.9%	4 Sooty Oystercatcher, 55 Eastern Curlew, 52 Pied Oystercatcher, 10 Bar-tailed Godwit
Corrie Island (at 3 places)	~556	27.1%	101 Eastern Curlew, ~400 Bar-tailed Godwit, ~50 Black-tailed Godwit, 5 Pied Oystercatcher
E side of North Arm Cove	25	1.2%	25 Whimbrel
Oyster leases off Tahlee	53	2.6%	53 Bar-tailed Godwit
North of Swan Bay	~463	22.6%	10 Bar-tailed Godwit, 1 Whimbrel, ~450 Eastern Curlew, 2 Pied Oystercatcher,
Oyster leases off Swan Bay	104	5.1%	81 Bar-tailed Godwit, 23 Pied Oystercatcher
West of Tanilba Bay	80	3.9%	78 Bar-tailed Godwit, 2 Pied Oystercatcher
Oyster leases off Oyster Cove	55	2.7%	9 Whimbrel, 46 Bar-tailed Godwit
Oyster Cove village	117	5.7%	77 Bar-tailed Godwit, 1 Common Sandpiper, 6 Terek Sandpiper, 8 Ruddy Turnstone, 5 Lesser Sand Plover, 20+ Red-necked Stint
One Tree Island	43	2.1%	25 Eastern Curlew, 16 Pied Oystercatcher, 2 Sooty Oystercatcher
Cromartys Bay	49	2.4%	1 Black-tailed Godwit, 30 Bar-tailed Godwit, 17 Whimbrel, 1 Eastern Curlew
Dowardee Island	26	1.3%	26 Grey-tailed Tattler
Tilligerry Creek (at 4 places)	166	8.1%	1 Bar-tailed Godwit, 132 Whimbrel, 16 Grey-tailed Tattler, 17 Masked Lapwing
Totals	1,858	90.0%	

emergent posts, in particular cormorants, pelicans, gulls and terns (Stuart 2004).

Distribution of Species

Distribution maps for most of the shorebird species recorded in the survey are presented in Figures 2 to 9. Most of the species that were present in at least moderate numbers overall, were found to be distributed over several roosting sites, indicating that it is Port Stephens overall that is their habitat and not just some parts of it. Several species were recorded at only one location (Oyster Cove) and distribution maps for them have not been included. The species recorded solely at Oyster Cove were Terek Sandpiper, Common Sandpiper, Ruddy Turnstone, Red-necked Stint and Lesser Sand Plover.

Annotated Species List

The shorebird species recorded in 2004 are discussed separately below.

Black-tailed Godwit. Smith (1991) recorded only a single record in Port Stephens over 1970-1990 for this species, which is listed as Vulnerable under the NSW Threatened Species Act. The count of 51 birds in February 2004 is easily the highest known record. However, the status for the species must be considered to be uncertain in Port Stephens. The February 2004 roost site on Corrie Island is one that is not readily accessible; also identification from Bar-tailed Godwit is not easy for inexperienced observers. More research into the status in Port Stephens is warranted (particularly given its Vulnerable status).

Bar-tailed Godwit. The count of 888 birds in the 2004 survey confirms the previously suspected belief that this species is a common and abundant shorebird of Port Stephens. The count is consistent with the count of 600+ birds by Hunter Bird Observers Club in a partial survey of Port Stephens for the Australasian Wader Studies Group in 1982 (Stuart 2004). The 2004 count represents >0.5% of the total population of the sub-species *baueri* that visits Australia each summer (Wetlands International 2002). Counts of 1,000-1,200 birds also occur commonly in the Hunter estuary (Hunter Bird Observers Club, unpublished data). Since the two locations are less than 75 km apart, exchanges between them may well occur and this possibility should be investigated.

Whimbrel. The count of 218 birds is consistent with a record of 260 birds in Port Stephens in 1982 (Smith, 1991). The majority of other known records for the area are of <20 birds, but these are based on opportunistic observations (Stuart 2004). Most of the birds present in February 2004 were roosting in mangroves, in an area not usually visited by bird observers. It seems quite possible that 200+ birds are regularly present in Port Stephens in summer. These numbers represent more than 2% of the Australian migrating population (sub-species *variegatus*) and well over 30% of the estimated NSW population of 700 birds (Watkins 1993).

Figure 2. Distribution of Black-tailed Godwit.

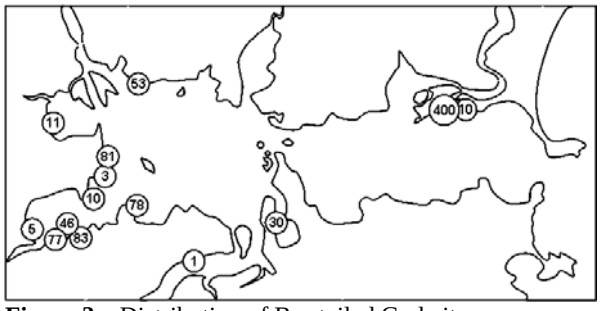

Figure 3. Distribution of Bar-tailed Godwit

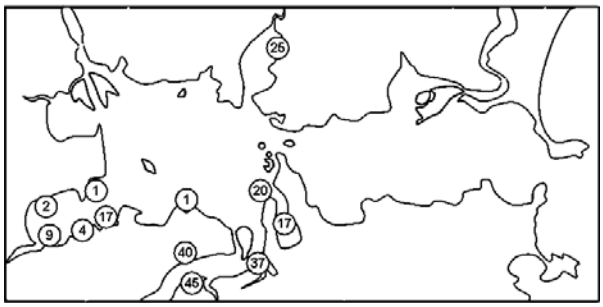

Figure 4. Distribution of Whimbrel

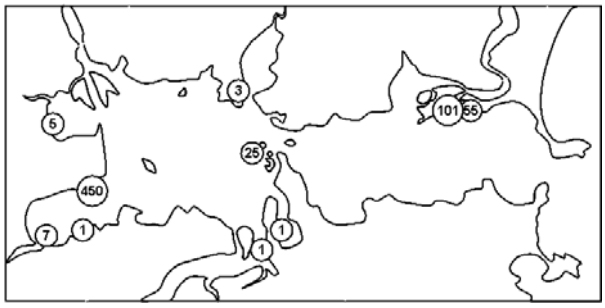

Figure 5. Distribution of Eastern Curlew

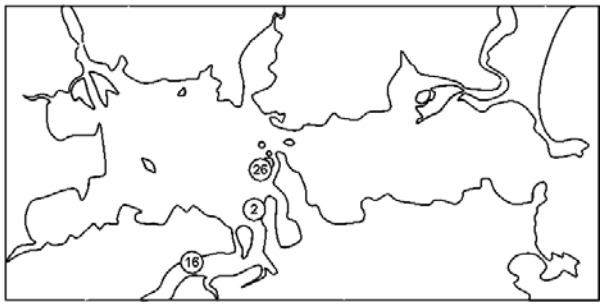

Figure 6. Distribution of Grey-tailed Tattler

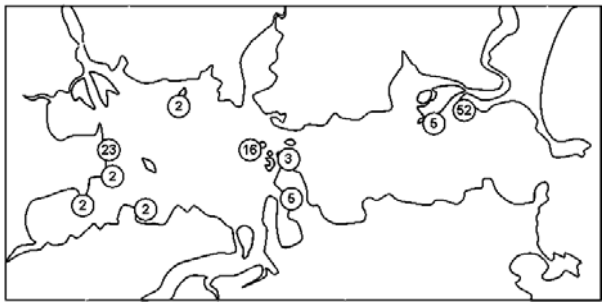

Figure 7. Distribution of Pied Oystercatcher

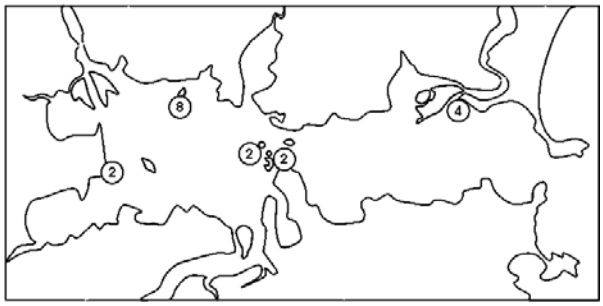

Figure 8 Distribution of Sooty Oystercatcher

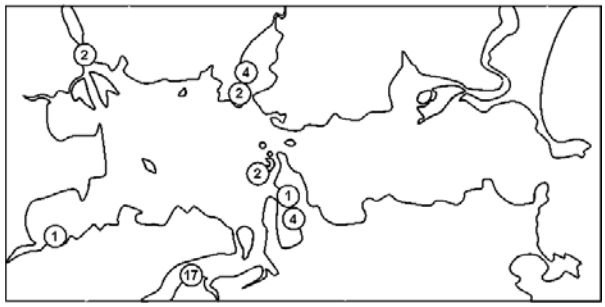

Figure 9. Distribution of Masked Lapwing

Eastern Curlew. Smith (1991) recorded a maximum count of 960 birds for Port Stephens over the period 1970-1990, compared with the Hunter Estuary maximum of 1,000 birds, both representing >1% of the Australian population at that time and thus of International Importance (Watkins 1993). It is still a common and abundant shorebird of Port Stephens. The count of 649 birds on February 2004 represents 1.7% of the total world population for this species, thus Port Stephens continues to be an internationally significant location for it, particularly in the context of its declining world population (Smith 1991). The 2004 count is consistent with a record of 700 birds in Port Stephens area January 1993 (Stuart 2004). Also, in the February 2004 survey, 455 of the birds were in the Swan Bay area, which is consistent with the maximum counts at Worimi N.R. over 2000-2004 (Stuart 2004). It is also consistent with a record in the NSW Bird Report of 418 birds in February 1985 (thought to be from Swan Bay).

Thus, it seems that at least 600 birds are regularly present in Port Stephens during summer.

Terek Sandpiper. Only six birds were recorded in 2004, which is consistent with all other known counts for this species in Port Stephens. Probably, the species is not abundant in Port Stephens. However, in view of its Vulnerable status in NSW, additional systematic surveys of Port Stephens are required so that local management plans properly reflect the needs of the Terek Sandpiper.

Common Sandpiper. Only one bird was recorded in 2004, which is consistent with the maximum recorded count of two birds over 1970-1990 (Smith 1991). The Common Sandpiper would seem to be an uncommon species in Port Stephens.

Grey-tailed Tattler. The count of 44 birds is consistent with many other recent summer records of 30-50 birds in Port Stephens and peak counts of 50-80 birds (Stuart 2004). Smith (1991) reported a maximum count of 245 birds over 1970-1990; this would seem to be based on the report by Pegler of 10 birds near Corrie island in December 1979 and 235 birds at Pindimar Bay in January 1980 (Pegler 1980). The latter birds were first seen feeding at low tide around Pindimar Bay and later were observed to fly into nearby mangroves to roost. It was not possible in the 2004 boat based survey to approach close enough to this particular area of mangroves to check for roosting Grey-tailed Tattler. It should be noted that most of the birds recorded in the 2004 high tide survey were roosting in mangroves along Tilligerry Creek – an area not readily accessible to bird observers. It is possible that the numbers of Grey-tailed Tattler in Port Stephens are greater than the recent data suggest.

Ruddy Turnstone. Only eight birds were recorded in 2004, which is consistent with the maximum recorded count of four birds over 1970-1990 (Smith 1991). The Ruddy Turnstone would seem to be an uncommon species in Port Stephens in summer.

Red-necked Stint. Smith (1991) reported a maximum of 116 birds in 1970-1990 in Port Stephens, but 100-150 birds were recorded there in the summers of 1982-1984 (Stuart 2004). Since 1990, there are no known records of >100 birds and the peak count since 2000 is 53 birds in January 2002 (Stuart 2004). The 2004 count of only 20 birds suggests that the species continues to decline in Port Stephens.

Pied Oystercatcher. Port Stephens had the highest maximum count of the 21 northern NSW coastal wetlands reviewed by Smith (1991). He noted the maximum count was 63 birds. Thus, the 2004 count of 112 Pied Oystercatcher is a significant increase in the number. The count corresponds to just on 1% of the total world population of the species (Wetlands International 2002), and to around 40% of the estimated NSW population (Watkins 1993). Possibly, the NSW population estimate may need to be reviewed.

Port Stephens clearly is a significant national location for Pied Oystercatcher. Also, the 2004 survey identified three very important roosting sites (Oyster Cove, Winda Woppa, oyster leases near Swan Bay) where larger parties of birds were congregated. It is probable that they mostly were immature birds, which are known to congregate in medium to large flocks. Thus, Port Stephens seems to have an important role in the survival of young NSW birds to maturity.

Additional knowledge about the feeding and roosting requirements of Pied Oystercatcher in Port Stephens is needed, so that management plans can be sure to be effective for this species, which is classified as Vulnerable in NSW.

Sooty Oystercatcher. The count of 18 birds in the 2004 survey represents an important increase in the known local population – Smith (1991) reported a maximum count over 1970-1990 of only four birds, and there is also a record of eight birds roosting at Worimi N.R. in August 2002 (Stuart 2004). The estimated population of the southern Australian sub-species of the Sooty Oystercatcher *(Haematopus fuliginosus fuliginosus)* is estimated at 4,000 birds (Wetlands International 2002); hence around 0.5% of the total population of this species also were present and thus Port Stephens is an important location for it.

Sooty Oystercatcher, which is classified as Vulnerable in NSW, breed almost exclusively on off-shore rocks and islands and the birds occurring at Port Stephens were most probably immatures. The Port Stephens habitat therefore is important for ensuring the survival of these to maturity.

Lesser Sand Plover. Smith (1991) reported a maximum count of 101 birds over 1970-1990 in Port Stephens, but this probably links with a record of 100 birds at Swan Bay in May 1971 (NSW Bird Report). Fewer than 10 birds were recorded each year in the summer surveys of Port Stephens for AWSG over 1982-1984, although 22 birds were present in January 2001 (Stuart 2004). The 2004 count of only five birds suggests that the species continues to decline in Port Stephens.

Masked Lapwing. The count of 33 birds in 2004 is reasonably consistent with the maximum of 53 birds over 1970-1990 as reported by Smith (1991). This is a common resident of Port Stephens, although generally not recorded in large numbers.

DISCUSSION

It is firstly of interest is to compare the 2004 counts with the available data for 1982 – which are from an incomplete survey of Port Stephens as part of the AWSG survey for that year (Stuart 2004). The 1982 and 2004 data in Table 3 suggest that Port Stephens has hosted around 2,000 shorebirds annually for a period spanning at least 20 years. This is of course a tentative conclusion since there are few records for the intervening years.

The 1982 summer survey for AWSG was not a systematic survey of all of Port Stephens but it provides the closest analogue available to the data that would be

Table 3. Comparison of 1982 and 2004 Summer Survey Results

Species	Scientific Name	1982	2004
Black-tailed Godwit	*Limosa limosa*	0	51
Bar-tailed Godwit	*Limosa lapponica*	600+	888
Whimbrel	*Numenius phaeopus*	27	218
Eastern Curlew	*Numenius madagascariensis*	800+	649
Terek Sandpiper	*Xenus cinereus*	0	6
Common Sandpiper	*Actitis hypoleucos*	0	1
Grey-tailed Tattler	*Heteroscelus brevipes*	21	44
Ruddy Turnstone	*Arenaria interpres*	0	8
Red-necked Stint	*Calidris ruficollis*	150+	20
Sharp-tailed Sandpiper	*Calidris acuminata*	42	0
Curlew Sandpiper	*Calidris ferruginea*	30	0
Pied Oystercatcher	*Haematopus longirostris*	0	112
Sooty Oystercatcher	*Haematopus fuliginosus*	0	18
Black-winged Stilt	*Himantopus himantopus*	4	0
Red-capped Plover	*Charadrius ruficapillus*	70+	0
Lesser Sand Plover	*Charadrius mongolus*	0	5
Masked Lapwing	*Vanellus miles*	16	33
Totals		1,750+	2,043

generated from such a survey. Therefore, some comparisons with the February 2004 survey are interesting. First, the counts of Bar-tailed Godwit and Eastern Curlew are similar in the two surveys despite a gap of 22 years. Overall, around 15% more shorebirds were recorded in 2004, which perhaps reflects that the coverage of areas was greater. For example, many more Whimbrel were recorded in 2004; these mainly were in an area less accessible to land-based surveys. Also, many more Grey-tailed Tattler were in this area and so the 2004 tally for these also was greater than in 1982 (but far less than the number recorded by Pegler in 1980). No Pied or Sooty Oystercatcher were recorded in 1982 but significant numbers of both species were present in 2004. Conversely, significant numbers of Red-necked Stint were in Port Stephens in 1982 and none recorded in 2004; similarly both Curlew Sandpiper and Sharp-tailed Sandpiper were absent in 2004.

Port Stephens is an important habitat for several species of migratory and breeding resident shorebirds, and has been for more than 20 years. A total of 2,053 shorebirds were recorded there in February 2004, a count that is comparable to one of 1,750 birds from a partial survey of the area in 1982. Port Stephens is a significant habitat for Eastern Curlew and Pied Oystercatcher (1-2% of the total populations of both species present there in February 2004) and Whimbrel (2% of the Australian population) and an important habitat for both Bar-tailed Godwit and Sooty Oystercatcher (0.5% of the Australian population of both species present in 2004).

ACKNOWLEDGEMENTS

Michael Murphy of NSW National Parks & Wildlife Service coordinated the organisation of the February 2004 survey of Port Stephens and many members of Hunter Bird Observers Club participated in it. The maps and figures used in this article are modifications to originals created by Chris Herbert.

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OCCASIONAL COUNT NO. 7 - ASHMORE REEF, 21 TO 30 JANUARY 2002

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INTRODUCTION

Ashmore Reef (123ºE 12ºS) is a small group of islets and reefs in the Timor Sea some 450 km north-east of the Kimberley, WA coast. It is designated as the Ashmore Reef Nature Reserve . In a week's survey in January 2002, 10,565 waders of 21 species and over 50,000 seabirds of 16 species were counted. Of the 21 species of shorebirds identified, five were found in internationally significant numbers. These were Grey-tailed Tattler, Ruddy Turnstone, Sanderling, Greater Sand Plover and Grey Plover. There were large breeding colonies of Sooty Terns on East and Middle Islands. Crested Terns were breeding in small numbers on East Island. Red-footed Boobies, Brown Boobies, and Lesser and Greater Frigatebirds were breeding on Middle Island. The survey highlights the importance of Ashmore Reef not only for seabirds but also for large numbers of migratory shorebirds and establishes the Reef as an area of national importance for waders in Australia. Cartier Island, 50 km to the south-east of Ashmore Reef, was visited briefly and produced 115 birds of five species. This report presents count details for waders, gulls and terns, and noddies - the species of immediate interest to the Australasian Wader Studies Group.

The vast majority of seabirds were Sooty Terns with an estimated 35,000 all appearing to be engaged in a synchronised breeding cycle on East and Middle Islands. All the Sooty Terns were incubating a single egg. No chicks or nests without eggs were found and only a few nests contained two eggs. Evidence of an earlier breeding cycle of Common Noddies was obvious from several hundred desiccated remains of fledged and half-fledged juveniles scattered over areas of East and Middle Islands. A small colony of Crested Terns (10 nests) with eggs and one recently hatched chick were found on East Island.

The weather was surprisingly benign over the survey period. A continual light north-westerly breeze blew throughout the period. Small isolated squalls and storms occurred irregularly. High day time temperatures, up to 38º C, and high humidity prevailed throughout the survey period. Copies of tide charts for the survey period are available from the author.

Waders were located in flocks at high tide roosts and counted with the aid of a high quality spotting scope with 20x wide-angle eyepiece. An automatic counter was also used to speed up the counting process. The flock would be scanned, counting one species at a time. This count would be performed twice for each species and the lower count taken. If the count was interrupted by birds leaving or arriving at the site or if the count was thought to be inaccurate, it would be repeated.

Successful counts of shorebirds were hindered by a series of neap tides occurring during the survey period. These small, slow moving tides restrict access to loafing sites, i.e. islands and sandbars. But they also allow the waders to move about feeding on exposed flats, and do not force them to congregate in large flocks. This is an advantage as waders loafing undisturbed on the sandbars can be observed over long periods.

RESULTS

Several counts were made on individual islands during the survey, but to achieve a complete count on the same day for all three islands and associated sandbars exposed on high tide was not possible. The most successful count was conducted on 28 January 2002; Middle Island had, however, to be omitted due to difficulties with access on a falling tide. Bird numbers on Middle Island would not have been substantial, as most species show a preference on neap tides to loaf on exposed sand bars to the south of East Island and between Middle and East Islands. Two species, Ruddy Turnstone and Grey-tailed Tattler, showed a preference for a rock bar at the northern end of Middle Island, so numbers of these two species may have been greater if Middle Island had been included in the count. Table 1 shows the numbers of waders counted for each location visited on 28 January 2002 and each species national or international status as part of the East-Asian Australasian Flyway. Table 2 shows individual counts made on Middle Island on 23 and 27 January 2002. Table 3 gives the numbers of terns and noddies counted over the period of the surveys; these include birds seen at sea. Table 4 shows wader species recorded in nationally or internationally important numbers, following established RAMSAR criteria.

Ashmore Reef has large areas of rich mud/sand flats that can support substantial numbers of migratory waders. In the course of the survey, five species were recorded in internationally significant numbers and three in nationally significant numbers. This, and the number of migratory shorebirds counted during the survey, establishes that Ashmore Reef is an internationally important migratory wader site.

The survey confirmed that large numbers of waders are present at Ashmore Reef during a period of the year when they are traditionally not migrating. Ashmore Reef also probably supports a number of waders on passage as well as over-wintering birds.

No leg-flagged waders were observed during the survey. This is a significant result, especially considering the number of shorebirds leg-flagged in northwest Australia over recent years.

Table 1. Counts of Shorebirds on Ashmore Reef, 28 January 2002

Species	East Island Sandbar	East Island	Sandbar between East and Middle Islands	West Island	Total
Black-tailed Godwit	5	-	1	-	6
Bar-tailed Godwit #	1,836	-	700	-	2,536
Whimbrel #	-	270	34	40	344
Eastern Curlew	-	-	-	1	1
Common Greenshank	165	-	17	3	185
Terek Sandpiper	60	-	-	-	60
Common Sandpiper	2	-	1	6	9
Grey-tailed Tattler *	1,061	-	200	40	1,301
Ruddy Turnstone *	15	768	11	150	944
Asian Dowitcher	6	-	-	-	6
Great Knot	1,557	-	35	-	1,592
Red Knot	15	-	-	-	15
Sanderling *	200	-	98	15	313
Red-necked Stint	935	-	20	20	975
Sharp-tailed Sandpiper	-	-	-	1	1
Curlew Sandpiper	150	-	-	-	150
Pacific Golden Plover #	233	40	10	20	303
Grey Plover *	289	-	327	0	616
Lesser Sand Plover	10	-	-	1	11
Greater Sand Plover *	1,046	-	80	70	1,196
Oriental Pratincole	-	-	-	1	1
Total					10,565

* = Internationally significant number
# = Nationally significant number

Table 2. Counts of Shorebirds on Middle Island, 23 – 27 January 2002

Species	23-Jan-02	27-Jan-02
Common Greenshank	8	4
Common Sandpiper	1	-
Grey-tailed Tattler	1	15
Ruddy Turnstone	707	700
Great Knot	1	-
Sanderling	5	20
Red-necked Stint	104	15
Pacific Golden Plover	70	123
Greater Sand Plover	-	15

Table 3. Counts of Terns and Noddies on West, Middle and East Island, Ashmore Reef from the 23 January 2002 to 29 January 2002 and other species seen at sea within the Timor MOU 74 Box[#].

Species	West Island	Middle Island	East Island	At Sea
Gull-billed Tern	-	-	1 (sand cay East Island)	-
Crested Tern (B)	40	150	310	23
Little Tern	-	97 (sand cay between Middle & East Island)	8 (sand cay East Island)	-
Sooty Tern (B)	20	15,000*	25,000*	500
Common Noddy	15	1,500	3,000	400
Black Noddy	-	100	1,500	15

* = Estimates (B) = Breeding
[#] The Timor MOU 74 box is an area of ocean containing Ashmore Reef, Cartier Island, and Browse Island subject to a 1974 agreement between Indonesia and Australia on fishing restrictions.

Table 4. Shorebirds that Qualify for National & International Status at Ashmore Reef based on RAMSAR Criteria of 1% of East Asian Flyway Population and 1% of Australian Flyway Population

Common Name	Status	% Australian Flyway Population	% Total East Asian Flyway Population	Total Count from data collected Jan 2002, Nov 2001, & Oct 1998
Bar-tailed Godwit	National	1.5	0.7	2536
Whimbrel	National	3.4	0.8	344
Grey-tailed Tattler	International	4.1	3.1	1500
Ruddy Turnstone	International	10.7	5.3	1500
Sanderling	International	3.9	2.8	313
Pacific Golden Plover	National	3.3	0.3	303
Grey Plover	International	5.1	3.8	616
Greater Sand Plover	International	1.6	1.2	1196

ANNOTATED SPECIES LIST

Black-tailed Godwit *Limosa limosa*. This species was first recorded on Ashmore Reef by M. Shultz (Pike 1998). Neither M. Carter, G. S., or D. A. Milton have recorded this species before this survey. During the week's survey Black-tailed Godwit were recorded on four occasions. The first sighting was of one bird seen on 24 Jan 2002 loafing with Bar-tailed Godwits *Limosa lapponica* on a sand bar between East and Middle Islands. The second sighting on the 28 January 2002 on a sandbar situated 2 km south of East Island was of five Black-tailed Godwits counted amongst a large flock of waders. Later, while counting another flock loafing on a sandbar situated between East and Middle Islands, one Black-tailed Godwit was recorded. Four birds were counted, again on the East Island sand bar, on 29 January 2002.

Bar-tailed Godwit *Limosa lapponica*. This common migratory wader was originally recorded at Ashmore Reef by V. Serventy in 1949 (Pike 1998). This species favours muddy sand-flats around East and Middle Islands. A total of 2,536 Bar-tailed Godwit was counted on 28 January 2002. A small number of these birds were starting to moult into breeding plumage, some displaying more advanced stages than others. This species is rarely seen about West Island. This count confirms Ashmore Reef as a nationally significant for this species (Watkins 1993).

Whimbrel *Numenius phaeopus*. This is a moderately common migratory wader first recorded at Ashmore Reef by John McKean in 1979 (Pike 1998). The following counts made on West Island from February 2000 to January 2002 by M. Carter and G. S. show a marked similarity in numbers:

Jan 2002	Nov 2001	Oct 2001	Oct 2000	Feb 2000
105	97	120	70	103

This count recorded a total of 344 birds for East Island, West Island, and associated sandbars. This represents 3.4% of the estimated Australian Population of 10,000 birds which makes Ashmore Reef of national importance for Whimbrel (Watkins 1993).

Whimbrel use various types of habitat in the reserve ranging from the island's herb fields to a number of intertidal zones. They seem to favour the flats around East Island. They were regularly recorded feeding on the grassland and herb field of West Island where, in the middle of the day, they resorted to shade provided by the fringing *Argusia* bushes.

Eastern Curlew *Numenius madagascariensis*. This species is seen regularly in small numbers i.e. one or two individuals. It has been seen on most visits by M. Carter and G. S. near West Island. It was first recorded on Ashmore Reef by John McKean in November 1979 (Pike 1998). Pike (1993) comments that they are an infrequent visitor. The species was not recorded in October 1998 (Milton 1999). One Eastern Curlew was recorded on the northern shore of West Island on 22 January 2002. A second sighting of a single bird seen on the herb field in the centre of the island was made on 26 January 2002, again on West Island.

Common Greenshank *Tringa nebularia*. This species was first recorded at Ashmore Reef by A. Press in February 1985 (Pike 1998) but have since been seen regularly. This species, like the majority of migratory waders recorded on Ashmore Reef, shows a preference for the extensive muddy sand flats towards the eastern side of the reserve, about Middle Island and East Island and east and south of these two islets. The wader count on 28 January 2002 recorded 185 Greenshank for West and East Islands.

Terek Sandpiper *Xenus cinereus*. This species was first recorded at Ashmore Reef in October 1949 by V. Serventy (Pike 1998). It appears, from the data available, to be scarce and has certainly not been recorded in large numbers by G.S. or M. Carter. D. Milton did not record them in October 1998. A total of 60 Terek Sandpipers was recorded in a large flock of loafing waders on an exposed sand bar 2 km south of East Island on 28 January 2002.

Common Sandpiper *Actitis hypoleucos*. This species is generally recorded in low numbers in various habitats. These include shaded areas on West Island during the heat of the day, the herb field of West Island, areas of beach rock, pools, reef and coralline rubble. The species is typically solitary in behaviour but sometimes occurs in small groups. Six individuals were found on West Island on the 23 January

2002. The survey of Middle Island on the 23 January 2002 recorded a single bird. Common Sandpipers were not found on East Island.

Grey-tailed Tattler *Heteroscelus brevipes*. This species was first recorded on Ashmore Reef by John McKean in 1979 (Pike 1998). This is a common migratory wader found throughout the Ashmore Reef reserve. They favour rocky reefs and coralline rubble and sand flats. They are common on the coast of north-west WA, including most of the Kimberley, Roebuck Bay and 80 Mile Beach. A significant count in October 1998 of an estimated 1,500 birds represents *c*. 3% of the East Asian flyway population (50,000 birds) (Milton 1999). The large areas of suitable feeding habitat obviously suit this species. With records during the dry season, this species possibly over-winters at Ashmore Reef. The largest count of this species made on 28 January 2002, including West and East Island and associated sand bars was 1,301 birds. The two counts of 1,500 and 1,300 birds qualify Ashmore Reef as being internationally significant for this species (Watkins 1993).

Ruddy Turnstone *Arenaria interpres*. The count conducted on 28 January 2002 recorded a total of 944 Ruddy Turnstone for East Island, West Island and associated sandbars. A significant count of 1,500 Turnstones was recorded on Middle Island in November 2001 (Carter & Swann 2002), representing 5.3% of the estimated flyway population of 28,000 (Watkins 1993). Like Grey-tailed Tattlers, the coralline sand flats and reef suit the feeding habits of Ruddy Turnstones. They possibly over-winter in the reserve with reports of birds present during the winter months (Pike 1993). Observations of opportunistic feeding behaviour of Turnstones are interesting. They feed on the herb field of West Island with other wader species, presumably feeding on insects. A search revealed small insects amongst the prostrate *Boerhavia* sp. Turnstones were also observed moving through Sooty Tern breeding colonies with regularity. Their behaviour was confident but cautious of the sitting terns and on several occasions Turnstones were seen to avoid the terns' defensive actions. On East Island a Turnstone was observed inspecting a broken Sooty Tern egg and feeding on the partially desiccated contents. Ruddy Turnstones have previously been recorded feeding on Tern (*Sterna*) eggs and scavenge eggs raided by Silver Gulls (Hulsman 1977; Cornelius 1985; Higgins and Davies 1996).

Asian Dowitcher *Limnodromus semipalmatus*. This species was first recorded at Ashmore Reef by D. Pike in April 1994 (Pike 1998). This species has not been recorded by D. Milton, G.S. or M. Carter at Ashmore Reef before this survey. During the week's survey a total of 6 Asian Dowitchers was counted. These birds were observed amongst a large loafing flock on the sand bar located 2 km south of East Island on 28 January 2002.

Great Knot *Calidris tenuirostris*. This species was first recorded at Ashmore Reef by John McKean in 1979 (Pike 1998). Great Knots winter in large numbers around Broome, Roebuck Bay and 80 Mile Beach. They can also be found on suitable mudflats around the Kimberley coast. Previous counts by G.S., M. Carter, and D. Milton did not record this species, except for a count of 11 birds recorded for Middle Island on 23 February 2000 (G.S. 2000 unpubl.) but they did not visit East Island and associated sandbars. Counts of Great Knot before the 2002 survey are low as the species shows a preference for that area. The count of 1,592 birds, with a good number already showing advanced stages of breeding plumage, is significant.

Red Knot *Calidris canutus*. This species was recorded originally at Ashmore Reef by V. Serventy in October 1949 (Pike 1998). The species has previously been unrecorded by G.S., M. Carter or D. Milton. The species would undoubtedly have been recorded by government personnel who performed regular patrols and by other visiting ornithologists over the years. The count on 28 January 2002 recorded 15 Red Knot amongst the large loafing flock situated on a sand bar approx 2 km south of East Island.

Sanderling *Calidris alba*. This species was first recorded for Ashmore Reef in July 1986 by H. Larsen (Pike 1998) and is regularly seen about West Island in low numbers. Two counts, one in February 2000 and another in November 2001 (M. Carter & G.S. unpublished) on Middle Island of 73 and 50 birds gives some indication of their frequency on Ashmore Reef. The count conducted on 28 January 2002 recorded a total of 313 birds for East Island, West Island and associated sandbars. On the morning of 25 January 2002 Sanderling were observed feeding on the extensive intertidal muddy sand flats to the east of East Island. Feeding with them were Curlew Sandpiper, Great Knot, Ruddy Turnstone, and Bar-tailed Godwit. It is somewhat unusual to see these species feeding closely together, particularly Sanderling. The total count of 313 Sanderling represents 2.8% of the total flyway population of 11,000 birds making Ashmore Reef internationally important for Sanderling (Watkins 1993).

Red-necked Stint *Calidris ruficollis*. First recorded at Ashmore Reef by V. Serventy in 1949 (Pike 1998). This is the most numerous migratory wader to visit Australia (Watkins 1993). Red-necked Stints were found over most of the locations surveyed during the week spent at Ashmore Reef. They were found on sand flats and the shoreline of West Island in low numbers with an average count of 15 birds taken over 5 counts (October 1998, February 2000, October 2000, October 2001, and November 2001). Red-necked Stints regularly loaf in the herb field of West Island and even forage there with other shorebird species. They also loaf and forage on Middle and East Island on bare and open areas, when the tide prevents access to muddy sand flats. On 28 January 2002 a total of 975 Red-necked Stints were counted during surveys of East and West Islands and associated sand bars.

Sharp-tailed Sandpiper *Calidris acuminata*. This species is an uncommon visitor to Ashmore, occurring in small numbers, first recorded in March 1989 by G. Miles (Pike 1998). One individual was seen during the week's survey, an adult bird foraging in the low herb field in the middle of

West Island, in loose association with Pacific Golden Plover, Greater Sand Plover, and Ruddy Turnstone.

Curlew Sandpiper *Calidris ferruginea*. This species was first recorded for the Ashmore Reef Nature Reserve in October 1987 by M. Hinchey (Pike 1998). Curlew Sandpipers appear to favour the intertidal sand flats surrounding East Island. One hundred and fifty Curlew Sandpipers were recorded on the 28 January 2002 while counting the large loafing flock located on a sand bar 2 km south of East Island. Sightings recorded by M. Carter, G.S. and D. Milton from Oct 1998 to November 2001 show only one record of two Curlew Sandpipers on West Island in October 2001 and none for Middle Island. Five birds were counted on a sandbar situated between East and Middle Island on 27 January 2002.

Pacific Golden Plover *Pluvialis fulva*. This species was first recorded for Ashmore Reef Nature Reserve in October 1949 by V. Serventy (Pike 1998). Pacific Golden Plovers are a regular visitor to Ashmore Reef and their numbers here are nationally significant. The count of 225 birds made on Middle Island in February 2000 represents 2.5% of the estimated Australian population of 9000 birds (Watkins 1993). During the week's survey several counts were conducted, the most comprehensive count made on 28 January 2002 recorded 303 Pacific Golden Plovers for East and West Islands and associated sandbars. This figure increased the representation of Pacific Golden Plovers at Ashmore Reef to 3.3% of the estimated Australian population (Watkins 1993).

Pacific Golden Plovers in Western Australia show a preference for sand-flats, coralline rubble and reefs, estuaries, short grasslands, and lawns and ovals. They are less common in areas where mudflats predominate and the mud is deep and soft. The open herb fields of West Island, and to a lesser extent Middle Island and East Island, are used extensively by plovers for feeding and loafing when the tide is up. Large numbers of insects including grasshoppers, beetles, dragonflies, leafhoppers, small moths and butterflies were abundant at the time. The plovers' feeding behaviour, i.e. stabbing at the ground with the bill and then ingesting, suggests they are feeding on some sort of insect. Pacific Golden Plovers are known to feed on a variety of insects and larvae (Marchant and Higgins 1993). The plovers were also recorded feeding on most of the intertidal areas searched in the reserve with higher concentrations around Middle and East Island.

Grey Plover *Pluvialis squatarola*. This species was first recorded in the Ashmore Reef Nature Reserve in August 1988 by Pike (1998). This species provided the most unexpected results of the survey. With the limited information accessed, it appears that Grey Plover are rarely recorded on West Island or surrounding shorelines. On 4 November 2001, 2 birds were recorded on Middle Island (M. Carter & G.S. unpublished 2001). They were not recorded on East Island in October 1998 (Milton 1999).

Several counts during the week's survey recorded Grey Plover on the two sand bars, one south of East Island with the other located between East Island and Middle Island. The most comprehensive and accurate count was conducted on 28 January 2002 recording 616 Grey Plover of which 289 were on the sand bar south of East Island and 327 on the sand bar between East and Middle Islands. This count represents 3.8% of the flyway population (16,000 birds). This is an important record, making Ashmore Reef internationally significant for the species (Watkins 1993). The paucity of sightings for West Island and Middle Island suggest that East Island and the surrounding intertidal flats are the locations favoured by Grey Plover.

Lesser Sand Plover *Charadrius mongolus*. This species was first recorded on Ashmore Reef by John McKean in 1979 (Pike 1998). Lesser Sand Plovers are usually well outnumbered by Greater Sand Plovers on the Kimberley Coast, Roebuck Bay and Eighty Mile Beach (pers. obs.) and this observation holds true for Ashmore Reef. The count conducted on 28 January 2002 found 10 loafing amongst the large flock on the sand bar 2 km south of East Island and 1 bird on West Island. A total of 11 birds was recorded during the survey. Some of the birds on the sandbar were showing well-developed breeding plumage.

Greater Sand Plover *Charadrius leschenaultia*. This species was first recorded on Ashmore Reef by V. Serventy in 1949 (Pike 1998). Greater Sand Plovers are a common wader around the Kimberley Coast particularly at Broome, Roebuck Bay and Eighty Mile Beach, which are of international importance to the species. Greater Sand Plovers were recorded over much of the Ashmore Reef Nature Reserve in a number of different habitats, including many of the intertidal areas where a sandy surface predominates. Greater Sand Plovers also feed and loaf on the herb fields of West Island and to a lesser extent at Middle and East Islands. From the counts conducted during the survey, Ashmore Reef is obviously an important site for the species. The count conducted on 28 January 2002 recorded 1,196 Greater Sand Plovers; this is 1.2% of the flyway population (99,000 birds) and makes Ashmore Reef an area of international importance (Watkins 1993).

Oriental Pratincole *Glareola maldivarum*. This species was first recorded for Ashmore Reef in December 1988 by D. Pike and L. Thomas (Pike 1998). On 26 January 2002 a single bird was found loafing with a mixed flock of waders in a central area of herb field on West Island. The bird was seen again in a similar area on West Island on 29 January 2002. The bird was in heavy tail moult.

Silver Gull *Larus novaehollandiae*. Several were seen about Darwin Harbour on departure and return from survey. It is important that this species should not become established on Ashmore Reef. The species has increased in numbers around Broome and is now causing substantial predation of seabird's eggs and chicks and Green Turtle hatchlings on the Lacepede Islands.

Gull-billed Tern *Sterna nilotica*. This species was first recorded on Ashmore Reef by W. Phillips in April 1986

(Pike 1998). Pike (1993) comments that Gull-billed Terns appear occasionally in the Nature Reserve. On 28 January 2002 a single bird was recorded, loafing with waders on a sandbar south of East Island. The tern was in non-breeding or immature plumage, i.e. not showing a black crown, but a dark smudge on the ear coverts. A few notes were made from the brief views obtained before the bird flew off. The tern was smaller that the Australian race *macrotarsus*, with a shorter fine bill; the legs also appeared to be short. Upperparts had a grey wash including the rump, dark ear coverts, greyish white crown, legs, bill and eye black. This Gull-billed Tern looked very much like some of the birds that occur in Broome which have been identified as subspecies *affinis* (D. Rogers pers. comm.).

Crested Tern *Sterna bergii*. This is a common species on coast and islands around the Northern Australian coastline. They are a breeding species at Ashmore Reef, using all three islands. Crested Terns were recorded breeding on the eastern side of East Island on the fore dune. Here there was a small colony where ten nests were counted; nine contained a single egg and one a recently hatched chick. None of the terns present appeared to be in breeding plumage with all individuals lacking the usual black crown. A total of 310 Crested Terns were counted on East Island on 25 January 2002. Specific counts for this species were not undertaken regularly.

On 26 January 2002 a Crested Tern was observed snatching a hatchling Green Sea Turtle (Chelonias mydas) from the sea surface on the eastern shore of West Island. The tern flew around in circles, calling loudly with the turtle in its bill, while a second tern joined the first tern in the air also flying about while calling. The tern with the turtle dropped its prey. The turtle landed back in the water. Seconds later one of the terns flew back down to the swimming turtle and picked it back up again, flying around and calling. The bird eventually flew off out of sight with the turtle in its bill.

Common Tern *Sterna hirundo longipennis*. This species was not recorded in the Ashmore Nature Reserve during the survey. However it was seen at sea nearer to Darwin with regularity with sightings of small groups of 4-5 birds, up to flocks of 50 plus, associating with White-winged Black Terns. On the outward journey to Ashmore Reef from Darwin on 21 January 2002, approximately 300 Common Terns were recorded from 130º 13'E 12º 18'S to 128º 36'E 12º 18's. On the return voyage to Darwin on 30 January 2002, 176 Common Terns were recorded from 129º 50'E 12º 19'S to 130º 04'E 12º 19'S.

Little Tern *Sterna albifrons*. This species was first recorded for Ashmore Reef Nature Reserve in August 1987 by Pike (1998). They apparently have not bred on Ashmore (Pike 1998) but are recorded loafing with wader flocks each year (Pike 1993).

Little Terns were recorded twice during the survey. On 27 January, 97 Little Terns were recorded loafing with a large wader flock on a sand bar located between Middle and East Islands. Two birds were noted as showing full breeding plumage with yellows bills, orange legs and black lores. The majority of birds were in non-breeding alternate plumage. On 28 January, eight Little Terns were recorded on the sandbar 2 km south of East Island, again loafing with migratory waders. All of the terns were in non-breeding alternate plumage. There are possibly two populations of Little Tern that frequent Ashmore Reef. These populations cannot be reliably separated in the field. Little Terns breed on the Kimberley coast between September and May (G.S. unpubl.). Other Little Terns in the Kimberley are thought to migrate perhaps to the northern hemisphere as is the case in the eastern states. Little Terns may well attempt to breed on Ashmore Reef in the future.

Sooty Tern *Sterna fuscata*. Ashmore Reef's total estimated population is 35,000. This was the commonest seabird species present on Ashmore Reef during the survey. Breeding was recorded on Middle and East Islands. Nearly all the terns appeared to be incubating one egg, while a few nests contained two eggs. No chicks or nests without an egg were observed. All the Sooty Terns appeared to be at the same stage of breeding on both islands, indicating a synchronised breeding effort. The Terns were breeding on many of the available areas on both islands, except for spots that were completely devoid of vegetation. The only exception was a low mat of dried grass, particularly around the island's edges. The dominant vegetation being used as cover was a thin sparse growth of the herb (*Amaranthus interruptus*) which had reached an average height of 400 mm. Sooty Terns were also breeding amongst flowering Beach Caltrop (*Tribulus cistoides)* in several areas of East Island. Nests were on average 500 mm to 1000 mm apart.

Interesting behaviour recorded during the survey included:

- The systematic wetting of the breast and belly in seawater by incubating terns, presumably to keep their eggs cool. Incubating adults would leave the nest and egg unprotected while making the short flight to available sea water; they then returned to the nest and continued to shelter the egg.
- What appeared to be the possible testing of egg temperature by placing the feet on the egg.
- The apparent lack of change-over between incubating adults, particularly during very hot periods of the day.
- Presumed defensive behaviour referred to as the "dreads" or "panics", where incubating birds all take off in unison, calling loudly and flying low, directly towards the intruder.

Date	**No. Counted**	**Location**
22-Jan-02	1,933	Between 124º 00'E 12º18'S and Ashmore Reef mooring 123º 01'E 12º 10'S counted during voyage from Darwin to Ashmore Reef.
23-Jan-02	15,000	Middle Island (estimated number).
25-Jan-02	25,000	East Island (estimated number).

Whiskered Tern *Childonias hibridus*. Several Whiskered Terns were recorded in the vicinity of Darwin Harbour during our departure on 21 January 2002. No Whiskered Terns were recorded at Ashmore Reef.

White-winged Black Tern *Childonias leucopterus*. This is a common migratory marsh tern, wintering throughout Australia in the Austral summer. It regularly associates with Common Terns at sea, following shoals of baitfish rounded up by large predatory pelagic fish species e.g. tuna sp. No White-winged Black Terns were recorded in the Ashmore Reef Nature Reserve during this survey. Two counts of White-winged Black Terns were conducted during the survey; the first on 21 January 2002 from Darwin to Ashmore Reef and the second on 30 January 2002 from Ashmore back to Darwin. The results were:

Date	No. Counted	Location
21-Jan-02	329	From 130º 13'E 12º 18'S to 129º 54'E 12º 18'S.
30-Jan-02	583	From 129º 50'E 12º 19'S to 130º 22'E 12º 19'S.

Common Noddy *Anous stolidus*. This is a common species breeding on Middle and East Islands. No evidence of current breeding was found during the survey. Evidence of a previous breeding cycle was obvious, with dead, desiccated juveniles scattered about East Island and to a lesser extent Middle Island. On inspection of a sample, most of the dead birds appeared to be fully fledged; in some individuals the outer primary feather was not fully grown.

Common Noddies were recorded over much of the Nature Reserve. Large flocks were recorded loafing on beaches of East and Middle Islands and at low tide on sand flats surrounding both these islands. Sizeable flocks were also seen at sea in the vicinity of Ashmore Reef. A count on 23 January 2002 recorded 1,500 Common Noddy on Middle Island. A count on East Island two days later recorded 3,000 Common Noddy.

Black Noddy *Anous minutus.* This species was first recorded on Ashmore Reef by I. Morris and M. Hinchley (Pike 1998) and listed by Pike (1993) as a breeding seabird on Middle and East Islands.

Black Noddies were counted on Middle and East Island on the 23 January 2002 and 25 January 2002 respectively. The results were Middle Island 100, East Island 1,500. Loafing flocks of Common Noddy were searched for Black Noddies and it became clear that they were more numerous than was initially recognised. Several loafing flocks were specifically made up of Black Noddies.

Observations to determine differing field marks of the two species were made. *Anous minutus* show a smaller overall size. The bill is long and fine when compared to *Anous stolidus* . The plumage of *Anous minutus* is generally much darker, almost black, so the dark primaries are concolorous with the rest of the wing and upperparts. On adult birds the white cap is more prominent than that of *Anous stolidus.*

Several small circular areas contained the remains of guano-cemented nests on East Island, all within approximately 400 mm of each other. The nests were located on mounds of dead vegetation. These colonies could possibly have been breeding sites of Black Noddies.

Lesser Noddy *Anous tenuirostris*. There were no confirmed sightings of this species (or race). Some individual Noddies that looked 'odd' could have been hybrids or Lesser Noddies. One individual observed on the 29 January 2002 at East Island showed brown upperparts, a white cap and dark demarcated lores. The bill shape was very similar to Black Noddy, being long and thin, while the grey on the rear of the crown extended down the nape. The brown upperparts were apparently the only field mark that failed to match Black Noddy (*Anous minutus*). A slide photograph of this individual was taken. These 'different' looking individuals were scarce and had a habit of disappearing amongst the flocks of other noddies.

CARTIER ISLAND

Cartier Island (123º 29'E 12º 29'S) is a tear-shaped platform reef approximately 4.5 km by 2.3 km, surrounded by deep water on all sides (300 metres west side). A small unvegetated sand cay is surrounded by beach rock with several shallow pools on the north western side of the island. It was visited for three hours on 24 January 2002. Five bird species were recorded on the island.

Species	Scientific name	No. of Birds
Lesser Frigatebird	*Fregata ariel*	3
Little Egret	*Egretta garzetta*	1
Ruddy Turnstone	*Arenaria interpres*	24
Ruddy Turnstone	*Sterna bergii*	85
Sooty Tern	*Sterna fuscata*	2

The sand cay was approached to within 30 metres. Turtle tracks and nesting activity were evident over the entire cay. No signs of any seabird breeding activity were observed. However, a Crested Tern in non-breeding plumage was observed carrying a small fish in its bill as the bird flew past the tender. The Lesser Frigatebirds were seen to harry the Crested Terns on several occasions. The terns were loafing on sand spits on both ends of the sand cay and on several coral bommies rising above the surrounding reef. (A bommie is a coral outcrop higher than the surrounding reef.) A pair of Sooty Terns was seen outside the reef fringe. The only migratory wader species observed were Ruddy Turnstone. Closer inspection of the island, had it been possible, might have revealed several other wader species e.g. Grey-tailed Tattler and Greater Sand Plover. Other tern species would almost certainly use the island for resting during the year and it is possible some species may breed on the island. Approximately 65 Green Sea Turtles *Chelonia mydas* were counted in shallow pools on the north western end of the island. Several smaller turtles (either juvenile Green Sea Turtles or Hawksbill Turtles) were also seen in the same pools.

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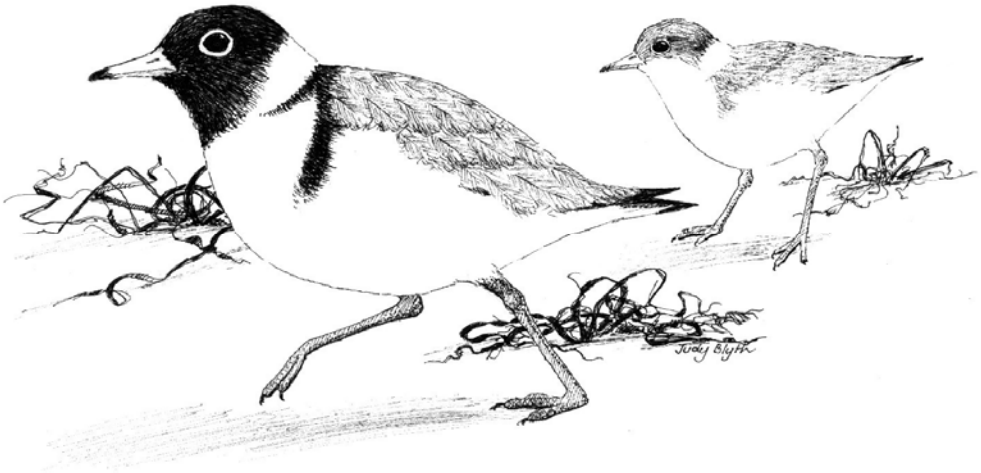

OCCASIONAL COUNT NO. 8 - ASHMORE REEF, 23 JANUARY TO 4 FEBRUARY 2003

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INTRODUCTION

Ashmore Reef (123ºE 12ºS) is a small group of islets and reefs in the Timor Sea some 450 km north-east of the Kimberley, WA coast. It is designated as the Ashmore Reef Nature Reserve. It and the surrounding ocean supported 14,166 shorebirds of 21 species and an estimated 22,000 seabirds of 16 species during the 10 day survey in late January and early February 2003. Six species of shorebirds were found in significant numbers. A single Gallinago snipe species was flushed on East Island and it may be a new record for the reserve. A small flock of 13 Black-winged Stilts was also an unusual record. The breeding cycles of several seabirds were just starting. Sooty Terns were yet to get underway although their behaviour indicated it would not be long. Five seabird species were confirmed as breeding: Red-tailed Tropicbird, Red-footed Booby, Brown Booby, Great Frigatebird, and Lesser Frigatebird. An interesting seabird record for the reserve was the discovery of a dead adult Abbott's Booby found floating close to the inner mooring of West Island. The specimen has been lodged with the WA Museum. Several vagrant species were also found on West Island representing new and second records for Australia. A single Scaly-breasted Munia, 2 sub adult Pale-headed Munias (first recorded in Australia by G.S. in February, 2000) and a White-breasted Waterhen race *leucomelanus.* These records and the record of Abbott's Booby have been submitted to the Birds Australia Rarities Committee. This survey further demonstrates Ashmore Reef's international importance as a nature reserve for numerous seabirds and migratory waders. This report presents count details for waders, gulls and terns, and noddies - the species of immediate interest to the Australasian Wader Studies Group.

Wader flocks were located at high tide roost and counted with the aid of high quality spotting scope with a 20x wide-angle eyepiece. An automatic counter was used to speed up the process. On 2 February a scribe (Steve Hall) helped speed up the count considerably enabling the comprehensive count.

Counts on sandbars required a careful approach by dinghy and personnel to *c*. 300 metres, the author would then approach the loafing flock by foot sometimes up to chest height in water, with tripod legs on the bottom. Accurate counts could be made by this method. A careful retreat from these loafing flocks was essential to avoid birds flying off to other sandbars or islands.

Weather during the survey period was fairly benign. Prevailing north westerly winds due to a monsoonal trough dominated the start of the survey but were replaced by southerly trade winds. Towards the end of the survey, an approaching monsoonal trough caused a return to north-east to north-west winds. This change brought daily thunderstorms, not uncommon at this time of year. Sea temperatures ranged from 29º C to 31º C. Daytime temperatures ranged from 26º C to 32º C.

RESULTS

Counts made on 25 and 26 January were incomplete, either timing or tides precluding access to all areas. Neap tides hampered shorebird counts from 27 to 29 January. A comprehensive count of all three islands and associated sand bars exposed on a high tide was achieved on 2 February 2003. Table 1 gives the results of this count. Table 2 gives the counts of terns and noddies made at Ashmore Reef and at sea over the 10 days of the survey. Table 3 compares the total shorebird counts this year with those made in 2002. This table includes the higher count of 252 Greenshank on 25 January which is preferred to the 178 counted on 2 February. The results of shorebird counts taken over the 10 day survey period have established some interesting data and comparisons with the results from the survey in January 2002. Table 4 compares the seven counts made at West Island since 1998.

The main findings of the survey with regard to shorebirds are:

1. There are no startling differences between the counts of January 2002 and February 2003.
2. There was a marked increase in numbers counted of Grey Plovers and Sanderling between the two most recent counts.
3. No banded or leg flagged waders were seen during the survey. This was also the case in the January 2002 survey.
4. Preferred roost sites throughout the reserve were identified; these include a clear preference for sandbars when the tide allows their use.
5. The survey re-confirms the status of Ashmore Reef as an internationally important site for wintering migratory shorebirds.
6. Six species were recorded in internationally significant numbers and three species in nationally significant numbers (following Watkins 1993). Table 5 shows wader species recorded in nationally or internationally important numbers following the established Ramsar Criterion (Watkins 1993; M. Barter 2002)

Table 1. Ashmore Reef Shorebird Counts, 2 February 2003

Species	East Island Sandbar	East Island	Sandbar Between East & Middle Island	Middle Island	West Island	Total
Gallinago Snipe Sp.	-	1	-	-	-	1
Black-tailed Godwit	3	-	5	-	-	8
Bar-tailed Godwit #	957	50	1,756	20	2	2785
Little Curlew	-	-	-	-	-	-
Whimbrel #	-	295	20	11	76	402
Common Redshank	-	-	1	-	-	1
Common Greenshank	-	30	69	71	8	178
Terek Sandpiper	58	15	6	4	-	83
Common Sandpiper	-	-	-	-	6	6
Grey-tailed Tattler *	788	250	200	219	136	1,593
Ruddy Turnstone *	259	852	4	492	101	1,708
Asian Dowitcher	3	-	-	-	-	3
Great Knot	493	18	326	-	1	838
Red Knot	13	-	-	-	-	13
Sanderling *	675	-	402	40	15	1,132
Red-necked Stint	339	600	-	139	50	1,128
Curlew Sandpiper	392	450	3	-	5	850
Black-winged Stilt	-	1	-	-	13	14
Pacific Golden Plover #	50	369	26	62	56	563
Grey Plover *	201	40	1,234	-	-	1,475
Lesser Sand Plover	9	-	4	-	3	16
Greater Sand Plover *	766	85	337	11	96	1,295
Total						**14,092**

* = Internationally significant number # = nationally significant number

Table 2. Counts of Terns and Noddies, Ashmore Reef. 24 January 2003 to 3 February 2003 and other species seen at sea within the Timor MOU 74 Box.

Common Name	West Island	Middle Island	East Island	At Sea
Gull-billed Tern	-	-	-	-
Crested Tern (B)	25	105	310	43
Common Tern	-	-	1	-
Little Tern	-	268	-	-
Sooty Tern	2	5000	10,000 *	200
White-winged Black Tern	-	1	-	-
Common Noddy	-	260	1,800	150
Black Noddy	-	3	5	15

B = Breeding * = Estimate

Table 3. Comparison of 2002 and 2003 Counts

Species	**Total Number for 28-Jan-02**	**Total Number for 02-Feb-03**
Gallinago Snipe Sp.	-	1
Black-tailed Godwit	6	8
Bar-tailed Godwit	2,536	2,785
Little Curlew	-	-
Whimbrel	344	402
Eastern Curlew	1	-
Common Redshank	-	1
Common Greenshank	185	252
Terek Sandpiper	60	83
Common Sandpiper	9	6
Grey-tailed Tattler	1,301	1,593
Ruddy Turnstone	944	1,708
Asian Dowitcher	6	3
Great Knot	1,592	838
Red Knot	15	13
Sanderling	313	1,132
Red-necked Stint	975	1,128
Sharp-tailed Sandpiper	1	-
Curlew Sandpiper	150	850
Black-winged Stilt	-	14
Pacific Golden Plover	303	563
Grey Plover	616	1,475
Lesser Sand Plover	11	16
Greater Sand Plover	1,196	1,295
Oriental Pratincole	1	-
Australian Pratincole	-	-
Totals	10,565	14,166

Table 4. Counts of Shorebirds on West Island Oct 1998 to Feb 2003

Species	**04Oct98**	**23Feb00**	**16Oct00**	**24Oct01**	**04Nov01**	**28Jan02**	**02Feb03**
Bar-tailed Godwit	-	-	1	2	-	-	2
Little Curlew	50	-	2	-	-	-	-
Whimbrel	10	103	70	120	97	40	76
Eastern Curlew	-	2	1	2	1	1	-
Common Greenshank	9	14	1	2	3	3	8
Common Sandpiper	-	2	4	4	3	6	6
Grey-tailed Tattler	131	100	20	90	56	40	136
Ruddy Turnstone	65	81	100	150	142	150	101
Great Knot	-	-	-	-	-	-	1
Sanderling	4	1	2	10	9	15	15
Red-necked Stint	-	42	6	10	16	20	50
Sharp-tailed Sandpiper	-	-	1	1	2	1	-
Curlew Sandpiper	-	-	-	2	-	-	5
Black-winged Stilt	-	-	-	-	-	-	13
Pacific Golden Plover	32	39	12	60	27	20	56
Grey Plover	-	-	-	-	-	-	1
Lesser Sand Plover	-	-	1	1	1	1	3
Greater Sand Plover	83	79	20	80	66	70	96
Australian Pratincole	2	-	5	1	1	-	-

Notes: (1) The October 1998 count for West Island was conducted by D.A. Milton
(2) All the other counts were conducted by G. Swann or G. Swann, M. Carter *et al*.

Table 5a. Shorebird Species that Qualify for National & International Status at Ashmore Reef based on Ramsar Criterion of 1% of East Asian Flyway Population and 1% of Australian Flyway Population Estimates (Watkins 1993)

Species	Status	% Australian Flyway Population	% Total East Asian Flyway Populations	Total Count 02-Feb-2003 and 25-Jan-2003
Bar-tailed Godwit	National	1.6	0.8	2,785
Whimbrel	International	4.0	1.0	402
Common Greenshank	National	1.2	0.6	252
Grey-tailed Tattler	International	4.4	3.3	1,593
Ruddy Turnstone	International	12.2	6.1	1,708
Sanderling	International	14.1	10.2	1,132
Pacific Golden Plover	National	6.2	0.6	563
Grey Plover	International	12.2	9.2	1,475
Greater Sand Plover	International	1.7	1.3	1,295

Table 5b. Shorebird species at Ashmore Reef based on Ramsar Criteria of 1% of East Asian Flyway population estimates M. Barter 2002 and M. Bamford et al. in prep.

Species	% Total East Asian Flyway Population	Total Count 02-Feb-2003 and 25-Jan-2003
Bar-tailed Godwit	0.8	2,785
Whimbrel	0.7	402
Common Greenshank	0.4	252
Grey-tailed Tattler	3.9	1,593
Ruddy Turnstone	5.5	1,708
Sanderling	5.1	1,132
Pacific Golden Plover	0.5	563
Grey Plover	1.1	1,475
Greater Sand Plover	1.2	1,295

* = Internationally significant number # = nationally significant number

ANNOTATED SPECIES LIST

Gallinago Snipe sp. *Gallinago sp*. A Gallinago Snipe, either Pintail *G. stenura* or Swinhoe's *megala*, was flushed from a dense matt of *Tribulus cistoides* on East Island on 30 January. The snipe was flushed twice, the first time flying low for about 100 metres and once giving a call which could be transcribed as a muted "skrrt". No call was heard the second time the snipe was flushed and the bird flew approximately 250 metres into a large area of *Amaranthus* that was being used by nesting Lesser Frigatebirds. The snipe could not be readily identified from these observations closer than the two species cited. Common Snipe *Gallinago gallinago* can be ruled out because of the lack of a white trailing edge on the secondary flight feathers. This is possibly a new record for the Ashmore Reef Nature Reserve.

Black-tailed Godwit *Limosa limosa*. Eight Black-tailed Godwits were counted on 2 February 2003 roosting with large mixed wader flocks on sand bars east of East Island between East and Middle Islands.

Bar-tailed Godwit *Limosa lapponica*. A total count of 2,785 made on 2 February 2003 is similar to the 2,536 counted in January 2002.

Whimbrel *Numenius phaeopus*. The total count of 402 on 2 February shows an increase of 58 birds compared to the January 2002 count. The numbers of this species recorded on West Island (Table 4) show some consistency over the wintering period. The count of 402 Whimbrel qualifies Ashmore Reef as internationally important site for the species on the Ramsar 1% of East Asian Flyway population criterion (Watkins 1993).

Common Redshank *Tringa tetanus*. This species was first recorded in the Reserve by Pike in March 1991 (Pike 1998). A single bird was recorded twice, on 25 January and 2 February, amongst other loafing waders on the sandbar between East and Middle Islands.

Common Greenshank *Tringa nebularia*. This was recorded in nationally significant numbers following Watkins (1993) with a total of 252 birds counted on the 25 January. Most of these birds were recorded amongst loafing flocks on sandbars east of East Island and between East and Middle Islands. This year's count is 67 birds higher than that of 2002.

Terek Sandpiper *Xenus cinereus*. Terek Sandpipers were found in similar numbers to the January 2002 survey and found in mixed flocks of waders on sandbars and on inland island roost sites of East, Middle, and West Islands, again mixed in with Curlew Sandpipers, Red-necked Stints and Grey-tailed Tattlers.

Common Sandpiper *Actitis hypoleucos*. Common Sandpipers seem to favour West Island with a maximum count on 2 February of six birds. They were not recorded on East or Middle Islands this year.

Grey-tailed Tattler *Heteroscelus brevipes*. Again this year's survey finds an increase in the numbers of Grey-tailed Tattlers relative to the 2002 survey; numbers are, however, broadly similar indicating the suitability of the reserve for the species and indicating perhaps a regular wintering population. The count of 1,593 qualifies Ashmore reef as an internationally important site for this species based on criteria in Watkins (1993).

Ruddy Turnstone *Arenaria interpres*. A substantial count of 1,708 birds, an increase of 746 birds relative to the January 2002 count, qualifies this species as internationally important at Ashmore Reef Nature Reserve following Watkins (1993). The importance of the Reserve for this species cannot be overstated.

Asian Dowitcher *Limnodromus semipalmatus*. Asian Dowitchers were again recorded in low numbers and found amongst mixed flocks on the sandbar situated east of East Island.

Great Knot *Calidris tenuirostris*. This species was found in smaller numbers than in January 2002. Nevertheless, 838 birds is still a high count for Great Knot and their presence demonstrates the diversity of suitable habitats available to migratory waders in the reserve.

Red Knot *Calidris canutus*. The Red Knot numbers were virtually the same as the January 2002 survey. They are uncommon on Ashmore Reef.

Sanderling *Calidris alba*. Exceptional numbers were counted during this survey with the maximum count of 1,132 made on 2 February. The significance of this count cannot be overstated; it again demonstrates the importance of Ashmore Reef to this species.

Red-necked Stint *Calidris ruficollis*. A marked increase in the number of Red-necked Stints to the high count of 1,123 this year from 975 in January 2002 survey may demonstrate more accurate counting methods for inland roost sites on all three islands but could equally be explained by natural fluctuations in bird numbers.

Curlew Sandpiper *Calidris ferruginea*. Counts of this species increased from 150 birds in January 2002 to 850 in February 2003. This difference could arise from the same causes hypothesised for the Red-necked Stint. The Curlew Sandpipers show a preference to loafing at inland sites on the main islands in association with other small wader species.

Black-winged Stilt *Himantopus himantopus*. Thirteen Black-winged Stilts were recorded on West Island and one on East Island during the count conducted on the 2 February 2003. This species were first recorded on Ashmore Reef by Ian Morris in September 1984 (Pike 1998).

Pacific Golden Plover *Pluvialis fulva*. The total count in February 2003 of 563 birds improved on the count of 303 made in January 2002. This larger figure may also represent the more comprehensive coverage of inland roosting sites on all three islands or natural fluctuation in numbers. This count qualifies Ashmore Reef Nature Reserve as nationally important for this species.

Grey Plover *Pluvialis squatarola*. The 1,475 Grey Plover counted on 2 February 2003 is the most significant count made during this survey and its importance cannot be overstated. Following Watkins (1993) this count represents a massive 9.2% of the estimated flyway population. Recent work on Grey Plover shows that males and females winter at different sites (D. Rogers pers. comm.); this increases the value of any site where they occur in good numbers.

Lesser Sand Plover *Charadrius mongolus*. Recorded in low numbers and found amongst mixed flocks of roosting waders on sandbars and all three islands. A total of sixteen birds was recorded on the count of 2 February.

Greater Sand Plover *Charadrius leschenaultia*. A common wader at Ashmore Reef and found in good numbers. This year's count showed an increase of 29 birds over that of January 2002. A few of these Greater Sand Plovers were starting to moult into breeding plumage.

Silver Gull. *Larus novaehollandiae*. Seen about Broome and Darwin at the beginning and end of the patrol.

Gull-billed Tern *Sterna nilotica*. Not recorded during this survey but was recorded by Alistair Smith (pers. comm..) at East Island on 7 January 2003.

Crested Tern *Sterna bergii*. Found breeding on East Island. One scrape was found with one egg indicating that the breeding cycle was just starting. Counts of over 300 birds were made on East Island with birds congregating about the breeding site. Adults were seen displaying on the ground and performing spectacular synchronised flying displays. Some of the adults present were not in breeding plumage.

Roseate Tern. *Sterna dougallii*. Observed at sea about the Lacepede Islands on 23 January between 121º50'E 17º04'S and 121º45'E 16º43'S with a total of 30 birds recorded. This species was not recorded at Ashmore Reef or in the MOU 74 Box in the survey reported here. (The Timor MOU 74 Box is an area of ocean containing Ashmore Reef, Cartier Island, and Browse Island subject to a 1974 agreement between Indonesia and Australia on fishing restrictions.)

Common Tern *Sterna hirundo*. This was recorded about Broome and north to the Lacepede Islands on 23 January in small flocks of up to a dozen birds often congregating with Common Noddy and Brown Booby. One individual was seen on 25 January loafing with waders on the sandbar situated to the east of East Island.

Little Tern *Sterna albifrons*. Several Little Terns were seen about Broome and inshore waters towards Willies Creek on 23 January. The count of 268 birds on 2 February was 268, more than double the 105 recorded in January 2002. These

Little Terns were loafing with mixed flocks of waders on sandbars between East and Middle Islands and their behaviour was similar to that of birds found in Broome. No juvenile plumage was noted. The majority of birds appeared to be non-breeding adults; a few terns were in full breeding plumage and a similar number were showing some breeding plumage.

Bridled Tern *Sterna anaethetus*. This was recorded at sea 18 nautical miles north-east of the Lacepede islands and at 121º46'E 16º52'S in mixed flocks of seabirds including Brown Booby, Common Noddy, Roseate Terns and Common Terns. Bridled Terns were not recorded inside the MOU 74 Box or in the Ashmore Reef Nature Reserve. It is interesting to note that Alistair Smith (pers. comm..), who visited the reserve aboard HMS Fremantle, recorded Bridled Terns between Cartier Island and Ashmore Reef on 7 January but he made no counts of this species.

Sooty Tern *Sterna fuscata*. A very common species that was seen over most of the reserve and at sea; it congregated over East and Middle Islands in large numbers. Synchronised aerial displays and courtship displays on the ground were observed. An interesting observation was of apparently freshly laid eggs on wet sand at low tide while birds were roosting in the afternoon. A total estimated count of 15,200 Sooty Terns was recorded for Ashmore Reef during the survey. Their behaviour indicated a possible breeding cycle was about to commence. Desiccated remains of fledged juveniles were common on East Island and less so on Middle Island. These birds were presumably from the previous breeding cycle.

White-winged Black Tern *Childonias leucopterus*. Surprisingly no White-winged Black Terns were recorded at sea during this survey. One bird was seen in the reserve while travelling in a dinghy between Middle Island and West Island on 28 January.

Common Noddy *Anous stolidus*. A total count of 2,910 birds was recorded in the survey. No recent evidence of breeding was found. Desiccated remains of this species were common on East and Middle Islands. Numbers of this species were low during the day but numbers would build up late in the afternoon as birds came in to roost. The largest flocks were recorded on East Island. Common Noddies were also seen at sea on 23 and 24 January while steaming to Ashmore Reef from Broome, at times in flocks of up to 30 birds.

Black Noddy *Anous minutes*. Low numbers were recorded for this species during the survey with a total of 15 birds. Occasionally birds were seen at sea and amongst loafing flocks of Common Noddies.

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SUMMARY OF HOODED PLOVER RESEARCH IN YALGORUP NATIONAL PARK REPORT NO. 3.

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INTRODUCTION

Birds Australia WA has been conducting research into the Hooded Plover *Charadrius rubricollis* since 1994. The third report on this project (Singor 2004) is summarised here. Earlier reports are by Newbey 1996 and Singor 1999a (Singor 1999b is a summary of the latter). Distribution patterns and behaviour were investigated in Yalgorup National Park. The Park is situated between Perth and Bunbury in south-west Western Australia (see Figure 1). It contains Western Australia's largest known resident Hooded Plover population. A colour banding project was undertaken to determine how the birds use the Park's wetlands.

The lakes that characterise Park lie in depressions between a series of coastal dunes. The lakes form three distinctive lines parallel to the coast. Lake Preston lies closest to the coast and is the largest lake within the Yalgorup lake system. Its length from north to south is 27.5 km; the widest point of the lake at the southern end is about 2 km, and the narrowest about 0.5 km.

The lakes behind the next ridge are far more broken, comprising (from north to south): Swan Pond, Duck Pond, Boundary Lake, Linda's Lagoon, Lake Pollard, Martins Tank Lake, Lake Yalgorup, Lake Hayward and Newnham Lake. Lake Clifton is the furthest from the coast. The soils are largely made up of calcareous material derived from sea shells and other marine organisms. The lakes are principally supplied by fresh groundwater and precipitation, but are saline due to high evaporation rates. All the lakes are bordered by essentially the same vegetation. On the lakesides, there is a narrow belt of samphire *Sarcocornia* sp. behind which clumps of shore rush *Juncus kraussii* and coast saw-sedge *Gahnia trifida* occur. All the lakes then have a dense belt of saltwater paperbarks *Melaleuca cuticularis* and *M. rhaphiophylla* or western coastal wattle *Acacia cyclops*.

MAIN RESULTS

A general behavioural pattern in Hooded Plover is that over summer, as the inland salt lakes dry out, there is a movement towards coastal lakes and beaches. This can lead to large flocks of Hooded Plovers forming; for example, more than 1,000 birds in the Esperance area in 1995. These summer flocks form after the birds have bred. Our research has confirmed that Yalgorup National Park contains the largest known concentration of resident and breeding Hooded Plover in Western Australia. The number of breeding Hooded Plover was estimated at 11 pairs in 2003 and 17 pairs in 2004. Regular summer surveys have provided an estimate on the number of Hooded Plover that frequent Yalgorup National Park, confirming that it is of international importance for Hooded Plover (see Table 1).

Breeding Season

The Hooded Plover breeding season in Yalgorup National Park is extended. Nests with eggs have been found from August to February (7 months). Observations of runners from mid-August to March indicate that breeding can occur almost throughout the year. At Lake Preston the majority of first nests are begun from the first week in December through to the last week in February. If the eggs of the first nest are lost, a second nesting attempt is often made. If this too is unsuccessful, a third attempt is sometimes made. In 2001/02, eight pairs were found to have made 14 nesting attempts. Two of these pairs made three nesting attempts; one of the two pairs was successful on the third attempt. In 2002-3 nine pairs were found to have made 12 nesting attempts.

Nest Sites

Breeding occurred at most lakes but most attention was focussed on Lake Preston due to easier access. Nests in the south-west of this lake were usually between 700 and 1,500 metres apart. The same breeding territories are frequently used year after year and there is some evidence that it is the same birds that return to the same sites. One pair that was colour banded early in the 2002/03 breeding season was in the same territory at the beginning of the 2003/04 breeding season. A bird distinguishable by a missing foot was, with an unmarked mate, very near the same site it nested in the previous year after having been away from the site for at least four months. It was seen at various locations several kilometres south of its breeding territory, often in a conspecific feeding flock. Nests are often located in close proximity to nest sites of previous years.

With few exceptions the birds nest on hard limestone headlands very close to the waterline, or on soft beach sites approximately equidistant from the waterline and the nearest substantial vegetation. Hooded Plovers from south-west Lake Preston sometimes make nesting sites in the depression formed by a kangaroo foot in a soft-mud or silt beach. Another nest-scrape had used an old steer track for a nest foundation. In December 2003, two pairs each chose to nest on dry, slightly elevated, mud mounds created by a bogged vehicle on the beach. Both these nests were unsuccessful. Another Hooded Plover nest was discovered on top of the remnants of a mud castle built by children in the south-west part of Lake Preston. Information from France *et al*. (unpubl.).

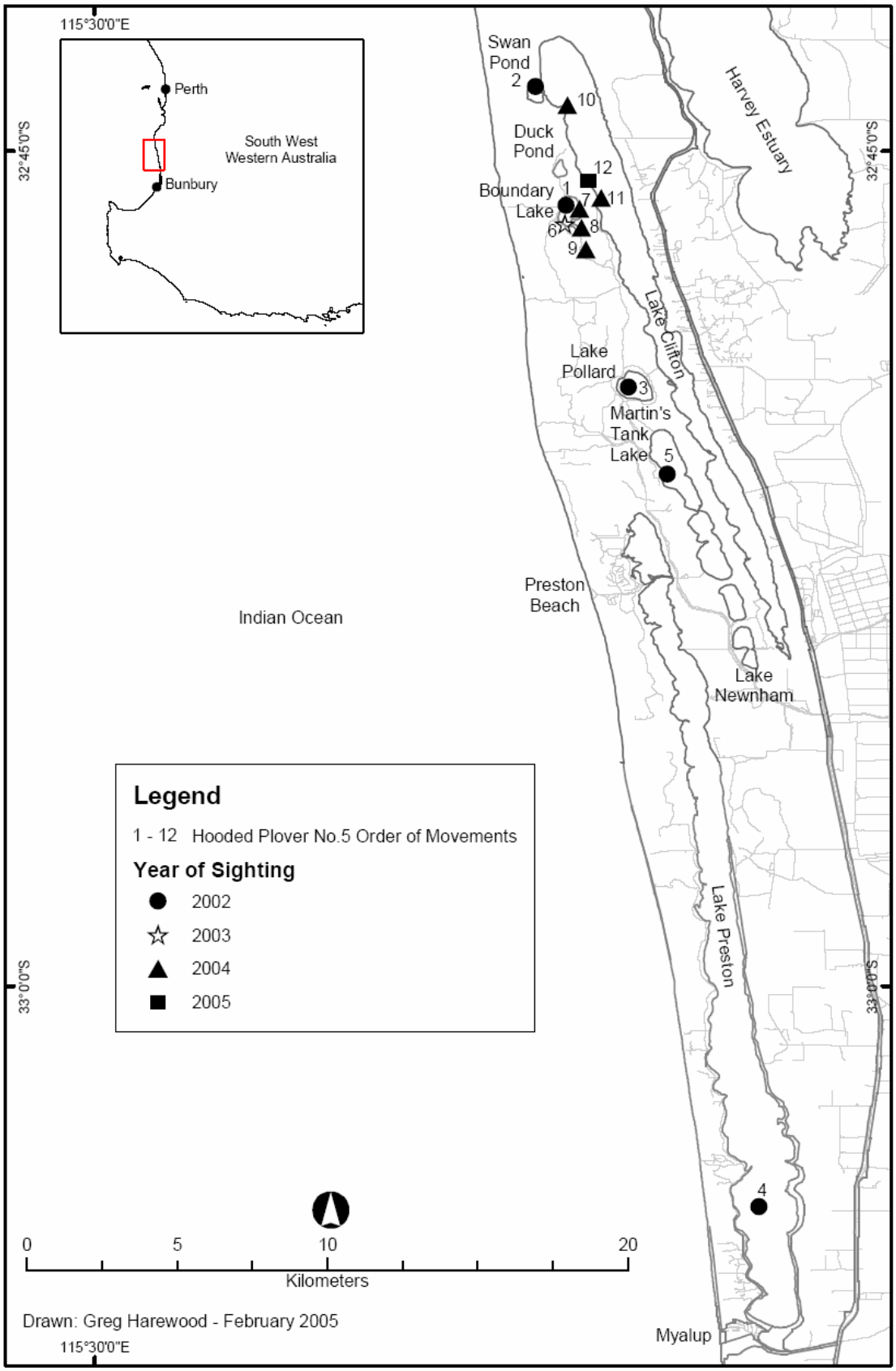

Figure 1. Movement of Hooded Plover Number 5 which was tracked through the years 2002-2005. Hooded Plover number 5 was banded on 3 February 2002 at Boundary Lake.

Table 1. Results of the last four summer surveys

Date	Adults	Juveniles	Total
March 2002	158	12	170
Feb/March 2003	102	9	111
February 2004*	90	14	104
February 2005	132	12	144

* Note: Summer flocking on Lake Preston (North) in 2004 occurred before February resulting in a lower count.

In winter, water levels at Lake Preston conceal some large islands that emerge in December as water levels drop. Clusters of islands occur on the western side of Lake Preston north of Myalup. The majority of the exposed islands remain barren throughout summer. This project determined that these islands are used as breeding sites by Hooded Plover.

Travel with Hatchlings.

Hooded Plovers with young can cover considerable distances very quickly, sometimes over very uneven surfaces encountered on the way. Bob Baird (pers. comm.) reports that, "As parents shift newly hatched chicks to cover within an hour of the last egg hatching, in some cases here [in Victoria] up to 200 metres away". In the 2000/01 breeding season, a pair of Hooded Plovers nested was found with three eggs on a slightly elevated summit of a ridge scattered with shale pieces, on an otherwise soft beach away from the hard-reef waterline. They were expected to use the same beach while parenting their young, of which only two survived. Almost overnight, however, the group moved southwards for more than a kilometre. Information from France *et al*. (unpubl.).

Creching Behaviour

On 22 February 2004, one pair, with two runners, a few days old, was on the west side of Martin's Tank. A second pair was about 700 m further south gave every sign of having either eggs or runners. On 28 February, the first pair had moved about 300 m north while the second pair had three runners and were now about 1 km from the first pair. Neither pair had moved by 6 March but on 12 March all five runners were with the first breeding pair and there was no sign of the second pair anywhere on the lake. See Russell (2004).

Threats to Nests

Lake Preston is a shallow lake and when strong north-easterlies blow, sheet water surges up its gently sloping beaches. The consequential flooding is one cause of nesting failures. At least three Hooded Plover nests were lost due to this at Lake Preston. Wind driven water surges also cause fresh high water marks, sometimes bringing them close to Hooded Plover nests. Silver Gulls *Larus novaehollandiae* forage along tide-lines; this often brings them within range of Hooded Plover nests making them liable to predation. Information from France *et al*. (unpubl.).

Colour Banding

A colour banding program was started to find out how Hooded Plovers use the wetlands system. This program ran from February 2002 to May 2004. Tangle nets and drop nets were used to catch the birds. Decoys, lifelike polystyrene models of Hooded Plovers, were used with some success to elicit a territorial response and lure Hooded Plovers into tangle nets. They were also used to instil, hopefully, a false sense of security when drop nets were used. In all, 27 Hooded Plovers were banded with colour and metal bands. Some birds which were banded in January 2002 are still being monitored three years later. Figures 1 and 2 give the locations and years in which two individuals were recorded. It is clear from these figures that the whole of the lake system is used but different birds use the system in quite different ways. Bird No. 5 (Fig. 1) was banded in 2002 and was recorded at four other locations from the north of Lake Clifton to the south of Lake Preston in that year. Subsequent sightings were all relatively close to the place of initial encounter. Bird No. 16 (Fig. 2) was banded as a runner at lake Pollard in 2004 and in two years never moved very far from that location.

Other Results

More detail on the above is given in Singor (2004) as are comments on the following.

- Some Hooded Plover in Yalgorup National Park are sedentary and remain in their geographical range within set regions of the Park. Variation in water levels can have an influence on their movements.
- Colour banding has confirmed pair bonding over a period of more than one year.
- Banding of runners provided a dispersal timeline of juveniles.
- Colour banding clarified the time it takes for runners to acquire adult plumage.
- The biggest flocks of Hooded Plover are seen over summer at Lake Preston (north).
- Flocking behaviour is observed throughout the year.
- Feeding behaviour.
- Fresh water use and preening.
- Roosting.
- Disturbance (vision).
- Display behaviour.

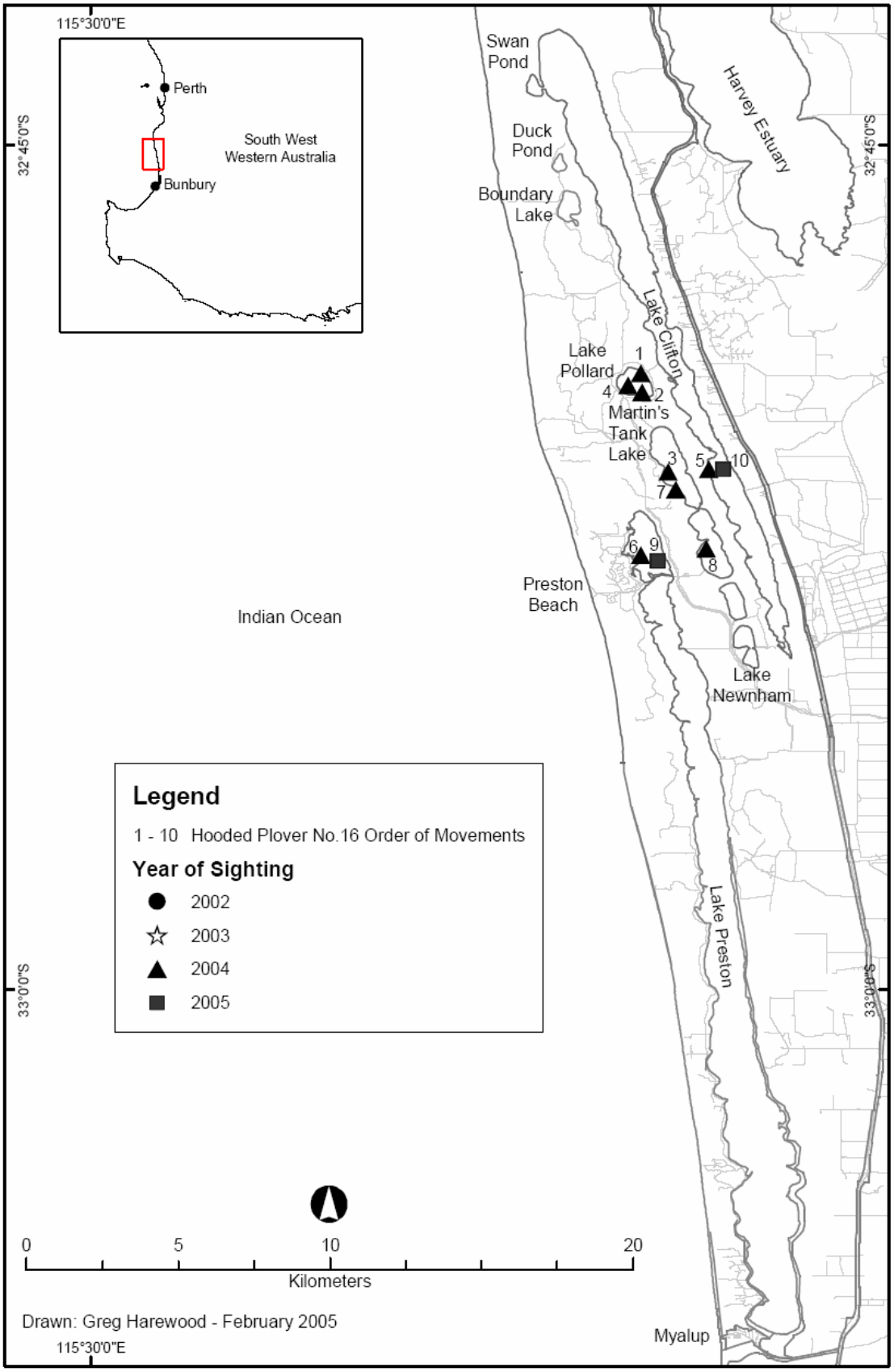

Figure 2. Movement of Hooded Plover Number 16 which was banded as a runner on 28 February 2004 at Lake Pollard and tracked through 2004-2005.

Hooded Plover research will continue in in Yalgorup National Park. Our intention is to continue banding and monitoring banded birds to learn more about their behaviour and dispersal patterns. We intend also to follow the Victorian example of using exclusion cages to protect nests from foxes and other predators. These have been shown to uncrease fledging success rates.

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WADER SURVEY OF ISLANDS OUT FROM MACKAY, QUEENSLAND, DECEMBER 2004

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A survey of waders was conducted in the Mackay region in 2003 (Harding and Milton 2003). It was understood then that the offshore islands should also be counted to complete the survey. The Queensland Wader Study Group (QWSG) in conjunction with the Queensland Parks and Wildlife Service (QPWS) arranged to do this at the end of 2004. Sites were surveyed on the following islands: Penrith Island, Bushy Islet, Redbill Islet, Tern Islet, Scawfell Island, Three Rocks Islet and Brampton Island.

Sandra Harding, Derek Ball, Tim Holmes, Matt Bloor, Andrew Dinwoodie, Bill Butler and Steve Fisher undertook the survey of wader populations in the non-breeding period in December 2004. Derek Ball had knowledge from previous visits of where likely high tide roosts would be found. The party left the Mackay Boat Harbour in the Marine Parks vessel Yerananda on 30 November, travelled to Penrith Island to stay overnight, went on to Bushy Islet on 1 December, then to Scawfell Island on 2 December, and finally returned to Mackay via Brampton Island on 3 December. Some of the islands consisted of a land mass surrounded by coral reef and some were small rock outcrops. Bushy Islet is a sandy cay and furthest away, approximately 95 km east of Shoal Point, Mackay and is used by thousands of Common Noddies roosting at night. As well as waders, other observations made on the survey were of breeding reef herons, sharks, and turtles.

The waders recorded and those of earlier counts are listed in Tables 1 and 2. No waders were found on Three Rocks Islet. These are the first wader counts for some of these islands and all the counts add to the picture of waders along the Queensland coast. I expect that the islands are more likely used by sand plovers and other waders on migration. Cornelius (1987) recorded over a 100 Grey-tailed Tattlers and Ruddy Turnstones in early April 1986 on the Far Northern Section of the Great Barrier Reef Marine Park (from Thursday Island to Cairns).

Thanks are due to the QPWS officers; Derek Ball, Steve Fisher and Bill Butler for accommodating a wader survey together with their normal marine and national park work and to the QWSG who funded transport to Mackay.

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Harding, S.B. and Milton, D.A. 2003. Mackay shorebird plan final report. Queensland Wader Study Group report to WWF Australia.

Table 1. Locations counted in 2002 and 2004

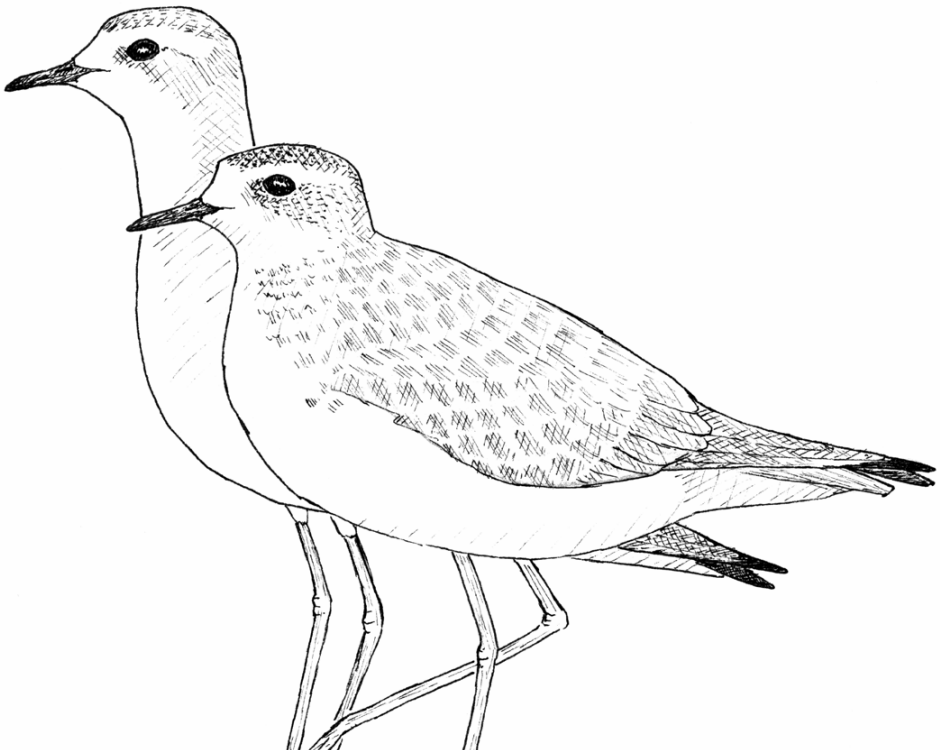
Species	**11 Dec 2002**	**12 Dec 2002**	**13 Dec 2002**	**30 Nov 2004**	**1 Dec 2004**
Bushy Islet (20° 57′ 15″ S, 150° 04′ 18″ E)					
Bar-tailed Godwit *Limosa lapponica*	-	1	-	-	-
Whimbrel *Numenius phaeopus*	-	2	-	-	-
Eastern Curlew *Numenius madagascariensis*	1	1	-	-	-
Grey-tailed Tattler *Heteroscelus brevipes*	1	70	-	-	-
Ruddy Turnstone *Arenaria interpres*	-	6	-	-	-
Sanderling *Calidris alba*	-	1	-	-	-
Beach Stone-curlew *Burhinus neglectus*	2	-	-	-	-
Pied Oystercatcher *Haematopus longirostris*	13	6	-	-	6
Sooty Oystercatcher *Haematopus fuliginosus*	4	2	-	-	2
Pacific Golden Plover *Pluvialis fulva*	-	40	-	-	-
Redbill Islet					
Grey-tailed Tattler *Heteroscelus brevipes*	-	97	-	-	2
Penrith Island (21° 00′ 37″ S, 149° 53′ 54″ E)					
Eastern Curlew *Numenius madagascariensis*	-	-	3	7	6
Grey-tailed Tattler *Heteroscelus brevipes*	-	-	1	-	-
Bush Stone-curlew *Burhinus magnirostris*	-	-	2	2	2
Pied Oystercatcher *Haematopus longirostris*	-	-	5	5	9
Sooty Oystercatcher *Haematopus fuliginosus*	-	-	2	2	-

Table 2. Locations only counted in 2004

Species	**Tern Islet 01-Dec-04**	**Refuse Bay**[1] **02-Dec-04**	**Dingy Bay**[2] **03-Dec-04**
Whimbrel	17	3	-
Ruddy Turnstone	9	-	-
Bush Stone-curlew	-	1	-
Beach Stone-curlew	-	3	-
Pied Oystercatcher	9	2	-
Sooty Oystercatcher	-	-	4
Pacific Golden Plover	44	-	-
Lesser Sand Plover	32	-	-
Greater Sand Plover	7	-	-

[1] Refuse Bay, Scawfell Island: 20° 52′ 09″ S, 149° 36′ 07″ E

[2] Dingy Bay, Brampton Island: 20° 48′ 57″ S, 149° 16′ 47″ E



SIGHTINGS OF WADERS AND TERNS LEG-FLAGGED IN NORTH-WEST AUSTRALIA: REPORT NUMBER 9

CLIVE MINTON[1], ROS JESSOP, PETE COLLINS, CHRIS HASSELL, ALICE EWING, HEATHER GIBBS

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INTRODUCTION

This list gives details of all sightings reported (to 8 April 2005) of waders and terns yellow leg flagged in north-west Australia (NWA) since the last list was published (Minton *et al*. 2004). The list is intended as a means of making available to AWSG members on-going information about the results generated by leg flagging. It is also intended as an acknowledgement of the efforts made by many different people, not only to catch and flag the birds, but also to sight them in the field and to report this information.

Additional tables are included in this report summarizing the details of the 1,322 flag sightings that have been reported since yellow flagging was introduced in NWA in August 1992. A table showing the number of each species flagged is also included.

All flag sightings of birds away from their flagging location are processed into the Leg-flag Database by the Coordinator, with acknowledgements and information being sent out to the observer and to the bander for each bird reported. Please send any future sightings to Clive Minton (mintons@ozemail.com.au) or enter them on to the proforma on the AWSG web site (www.tasweb.com.au/awsg/).

Anyone wishing to utilize this published leg-flag data is requested first to contact the principal author to ensure that the information is fully understood and that any planned use does not conflict with existing or intended analyses by those who have been involved in the flagging operations.

In the list of sightings under each species, information is given in the following order: date seen (day/month/year); number of flagged birds; location seen; observer(s).

BLACK-TAILED GODWIT *Limosa limosa*

CHINA (MAINLAND)

15/05/2004	1	Zuidong, near Tanshang, Heibei Province	Yang Hong Yan

New South Wales **AUSTRALIA**

15/11/2004	1	Kooragang Dykes, Kooragang Island, near Newcastle	Jenny Spencer and Ann Lindsey

The flag sighting in the north-western part of the Yellow Sea is the second of a Black-tailed Godwit from north-west Australia in mainland China. There have been 11 previous sightings in the South Korean part of the Yellow Sea, and also seven sightings in Taiwan, China.

Surprisingly, the north-west Australian flagged bird which had moved to Newcastle is not the first movement between NWA and the east coast of Australia. A Black-tailed Godwit originally flagged in Victoria was later seen (twice, in successive years) at Broome.

BAR-TAILED GODWIT *Limosa lapponica*

RUSSIA

10/08/2004	1	Moroshechnaya Estuary, west central Kamchatka,	Rob Schuckard and John Geale
14/08/2004	1	Moroshechnaya Estuary, west central Kamchatka	Rob Schuckard and Steve Kendall
16/08/2004	3	Moroshechnaya Estuary, west central Kamchatka	Rob Schuckard, John Geale and Ken Gosbell
18/08/2004	1	Moroshechnaya Estuary, west central Kamchatka	Rob Schuckard, Steve Kendall and Katya Matsyna

KOREA

22/04/2004	1	Hongsung	Ji In-sook and Ham In-ja
13/05/2004	1	Yeongjong	Nial Moores
21/05/2004	1	Yeongjong	Nial Moores
2/08/2004	2	Saemangeum	Thomas Heinicke, Jurgen Steudtner, and Nial Moores
13/08/2004	1	Yeongjong Island, Incheon	Thomas Heinicke, and Jurgen Steudtner

CHINA (MAINLAND)

10/05/2002	1	Qilihai, South of Beidaihe, Hebei Province	Paul Holt
14/04/2004	4	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
15/04/2004	5	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
17/04/2004	1	Tianjin	Liu Yang and Mark Barter

18/04/2004	3	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
19/04/2004	4	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
20/04/2004	1	Yalu Jiang National Nature Reserve	Tony Habraken, David Lawrie, and Gillian Vaughan
20/04/2004	1	Yalu Jiang National Nature Reserve	Tony Habraken, David Lawrie, and Gillian Vaughan
20/04/2004	1	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
21/04/2004	2	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
22/04/2004	4	Yalu Jiang National Nature Reserve	Tony Habraken, David Lawrie and Adrian Riegen
25/04/2004	1	Yalu Jiang National Nature Reserve	Tony Habraken
2/05/2004	2	south of Tianjin Haibin Yuchang, Tianjin	Paul Holt
4/05/2004	1	Zuidong, near Tanshang, Heibei Province	Hongyan Ying
9/05/2004	1	Happy Island, Hebei Province	Shaun Robson and David Taylor
14/04/2004	1	Fang-Yuan, Changhua County	Chia-Yang Tsai

NEW ZEALAND

1/03/2004	1	Miranda, Firth of Thames, South Auckland	Phil Battley
5/03/2005	1	Avon-Heathcote Estuary, Christchurch, South Island	Sheila Petch, Filipe Moniz, Jan Walker and Bev Alexander
8/03/2005	1	Avon-Heathcote Estuary, Christchurch, South Island	Sheila Petch, Filipe Moniz, Jan Walker and Bev Alexander

The six sightings over an eight day period in mid-August on the coast of the Kamchatka peninsula in eastern Siberia were at the same location as a yellow-flagged Bar-tailed Godwit was seen in mid-August five years previously. It suggests that at least some of the Bar-tailed Godwits breeding in the Yakutia region of northern Siberia migrate south-eastwards into the Sea of Okhotsk as a first step on their southward migration.

The six sightings in Korea confirm previous records which show that the Yellow Sea coast is used as a staging point for some Bar-tailed Godwits on southward migration in August as well as during northward migration in April-May.

The much increased number of sightings in the Yellow Sea area of mainland China is partly a reflection of the efforts of ornithologists from New Zealand and Australia who visited the Yalu Jiang area in late April. Others were seen in the north-western part of the Yellow Sea by travelling ornithologists and bird-tour groups. The 33 sightings in mainland China were all of birds on northward migration and nearly doubles the previous number of Bar-tailed Godwit flag sightings there (39 previously).

Again, there was a small number (three) of sightings in New Zealand of yellow flagged birds. The majority of the flagged Bar-tailed Godwits seen in New Zealand are birds which have been marked in eastern Australia.

EASTERN CURLEW ***Numenius madagascariensis***

CHINA (MAINLAND)

19/04/2004	1	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team

This is the first sighting of a flagged Eastern Curlew from NWA in mainland China. There have been seven previous sightings in the Korean part of the Yellow Sea.

COMMON REDSHANK ***Tringa totanus***

CHINA (HONG KONG)

23/09/2003	1	Mai Po Marshes	Ying Hak King
21/03/2004	1	Mai Po Marshes	Ying Hak King

These sightings may well refer to the same individual which was thought to be responsible for the two sightings at Mai Po Marshes detailed in the previous leg flag report. With only five Common Redshank having ever been flagged in north-west Australia it is quite probable that these records relate to one bird which has now relocated its non-breeding area as 21 March, and a previous record on 7 October, are unusual dates for a bird to be on passage in Hong Kong, China, from NWA.

TEREK SANDPIPER ***Tringa cinereus***

KOREA

12/08/2004	1	Ganghwa Island, Gyeonggi Province	Thomas Heinicke, and Jurgen Steudtner
13/08/2004	1	Yeongjong Island, Incheon	Thomas Heinicke, and Jurgen Steudtner

CHINA (MAINLAND)

15/04/2004	1	Xiamen	Hangdong Jiang and Yang Liu
17/05/2004	1	Happy Island, Hebei Province	Hans Meltofte
16/08/2004	1	Shen-Kang, Changhua County	Taiwan Wader Study Group
17/08/2004	1	Han-Bou, ChangHwa County	Taiwan Wader Study Group

These sightings are all in areas from where previous records of Terek Sandpipers flagged in NWA have been reported. It is particularly noteworthy that four of the 6 sightings were during the southward migration period, when relatively fewer flag sightings normally occur for most species.

GREY-TAILED TATTLER ***Heteroscelus brevipes***

KOREA

31/08/2003	1	Namdae Cheon, Gangneung City, Gangwon Province	Choi Soon-kyoo
1/08/2004	1	Saemangeum	Thomas Heinicke, Jurgen Steudtner, and Nial Moores

CHINA (TAIWAN)

26/04/2004	1	Ta-Yuan, Tao Yuan County	Li-Chun Chu and Fuu-Diing Chen
27/04/2004	2	Han-Pao, Changhua County	Pete Collins and Taiwan Wader Study Group
28/04/2004	1	Ta-Yuan, Tao Yuan County	Pey-Sen Chang
3/05/2004	1	Han-Pao, Changhua County	Taiwan Wader Study Group
6/05/2004	2	Han-Pao, Changhua County	Taiwan Wader Study Group
6/05/2004	1	Han-Pao, Changhua County	Taiwan Wader Study Group
9/05/2004	1	Shen-Kang, Changhua County	Taiwan Wader Study Group
17/05/2004	2	Shen-Kang, Changhua County	Taiwan Wader Study Group
17/05/2004	1	Shen-Kang, Changhua County	Taiwan Wader Study Group
18/05/2004	1	Han-Pao, Changhua County	Taiwan Wader Study Group
1/08/2004	1	Changhua Coastal Industrial Park, Changhua County	Taiwan Wader Study Group
16/08/2004	1	Changhua Coastal Industrial Park, Changhua County	Taiwan Wader Study Group
16/08/2004	1	Shen-Kang, Changhua County	Taiwan Wader Study Group
17/08/2004	2	Han-Bou, ChangHwa County	Taiwan Wader Study Group
27/08/2004	2	Han-Bou, ChangHwa County	Taiwan Wader Study Group
14/09/2004	1	Han-Bou, ChangHwa County	Taiwan Wader Study Group

CHINA (HONG KONG)

8/05/2004	1	Mai Po Marshes	Mike Chalmers

Another good collection of 24 overseas flag sightings for the Grey-tailed Tattler. As usual, the majority were in Taiwan, China. Again it is notable that ten of the sightings were of birds on southward migration.

ASIAN DOWITCHER ***Limnodromus semipalmatus***

CHINA (MAINLAND)

13/05/2004	1	Happy Island, Hebei Province	Shaun Robson and David Taylor

There has only been one previous overseas sighting of a flagged Asian Dowitcher from NWA. This was in Taiwan, China, in April 2001.

GREAT KNOT ***Calidris tenuirostris***

Northern Territory **AUSTRALIA**

12/02/2005	1	between Lee Pt. and Buffalo Ck. Beach, Darwin, NT	Arthur and Sheryl Keates and Stephen Garnett
15/02/2005	1	Rushy Point, Albany, WA	June Morrison

CHINA (MAINLAND)

31/03/2004	3	Chongming Dongtang	Yuan Xiao Chongming East End Nature Reserve for Wetlands and Birds
15/04/2004	2	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
15/04/2004	1	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
17/04/2004	1	Tianjin	Liu Yang and Mark Barter
18/04/2004	3	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
20/04/2004	4	Yalu Jiang National Nature Reserve	Tony Habraken, David Lawrie, and Gillian Vaughan
20/04/2004	1	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
21/04/2004	4	Yalu Jiang National Nature Reserve	Yalu Jiang 2004 team
21/04/2004	1	Yalu Jiang National Nature Reserve	Tony Habraken
23/04/2004	1	Yalu Jiang National Nature Reserve	Keith Woodley
24/04/2004	1	Yalu Jiang National Nature Reserve	Adrian Riegen
2/05/2004	1	south of Tianjin Haibin Yuchang, Tianjin	Paul Holt

17/05/2004	1	Happy Island, Hebei Province	Hans Meltofte
19/05/2004	1	Beidaihe, Qinhuangodao City, Hebei Province	Mike Parker
29/03/2005	1	Chongming Island, Shanghai	Adrian Boyle
2/04/2005	4	Chongming Island, Shanghai	Adrian Boyle

CHINA (TAIWAN)

2/04/2004	1	Fang-Yuan, Changhua County	Chia-Yang Tsai
20/04/2004	2	Changhua County	Chung-Yu Chiang
20/04/2004	3	Changhua County	Chung-Yu Chiang
28/03/2005	2	HanBou (Hanpou), ChangHwa County	Chung-Yu Chiang
3/04/2005	1	Auku, Chiayi County	Chung-Yu Chiang
4/04/2005	4	HanBou (Hanpou), ChangHwa County	Chung-Yu Chiang

CHINA (HONG KONG)

28/03/2004	1	Mai Po Marshes	Geoff Carey
18/04/2004	1	Mai Po Marshes	Geoff Carey

The past year has been by far the best so far for overseas sightings of Great Knot. The 30 sightings in mainland China are the result of a considerable increase in sighting effort in the Yellow Sea, an area used as a major stopover location for fat replenishment during northward migration, from late March to early May. Thirteen sightings of yellow-flagged Great Knot in Taiwan, China is also a record. These indicate that, although most birds departing from the north-west Australian coast are thought to be targeting the Yellow Sea in one flight, some clearly land, at least briefly, before then. It is probable that birds which do this have met adverse weather conditions – monsoonal storms are frequent across the tropics in late March-April – forcing them to land prematurely. The same is probably also true for the annual sightings of Great Knot which are reported from Hong Kong, China.

Most Great Knot which reach the northern shores of Australia remain there throughout the non-breeding season. The sighting in Albany indicates however that some do cross the continent to spend the non-breeding season on the southern shores of Australia.

RED KNOT ***Calidris canutus***

New South Wales **AUSTRALIA**

16/09/2004	1	Kooragang Dykes, Kooragang Island, near Newcastle	Jenny Spencer and Ann Lindsey
4/10/2004	1	Stockton Sandspit, Hunter Estuary, near Newcastle	Jenny Spencer
6/10/2004	1	Kooragang Dykes, Kooragang Island, near Newcastle	Jenny Spencer

Queensland **AUSTRALIA**

16/10/2004	1	Toorbul, near Bribie Island	Judy Caughley, and Barb Dickson

Western Australia **AUSTRALIA**

9/11/2004	1	Lake Macleod, near Carnarvon	Chris Hassell, Les George, and Tony Kirby
25/11/2004	1	Lacepede Islands	Adrian Boyle

Tasmania **AUSTRALIA**

12/12/2004	1	Bird Point, Robbins Island, north-west Tas.	R. and C. Donaghey, F. Spruzen, and P. Porteus

CHINA (MAINLAND)

2/05/2004	1	south of Tianjin Haibin Yuchang, Tianjin	Paul Holt
4/05/2004	2	Zuidong, near Tanshang, Heibei Province	Yang Hong Yan
21/05/2004	1	Zuidong, near Tanshang, Heibei Province	Yang Hong Yan
22/05/2004	1	Zuidong, near Tanshang, Heibei Province	Hongyan Yong

CHINA (HONG KONG)

8/05/2004	3	Mai Po Marshes	Mike Chalmers
8/05/2004	1	Mai Po Marshes	Mike Chalmers
17/05/2004	1	Mai Po Marshes	Yu Yat-Tung
18/05/2004	1	Mai Po Marshes	Paul Leader

NEW ZEALAND

24/10/2003	2	Taramaire, Firth of Thames, South Auckland	Phil Battley
11/03/2004	1	Kaiaua, Firth of Thames, Auckland	Phil Battley
12/03/2004	1	Kaiaua, Firth of Thames, Auckland	Phil Battley
15/03/2004	1	Waihou River, Thames, Firth of Thames	Phil Battley and SJM
18/10/2004	1	Big Sand Island, Kaipara Harbour, North Island	(unknown)

19/10/2004	1	Miranda, Firth of Thames, South Auckland	Phil Battley
9/11/2004	1	Kiwi Esplanade, Manukau Harbour	Phil Battley
14/11/2004	1	Mangere Sewage Ponds, Manukau Harbour	Ted Wnorowski
14/12/2004	2	Tapora Wildlife Refuge, South Kaipara Harbour	Gordon Gorbey
2/01/2005	1	Motueka Sandspit, near Nelson	David Melville
3/01/2005	1	Motueka Sandspit, near Nelson	David Melville
3/01/2005	1	Mangere Sewage Ponds, Manukau Harbour	Gwen Pulham and R. Clough
5/01/2005	1	Jordan's Farm, SE Kaipara Harbour, Auckland	Gwen Pulham and Simon Chamberlin

As with Great Knot and Bar-tailed Godwit, there has been a noticeable increase in flag sightings from mainland China this past year, although sightings (only five) are still much less frequent in Red Knot than in the other two species. Relatively, the six sightings in Hong Kong, China, are more than usual. However, no sightings of yellow-flagged Red Knot occurred in Taiwan, China, during the past year.

A small number of the Red Knot which visit NWA travel to New Zealand for the non-breeding season. The 15 sightings in the past year, however, are only about half the record number of sightings (33) in the previous year. An explanation of the possible reasons for these movements to New Zealand was given in Minton *et al*. (2004). Proportionately more Red Knot from NWA visit New Zealand compared with Bar-tailed Godwits; no Great Knot go there regularly.

Sightings of yellow-flagged Red Knot within Australia include three at Newcastle, NSW (probably relating to a single bird) and one in north-west Tasmania. The latter is at the same location as two yellow-flagged Red Knot were seen in February 2002, the only previous time NWA Red Knot have been shown to visit Tasmania.

SANDERLING ***Calidris alba***

South Australia **AUSTRALIA**

9/11/2004	1	Murray River Mouth, Coorong, SA	Iain Stewart
23/02/2005	1	Murray Mouth, Goolwa, SA	Mat Gilfedder

KOREA

30/08/2003	1	Nakdong Estuary, near Busan	Chungrok Park, Wetlands & Birds Korea
10/09/2003	1	Nakdong Estuary, near Busan	Chungrok Park, Wetlands & Birds Korea
5/09/2004	1	Nakdong Estuary, near Busan	Chungrok Park, Wetlands & Birds Korea

Only a small number of Sanderling flag sightings were reported in the past year and the five records quite possibly relate to only two individuals. Overseas sightings in this species tend to mostly be during southward migration in August and the first half of September. A small number of yellow-flagged Sanderling is seen each year in southern Australia, having presumably used NWA as a staging point on either northward or southward migration.

RED-NECKED STINT ***Calidris ruficollis***

Victoria **AUSTRALIA**

31/01/2005	1	Stockyard Point, Lang Lang, Westernport, VIC	Naoko Takeuchi

MONGOLIA

31/07/2004	1	an unnamed lake	Mark Thomas

KOREA

15/10/2004	1	Mangyeung River, Saemangeum,	Chai Seung-Hoon

CHINA (MAINLAND)

29/08/2002	2	Tanggu, Tianjin	Paul Holt
30/08/2002	3	Tanggu, Tianjin	Paul Holt
31/08/2002	1	Tanggu, Tianjin	Paul Holt
10/05/2004	1	Ba Li Qiao, 50 km south of Beidaihe	Allan Hale
10/05/2004	1	Baliqiao, Leting district, Hebei	Paul Holt
13/05/2004	1	Ba Li Qiao, 50 km south of Beidaihe	Allan Hale
3/09/2004	3	near Tanggu, Tianjin	Paul Holt
4/09/2004	6	near Tanggu, Tianjin	Paul Holt
5/09/2004	2	near Tanggu, Tianjin	Paul Holt
6/09/2004	2	near Tanggu, Tianjin	Paul Holt
7/09/2004	4	near Tanggu, Tianjin	Paul Holt

CHINA (TAIWAN)

22/08/2004	1	Cheng-Hsi-Li, Tainan City	Kun-Hsien Hsu

CHINA (HONG KONG)

5/04/2004	1	Mai Po Marshes	Geoff Carey
23/04/2004	1	Mai Po Marshes	Tam Yiu-leung
24/04/2004	1	Mai Po Marshes	Tam Yiu-leung
19/05/2004	1	Mai Po Marshes	Mike Leven

INDONESIA

2/05/2004	1	Wonorejo Wetlands, Surabaya,	Iwan Londo
3/05/2004	1	Wonorejo Wetlands, Surabaya	Iwan Londo
5/05/2004	3	Wonorejo Wetlands, Surabaya	Iwan Londo

The outstanding feature of this year's collection of Red-necked Stint flag sightings is 26 records from the Yellow Sea area of mainland China. Most of these were seen by Paul Holt, a bird tour leader who visits the area in most years. It is notable that most of the sightings were of birds on southward migration, whereas flag sightings in previous years have mostly been during northward migration. It was nice to receive a further sighting from Mongolia – there were several flagged Red-necked Stints from Australia seen there on migration a few years ago.

Another welcome development was five sightings of yellow-flagged Red-necked Stints on northward migration through Indonesia. These were made by a new observer, Iwan Londo. It was previously thought that most Red-necked Stints (and other waders) leaving the shores of Australia on northward migration over-fly Indonesia and neighboring countries with a direct non-stop flight to the Asian continent. Clearly some birds come down much earlier than this, their journey having probably been interrupted by meeting bad weather.

SHARP-TAILED SANDPIPER *Calidris acuminata*

Western Australia **AUSTRALIA**

16/01/2005	1	Lake McLarty, near Pinjarra, SE of Perth	Les George
8/03/2005	1	Lake McLarty, near Pinjarra, SE of Perth	Bill Russell

No overseas sightings were reported this year. The sightings at Lake McLarty would appear to refer to a bird (or possibly two birds) that had used NWA as a staging area on migration at some time previously.

CURLEW SANDPIPER *Calidris ferruginea*

Western Australia **AUSTRALIA**

11/11/2004	2	Lake Macleod, near Carnarvon	Chris Hassell, Les George, and Tony Kirby
25/11/2004	1	Lacepede Islands	Adrian Boyle

Victoria **AUSTRALIA**

10/12/2004	1	Werribee Sewage Farm	Pete Collins
13/12/2004	1	Reef Island, Western Port	Peter Dann
1/02/2005	1	Stockyard Point, Lang Lang, Westernport	Pete Collins

CHINA (MAINLAND)

20/05/2004	1	Beidaihe, Qinhuangodao City, Hebei Province	Hans Meltofte
21/05/2004	1	Zuidong, near Tanshang, Heibei Province	Yang Hong Yan
22/05/2004	1	Zuidong, near Tanshang, Heibei Province	Hongyan Yong

CHINA (TAIWAN)

27/04/2004	1	Ma-Gon, Peng-Hu County	Chien-Hsuin Cheng, Li-Chao Chou, Kai-Yi Ling and Chang-Hsing Lin
3/05/2004	1	Han-Pao, Changhua County	Taiwan Wader Study Group
8/05/2004	1	Fu-Bou, ChangHua County	Cheer
1/08/2004	1	HsinHsing, ChangHwa County	Ming-Tsai Hsu

CHINA (HONG KONG)

27/03/2004	1	Mai Po Marshes,	Geoff Carey
22/04/2004	1	Mai Po Marshes	Yu Yat-Tung
23/04/2004	3	Mai Po Marshes	Tam Yiu-leung
24/04/2004	1	Mai Po Marshes	Tam Yiu-leung
24/04/2004	2	Mai Po Marshes	Tam Yiu-leung
8/05/2004	3	Mai Po Marshes	Mike Chalmers
10/05/2004	1	Mai Po Marshes	Yu Yat-Tung

As usual, the main location for overseas sightings of Curlew Sandpipers flagged in NWA is Hong Kong, China. However this year there were also three sightings from the north-west side of the Yellow Sea in mainland China.

The sightings in Victoria indicate that during the last non-breeding season at least three different individuals flagged in NWA were present.

RED-NECKED PHALAROPE ***Phalaropus lobatus***

Western Australia **AUSTRALIA**

2/11/2004	2	Port Hedland Saltworks, WA	Chris Hassell and Adrian Boyle

Although these two yellow-flagged Red-necked Phalaropes were resighted at the original flagging location, they are included here because they are the first reported sightings of flagged individuals of this species. They would have bee part of a catch of 22 made at Port Hedland Saltworks on 18 October 2001. These records further confirm that the saltworks is a regular non-breeding area for this species, not just a haven for wandering first-year individuals.

PIED OYSTERCATCHER ***Haematopus longirostris***

Western Australia **AUSTRALIA**

20/11/2004	1	Adele Island, about 100 km north of Cape Leveque	Adrian Boyle

After last year's record movement for an NWA Pied Oystercatcher, to the Lacepede Islands, this bird has gone almost twice as far, to Adele Island. As in Victoria, it is probable that recoveries and flag sightings of Pied Oystercatchers in NWA which may accumulate over the next few years will show that the species is not really as sedentary as originally thought, with birds sometimes moving several hundred kilometres between banding flock location and probable breeding location. It is interesting that two Sooty Oystercatchers from Broome were seen in July 2004 on the Lacepede Islands, and that both had returned to Broome within a month. These birds carried engraved leg-flags, which enabled the individuals involved to be identified, and the records are classed as recoveries rather than flag sightings.

RED-NECKED AVOCET ***Recurvirostra novaehollandiae***

Western Australia **AUSTRALIA**

4/11/2004	1	Dampier Saltworks, near Dampier	Chris Hassell and Adrian Boyle

Red-Necked Avocet have been flagged at Roebuck Bay, Broome, and at Port Hedland Saltworks. It is not possible to determine the origin of the bird seen at Dampier Saltworks, but it would have moved a minimum of 200 km west.

GREY PLOVER ***Pluvialis squatarola***

CHINA (MAINLAND)

20/04/2004	1	Yalu Jiang National Nature Reserve	Tony Habraken

This is only the fourth overseas sighting of a yellow-flagged Grey Plover. Previous records were in Japan, Korea, and, in April 2002, at Yalu Jiang.

LESSER SAND PLOVER ***Charadrius mongolus***

VIETNAM

22/03/2004	1	Xuan Thuy	Chris Bradshaw

This is the first sighting of a yellow-flagged Lesser Sand Plover in Vietnam, and only the third overseas sighting. The previous two were in Hong Kong, China, in 1999. These sightings suggest a more north-westerly migration direction (similar to Greater Sand Plover) than most other wader species.

GREATER SAND PLOVER ***Charadrius leschenaultii***

CHINA (TAIWAN)

16/07/2004	4	Hsien-Hsi, Changhua County	Taiwan Wader Study Group
17/07/2004	4	Lu-Kang, Changhua County	Chung-Yu Chiang and Shih-han Hsu
19/07/2004	2	Changhua Coastal Industrial Park, Changhua County	Taiwan Wader Study Group
1/08/2004	4	Changhua Coastal Industrial Park, Changhua County	Taiwan Wader Study Group
16/08/2004	1	Changhua Coastal Industrial Park, Changhua County	Taiwan Wader Study Group
18/08/2004	2	Changhua Coastal Industrial Park, Changhua County	Taiwan Wader Study Group

CHINA (HONG KONG)

5/04/2004	1	Mai Po Marshes	Geoff Carey
8/04/2004	2	Mai Po Marshes	Paul Leader

The overseas sightings of Greater Sand Plover during the past year are dominated by the 17 records from Taiwan, China. Most interestingly all these were birds on southern migration. Count, and now flagging, data indicate that major southward migration of adult Greater Sand Plovers reaches Taiwan, China, in mid-July. There is also a marked increase in NWA before the end of that month, indicating that this species is one of the two first to arrive back in Australia after southward migration. The other species arriving back in numbers in NWA before the end of July is the Eastern Curlew.

WHISKERED TERN ***Chlidonias hybridus***

Northern Territory **AUSTRALIA**

4/07/2004	1	Katherine Sewage Ponds	Rhonda Scoccimarro

This is the first sighting of a yellow-flagged Whiskered Tern away from the banding locations in NWA. It was identified as an adult bird and therefore was not one of the chicks banded and flagged on Roebuck Plains in May-June 2004, when Whiskered Terns bred extensively after a good wet season. Since it was present in Katherine in July, it was clearly a member of the resident Australian Whiskered Tern population. Additional Whiskered Terns from the Northern Hemisphere are thought to visit Australia from October to April.

SUMMARY OF FLAG-SIGHTING DATA

The attached tables summarise the information that has been generated on waders and terns leg-flagged in NWA between August 1992, when leg flagging was started there, and the end of December 2004. Table 1 shows the reported flag sightings broken down by year and country of sighting. The growth in the number of sightings reported annually was particularly marked in 2004. This was mainly the result of a considerable increase in flag-sighting effort in mainland China and in the intensity of searches for flagged birds by the small team of skilled field workers in Taiwan, China.

Table 2 shows the reported flag sightings broken down by species and country of sighting. It shows that Great Knot, Curlew Sandpiper and Bar-tailed Godwit are the species for which flag sightings are most frequently reported. Surprisingly, at present, Korea tops the list as the overseas location where yellow-flagged Great Knot and Bar-tailed Godwit have been most frequently sighted. The Curlew Sandpiper records are dominated by sightings in the intensively watched Mai Po marshes in Hong Kong, China. Red Knot is the fourth most frequently reported species, but in this case the majority of sightings are from New Zealand. Red-necked Stint has the widest spread geographically of sighting locations.

Table 3 shows the numbers of birds of each species that have been flagged each year in NWA. Great Knot, Red-necked Stint, Bar-tailed Godwit and Greater Sand Plover (in that order) are the most frequently flagged species. A total of 57,527 birds, of 45 species, have now been yellow leg flagged in NWA in the 13 years since flagging commenced there.

The 2004 flagging total of 3,066 contained an unprecedented large number of Oriental Pratincoles (251) and particularly good numbers of two other species of migratory waders – 272 Sharp-tailed Sandpiper and 63 Oriental Plover. The majority of these were mist-netted by the Broome-based Northwest Wader Study Group team. Their most successful mist-netting activities were also responsible for good totals of a number of other species of predominantly freshwater waders and also for the excellent total of resident species such as Black-winged Stilt, Red-capped Plover, Masked Lapwing, Black-fronted Plover and Red-kneed Dotterel.

REFERENCE

Minton , C., R. Jessop, P. Collins, C. Hassell, & L. Beasley. 2004. Sightings of waders and terns leg-flagged in N.W. Australia: Report Number 8. Stilt 45: 54-59.

ACKNOWLEDGEMENTS

The above lists of flag sightings, and the information generated from them over the years, would not be available without the enormous input of effort by banders who have participated in catching waders in NWA over the years, especially since leg-flagging was introduced there in August 1992.

Considerable thanks are also due to all those people throughout the flyway who have made and reported flag sightings and to those who have also helped through collecting and collating many of these sightings. We also thank the Australian Department of Environment and Heritage for providing funding to enable the flag sighting database to be maintained and all flaggers and flag sighters to be promptly advised of reports of flagged birds.

Table 1: Flag sightings reported each year, overseas and elsewhere in Australia, of waders and terns yellow leg-flagged in N.W. Australia*

Year	Hong Kong (China)	Korea	China (mainland)	Taiwan (China)	New Zealand	Japan	Russia	Indonesia	Brunei	Mongolia	Vietnam	Malaysia	Singapore	Total Overseas	Total within Australia (excluding NWA)	TOTAL
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	**3**
1993	36	-	-	-	1	1	-	-	-	-	-	-	-	38	1	**39**
1994	12	4	1	1	-		1	-	-	-	1	-	-	20	3	**23**
1995	3	-	1	-	1	2		-	-	-	-	-	-	7	2	**9**
1996	10	6	2	-	6	8	1	-	-	-	-	-	-	33	1	**34**
1997	17	47	2	3	10	10	1	-	-	-	-	-	-	90	2	**92**
1998	63	53	5	1	12	7	-	-	-	-	-	-	-	141	21	**162**
1999	87	39	11	14	9	9	5	-	-	-	-	-	-	174	13	**187**
2000	55	22	12	9	13	4	1	-	-	1	-	-	1	118	7	**125**
2001	55	20	13	6	19	17	-	-	-	-	-	-	-	130	28	**158**
2002	32	18	29	22	27	-	-	-	3	-	-	-	-	131	18	**149**
2003	34	9	2	23	16	-	3	-	-	-	-	1	-	88	16	**104**
2004	29	11	91	52	16	-	6	5	-	1	1	-	-	212	25	**237**
Totals	**433**	**229**	**169**	**131**	**130**	**58**	**18**	**5**	**3**	**2**	**2**	**1**	**1**	**1182**	**140**	**1322**

* Year category relates to sighting (not reporting) date. The data used to prepare this table includes all sightings to the end of 2004 that had been reported to AWSG and entered into the leg-flag database as of 29/04/2005.

Table 2: Flag sightings reported; overseas and elsewhere in Australia, for each species of wader and tern yellow leg-flagged in N.W. Australia*

Species	Hong Kong (China)	Korea	China (mainland)	Taiwan (China)	New Zealand	Japan	Russia	Indonesia	Brunei	Mongolia	Vietnam	Malaysia	Singapore	Total Overseas	Total within Australia (excluding NWA)	TOTAL
Black-tailed Godwit	-	11	2	7	-	-	-	-	-	-	-	-	-	20	1	**21**
Bar-tailed Godwit	5	94	72	8	23	3	9	-	-	-	-	-	-	214	1	**215**
Eastern Curlew	-	7	1	-	-	-	-	-	-	-	-	-	-	8	0	**8**
Common Redshank	4	-	-	-	-	-	-	-	-	-	-	-	-	4	0	**4**
Marsh Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	**2**
Common Greenshank	1	-	-	-	-	-	-	-	-	-	-	-	-	1	0	**1**
Terek Sandpiper	42	8	3	5	-	-	-	-	-	-	-	-	-	58	0	**58**
Common Sandpiper	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	**1**
Grey-tailed Tattler	6	5	1	49	-	14	-	-	-	-	-	-	-	75	2	**77**
Ruddy Turnstone	2	1	-	3	-	1	-	-	-	-	-	-	-	7	5	**12**
Asian Dowitcher	-	-	1	1	-	-	-	-	-	-	-	-	-	2	0	**2**
Great Knot	72	95	41	14	-	5	2	-	-	-	-	-	-	229	1	**230**
Red Knot	15	-	7	2	107	-	-	-	-	-	-	-	-	131	36	**167**
Sanderling	2	3	-	-	-	19	3	-	-	-	-	-	-	27	15	**42**
Red-necked Stint	39	2	33	7	-	14	4	5	3	2	-	1	-	110	26	**136**
Sharp-tailed Sandpiper	3	-	-	1	-	-	-	-	-	-	-	-	-	4	5	**9**
Curlew Sandpiper	176	-	5	9	-	1	-	-	-	-	-	-	-	191	30	**221**
Broad-billed Sandpiper	15	1	1	-	-	-	-	-	-	-	-	-	-	17	0	**17**
Red-necked Phalarope	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	**2**
Pied Oystercatcher	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	**2**
Black-winged Stilt	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	**1**
Red-necked Avocet	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	**1**
Grey Plover	-	1	2	-	-	1	-	-	-	-	-	-	-	4	0	**4**
Lesser Sand Plover	2	-	-	-	-	-	-	-	-	-	1	-	-	3	0	**3**
Greater Sand Plover	49	-	-	23	-	-	-	-	-	-	1	-	-	73	1	**74**
Silver Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	**1**
Gull-billed Tern	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	**1**
Common Tern	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	**2**
Little Tern	-	1	-	2	-	-	-	-	-	-	-	-	-	3	4	**7**
Whiskered Tern	-	-	-	-	-	-	-	-		-	-	-	-	0	1	**1**
Totals	**433**	**229**	**169**	**131**	**130**	**58**	**18**	**5**	**3**	**2**	**2**	**1**	**1**	**1182**	**140**	**1322**

* Data includes all sightings to the end of 2004 that had been reported to AWSG and entered into the leg-flag database as of 29/04/2005.

Table 3. Waders Leg-flagged in North-west Australia (yellow)

Species	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Pin-tailed Snipe	-	-	-	-	-	-	1	-	-	-	-	-	1	2
Swinhoe's Snipe	-	-	-	-	-	-	-	-	-	-	2	3	-	5
Black-tailed Godwit	72	5	17	-	12	7	223	37	3	92	50	40	28	586
Bar-tailed Godwit	468	184	1171	249	1795	16	1283	12	281	899	458	173	271	7260
Little Curlew	17	-	1	1	-	-	235	73	-	299	264	-	-	890
Whimbrel	-	1	13	-	42	16	87	-	15	47	34	1	1	257
Eastern Curlew	12	5	12	-	6	-	41	-	6	48	6	1	32	169
Common Redshank	-	-	1	-	-	-	3	-	-	-	-	-	1	5
Marsh Sandpiper	16	-	8	-	1	-	7	-	1	47	3	12	20	115
Common Greenshank	3	-	19	-	5	-	45	-	1	24	25	13	18	153
Wood Sandpiper	7	-	1	-	1	1	2	-	-	-	9	20	8	49
Terek Sandpiper	484	93	465	19	765	10	859	17	219	620	178	10	230	3969
Common Sandpiper	-	-	2	-	1	-	6	-	2	10	18	6	13	58
Grey-tailed Tattler	305	157	393	33	542	30	624	44	104	1159	224	88	96	3799
Ruddy Turnstone	114	103	180	7	106	5	187	1	43	46	10	2	44	848
Asian Dowitcher	12	15	13	10	3	-	5	-	19	11	6	1	-	95
Great Knot	843	63	822	198	2140	15	2217	188	807	2311	603	165	389	10761
Red Knot	376	2	286	40	638	1	562	64	269	461	161	24	253	3137
Sanderling	4	-	4	-	44	-	389	-	4	131	64	-	-	640
Little Stint	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Red-necked Stint	611	42	835	36	1355	241	2329	249	139	1556	698	245	264	8600
Long-toed Stint	10	-	11	-	1	-	4	2	-	-	1	16	2	47
Pectoral Sandpiper	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Sharp-tailed Sandpiper	31	-	129	-	16	2	234	3	-	25	30	129	272	871
Curlew Sandpiper	1018	16	474	117	453	10	1753	21	165	575	278	420	90	5390
Broad-billed Sandpiper	84	-	102	1	138	4	86	11	13	33	12	-	8	492
Ruff	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Red-necked Phalarope	-	-	-	-	-	-	-	-	-	22	-	-	-	22
Painted Snipe	-	-	-	-	-	-	-	-	-	-	6	-	-	6
Pied Oystercatcher	43	-	36	1	3	1	19	7	16	21	10	35	16	208
Sooty Oystercatcher	-	-	1	-	19	-	1	-	-	14	-	10	13	58
Black-winged Stilt	-	7	42	-	26	-	21	9	-	1	21	126	95	348
Red-necked Avocet	-	-	29	-	3	-	1	-	-	-	46	54	-	133
Pacific Golden Plover	1	-	1	-	2	-	5	-	-	1	7	2	6	25
Grey Plover	46	3	31	-	48	15	25	-	1	3	65	-	2	239
Little Ringed Plover	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Red-capped Plover	10	-	145	4	10	1	135	3	1	40	96	69	79	593
Lesser Sand Plover	45	10	65	-	71	-	24	-	-	12	3	-	6	236
Greater Sand Plover	724	20	660	39	912	10	1829	40	191	1260	328	100	335	6448
Oriental Plover	45	-	2	-	2	-	157	3	-	11	17	1	63	301
Black-fronted Dotterel	-	-	14	-	3	7	4	15	-	4	2	17	52	118
Red-kneed Dotterel	2	-	27	-	18	9	-	6	-	-	10	2	21	95
Masked Lapwing	2	-	12	-	-	3	1	-	-	-	33	21	75	147
Oriental Pratincole	-	-	1	-	1	-	-	-	-	49	-	24	251	326
Australian Pratincole	-	-	-	-	-	-	3	-	-	-	-	8	11	22
Totals (45 species)	**5406**	**726**	**6026**	**755**	**9182**	**404**	**13407**	**805**	**2300**	**9832**	**3779**	**1839**	**3066**	**57527**

NWA 2005 WADER AND TERN EXPEDITION, 12 FEBRUARY TO 6 MARCH 2005

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INTRODUCTION

The NWA 2005 expedition, the twenty-fourth by the Australasian Wader Studies Group to north-west Australia (NWA), was in many ways a repeat of NWA 2004 (Minton *et al*. 2004). All the principal objectives were met, the catching totals of both waders and terns were similar, atypical stable weather occurred in spite of it being the middle of the wet season, and the expedition finished with a bang – with a large and probably the best quality catch on the last afternoon.

This report has been prepared as a permanent record of events and for the benefit of participants, for those who have assisted the expedition in many ways, for the wider AWSG membership and other interested parties in the flyway. It starts with a summary of the main results in relation to the objectives specified in the pre-expedition planning and information document.

HIGHLIGHTS AND ACHIEVEMENTS

1. The catching of 2,801 waders, of 29 species, in 16 cannon net and two mist net catches at Roebuck Bay, Broome (1,172), 80 Mile Beach (1,436), Anna Plains (141) and Taylor's Lagoon (52) filled the last gap in the August to April (non-breeding season) data on biometrics, weight, moult, and plumage. During the expedition, most adults completed their primary moult and started their moult into breeding plumage and the accumulation of fat to fuel their northward migration. Detailed data on the varied wing moult strategies of juvenile (first year) birds was obtained.
2. The proportion of juveniles in catches of all the species which are monitored annually was calculated. The 2004 Arctic breeding season (June-July) appears to have been a poorish one for the wader populations which spend the non-breeding season in north-west Australia. Great Knot had a particularly low breeding outcome with only 3.2% juveniles (down from 16% last year). Only Curlew Sandpiper (21.3% juveniles) fared better than normal.
3. Good numbers of some species which are relatively infrequently caught in north-west Australia were obtained; these included 89 Oriental Plover, 59 Oriental Pratincole, 52 Black-tailed Godwit, and 15 Broad-billed Sandpiper.
4. In a new development, 951 engraved yellow plastic leg flags were placed on ten species of large and medium-sized waders caught at Roebuck Bay. These flags, which have an individual two digit alphanumeric code engraved on each side of the tab, are designed to facilitate the rapid collection of more information for survival rate estimation than can be obtained from recaptures of banded birds. Intensive efforts will be made to resight these individually marked birds in future years by telescopic inspection of roosting or feeding flocks. Tests during the expedition indicated this could readily be achieved at about 80 m but that some difficulty in reading the flag code would be experienced at distances greater than 100 m.
5. Hot weather catching techniques were further developed and refined during the expedition. The use of small-mesh cannon nets (from which birds can be quickly extracted), the rapid erection of shade over birds held in the cannon net before they are extracted, the removal of up to 15 cm of the surface layers of hot sand on the beach before erection of keeping cages, the early setting up of shade over the keeping cages, and the release directly from the net, without banding or processing, of birds from which no data were sought were the key elements. This last option is needed only in extreme weather conditions and was used only once on this expedition. This process enabled cannon net catches, albeit sometimes limited, to be made even in hot weather conditions.
6. Although a useful catch of 36 Little Terns was made, it is now clear that the January to early March period is not normally a good one for tern studies in NWA as relatively few birds occur on the beaches.
7. The extremely poor wet season caused large numbers of Oriental Plover to remain at the coastal grasslands on cattle stations next to 80 Mile Beach rather than to disperse inland; 29,000 were counted and at least 50,000 were estimated to be present in the area. Oriental Pratincole numbers returned to a more typical level after the exceptional figure of 2.8 million in February 2004.

ITINERARY

Nine days out of the total of 21 days in the field were spent at 80 Mile Beach and Anna Plains. This is the longest continuous stretch we have ever had there. Ten days were spent in two periods at Roebuck Bay, Broome, and two days were involved in travelling between locations.

PARTICIPANTS

Nineteen people took part in the expedition with sixteen being present for the full three week period. Eight people were from Victoria, three from Western Australia, and one each from South Australia, Queensland and New South Wales. The overseas participation was lower than usual, with two people from the UK, two from New Zealand, and one from the USA. Thirteen of the team had been on one or more previous NWA expeditions.

Overall it proved to be one of the strongest and most efficient teams, certainly for its size, we have ever had in the

field in NWA. However, it would have been beneficial to have had an additional one or two people.

The group was, as usual, considerably helped by locally based Broome participants. Of these Liz Rosenberg should be especially mentioned – she took part on every day in which the team was based in Broome (at the Broome Bird Observatory).

FINANCES

Income (i.e. participants' contributions to costs) totalled $16,558. "Food and other costs" income was $9,508 and "transport" was $7,050. Expenditure, based on that actually incurred and estimates of bills still to be received, totalled $16,183, as detailed below. Expeditions are budgeted to break even and this appears likely to be close to the final outcome for NWA 2005.

Estimated Expenditure

Food			$3,908
Transport	- Servicing and repairs	$5,007	
	- Fuel	$1,797	
	- Vehicle rental (Hertz)	$1,378	$8,182
Equipment			$3,584
Miscellaneous			$509
Total			$16,183

COUNTING

The main annual summer and winter wader monitoring counts at Roebuck Bay and 80 Mile Beach are carried out independently of expedition activities by locally based Broome wader experts, supplemented where necessary by visiting experienced counters. These counts take place in November/December and June/July and have recently undergone development and enhancement with new techniques designed to give greater accuracy under a contract between the AWSG and the Federal Department of Environment and Heritage. Given the Pratincole event of the previous year, the annual variability of distribution and numbers of grassland species, both the WA Department of Conservation and Land Management and we are placing increased emphasis on these habitats. On the first day at 80 Mile Beach (20 February), we made a complete reconnaissance of the coastal grassland habitats of Anna Plains, Mandora, and Wallal Downs stations, and in some cases, of the adjacent shorelines. Best estimate counts were made of selected species with attention focussed on Oriental Pratincole, Oriental Plover and Little Curlew; one or two other species were also counted.

A total of 20,000 Oriental Pratincoles were located in the incomplete count on 20 February. They were seen at various locations throughout the expedition, particularly on the paddocks of Anna Plains station from about 25 km south of the station to 15 km north. Some dense flocks of five to ten thousand birds were seen, and it was estimated that at least 30,000 Oriental Pratincoles in total were present in the area. This is a typical annual level, well short of the 2.8 million located in February 2004, when exceptional weather conditions across much of the northern part of Australia drove the whole population westwards (Sitters *at al*. 2004).

The huge numbers of Oriental Plovers present, many in advanced breeding plumage, were a real surprise and joy. The 50-60,000 Oriental Plovers which occur annually on these grasslands and the adjacent shores of 80 Mile Beach, which arrive in late October-early November, mostly disperse inland as soon as the first rains occur. They remain there and usually depart by early March without returning to the coastal regions. On 20 February, 29,000 were counted, almost all after they had moved from the station grasslands to roost on the beach during the heat of the day. The tide was too low, and the beach and mudflats too wide, for a key central section to be counted and it is likely that the total population of Oriental Plover in the area was much higher than that counted. Based on the distribution in previous counts in October/ and November, the uncounted section usually has the largest numbers and therefore it is possible that 50-60,000 could have been present. Further, the 20 February count had 23,000 plovers on the shore 50-80 km south of the Anna Plains entrance compared with 12-13,000 usually counted on the same section in October/November. The reasons for this increase are unknown but maybe related to changes in the suitability of the grazed pastures immediately adjacent to this section of the beach. Oriental Plovers generally move directly from the grassland to the nearest section of the beach when they go to roost in the heat of the day. However if this higher count is typical of the whole beach, it suggests the possibility that the previous maximum counts may underestimate the total population, the underestimate arising from many birds dispersing to the inland soon after arrival. It appears that the very dry conditions this year, with little in the way of a coastal wet season in north-west Australia and negligible rain penetrating inland, has caused the Oriental Plovers to remain in the coastal zone. Fortunately food was plentiful with vast of grasshoppers and locusts at the "small hopper" stage everywhere.

These hoppers also provided abundant food for the Oriental Pratincoles, Little Curlew, and Whiskered and White-winged Black Terns. Other signs of the "dry" wet season inland were Budgerigars *Melopsittacus undulatus*, Pied Honeyeaters *Certhionyx variegatus*, Crimson Chats *Epthianura tricolor* and other species on the station. Several small flocks of Banded Stilts *Cladorhyncus leucocephalus*, totalling 70 birds, were seen on the shore – and one flock of 30 on the Brolga Bore pool at Anna Plains. This is the first time this species has been recorded in the 80 Mile Beach area. Interestingly both Banded and Black-winged Stilts *Himantopus himantopus* were seen roaming the grasslands feeding on hoppers, well away from any water. Little Curlew numbers were modest compared with some previous occasions, but nevertheless they were more obvious than in 2004, with 2,686 counted on 20 February and an estimated 3,000 present. They were mostly feeding on Anna Plains station about 20 km south of the station. It should be noted that all the above-mentioned species are totally dependent on the grazed grasslands on these coastal stations for their food supply. The shores of the adjacent 80 Mile Beach are only used as resting areas during the heat of the day. It was

noticeable that it was only the areas of shorter vegetation (i.e. more heavily grazed areas) which were being used for feeding by most of these birds, although the terns would hover and feed over areas where the grass and other vegetation was rather taller (10-30 cm). There is a need for studies to determine how these important coastal grassland areas are used by these species and to identify the most important features of the habitat and how they may be conserved and enhanced.

It was immediately apparent on arriving at Anna Plains that unusually large numbers of Nankeen Kestrels *Falco cenchroides* were present, as well as many other birds of prey (especially Brown Falcons *Falco berigora*). The reconnaissance on 20 February therefore set out to record kestrel numbers and came up with a total of 236. Previous experience suggested that kestrel numbers peak in the winter months (July and August), when they are thought to be reinforced by migrants from further south. Nankeen Kestrels have not been reported breeding in the area but we don't know of a systematic search ever being made. Australian Bustards *Ardeotis australis* were also particularly plentiful with at least 100 estimated to be present in the central and northern parts of Anna Plains station.

The bore pool at Anna Plains is now in perfect condition after the work kindly carried out by the station owner two years ago to improve the habitat for waterbirds. A highlight was the four crake and rail species which could easily be viewed on most visits (Buff-banded Rail *Gallirallus phillippensis* , Australian Spotted Crake *Porzana flminea*, Spotless Crake *Porzana tabuensis* and Baillon's Crake *Porzana pusilla*).

BANDING

Table 1 gives details of all waders newly banded and recaptured. As in 2004, the three most numerous species were Great Knot (37%), Greater Sand Plover (13%), and Bar-tailed Godwit (9%) constituted 59% of the total of 2,775 waders caught . The number of wader species caught was also similar with 29 species during NWA 2005, two more than on the previous expedition.

It was, as usual in recent years, difficult to achieve satisfactory catch totals for Red Knot and Curlew Sandpiper. This may be due to a marked decline in their populations relative to other species over the years. This is illustrated by comparing the percentages of birds in catches over different time periods. In the Red Knot for example, 4,919 have been caught in NW Australia in the 1981-2003 period compared with 15,678 Great Knot i.e. Red Knot have comprised 23.8% of the "knot" catch. During NWA 2005 Red Knot formed only 1.9% of the knots caught. Curlew Sandpipers have been 10.9% of the total birds caught in NW Australia to the end of 2003 (9,014 out of 82,659) but were only 5.4% of those caught during NWA 2005 (and 4.3% during NWA 2004).

Cannon net catches of waders ranged from 6 to 385 birds, averaging 163, with most falling in the 100-200 range (Table 2). Several catches were notable for the large variety (11 or 12 species) present. Great Knot predominated and significant numbers of these had to be caught in order to obtain more modest numbers of other species such as Bar-tailed Godwit, Greater Sand Plover, and even Red-necked Stint. This reflects the mixed nature of nearly all roosting flocks in north-west Australia. The superb catch on the last day at Broome is an example of this with 76 Curlew Sandpiper, 53 Bar-tailed Godwit (50 Bar-tailed Godwit was the specific objective of the catch that day), 50 Black-tailed Godwit, 21 Red Knot, and 173 Great Knot (including all retraps and controls) being banded and flagged and a further 200 or so Great Knot released directly from the net, unbanded and unflagged. The advantage of small-mesh nets in facilitating the easy extraction and release of excess captured birds has long been recognised but this is the first time this feature has been exploited. The 374 birds which were kept for banding and flagging, and in some species processing, was considered appropriate given the weather conditions and the keeping cage holding capacity available.

The two wader mist netting sessions were especially productive and enjoyable. After relatively unsuccessful attempts to cannon net Oriental Pratincoles and Oriental Plovers when they move to the shores of 80 Mile Beach, they were successfully mist netted on the grasslands about 3 km north of Anna Plains Station on the nights of 25/26 February. Thirteen monofilament nets set in a line produced 68 Oriental Plovers, 41 Oriental Pratincoles, and 28 Red Capped Plovers. The earlier mist-netting session at an almost dried out Taylor's Lagoon, approximately 60 km inland from Broome, produced 52 waders of nine species including 32 Sharp-tailed Sandpipers, 2 Banded Stilts, 2 Wood Sandpipers, a Long-toed Stint, and a Pin-tailed Snipe (as well as four species of duck).

Particularly pleasing were four controls of waders banded overseas. A Bar-tailed Godwit and a Great Knot from China, our first from this country for both species, were a reflection of the successful wader banding which has been taking place at Chongming Dao near Shanghai during the northward and southward migration seasons over the last two years. Both birds were banded there in early April 2004. It was nice to catch on 2 March a Grey-tailed Tattler banded as a juvenile in central Japan on 3 September 2004, and even more to catch a Korean-banded Great Knot, which was banded as a juvenile on 3 September 1997 and which had previously been recaptured at Broome on 4 March 2000. A Curlew Sandpiper which was banded at Corner Inlet in Victoria on 4 January 1996 was recaptured in Roebuck Bay on 14 February for the second time, having previously been captured on 29 August 1998. This bird had probably permanently changed its non-breeding area by nearly 3,000 km.

PERCENTAGE JUVENILES

Details of the proportion of juveniles in catches of the main monitoring species are given in Table 3. As already mentioned, the extremely low rate for Great Knot (3.2%) was the outstanding feature. Even the 21.1% rate for Greater Sand Plover was lower than normal for this species, and most other species had only average or slightly below average proportions of young (10-15%) except for Curlew Sandpiper (21.3%).

Table 1: NWA 2005 – Species Catch Totals

Species	Scientific Name	New	Retrap	Total
WADERS				
Great Knot	*Calidris tenuirostris*	925	112	1037[1]
Greater Sand Plover	*Charadrius leschenaultii*	296	55	351
Bar-tailed Godwit	*Limosa lapponica*	210	34	244[2]
Terek Sandpiper	*Xenus cinereus*	219	12	231
Grey-tailed Tattler	*Heteroscelus brevipes*	182	26	208
Red-necked Stint	*Calidris ruficollis*	137	15	152
Curlew Sandpiper	*Calidris ferruginea*	130	20	150
Oriental Plover	*Charadrius veredus*	89	-	89
Oriental Pratincole	*Glareola maldivarum*	59	-	59
Red-capped Plover	*Charadrius ruficapillus*	53	-	53
Black-tailed Godwit	*Limosa limosa*	51	1	52
Sharp-tailed Sandpiper	*Calidris acuminata*	31	2	33
Red Knot	*Calidris canutus*	20	4	24
Ruddy Turnstone	*Arenaria interpres*	20	4	24
Broad-billed Sandpiper	*Limicola falcinellus*	15	-	15
Black-winged Stilt	*Himantopus himantopus*	13	-	13
Little Curlew	*Numenius minutus*	10	-	10
Marsh Sandpiper	*Tringa stagnatilis*	7	-	7
Common Greenshank	*Tringa nebularia*	5	-	5
Lesser Sand Plover	*Charadrius mongolus*	4	-	4
Grey Plover	*Pluvialis squatarola*	3	-	3
Banded Stilt	*Cladorhynchus leucocephalus*	2	-	2
Pacific Golden Plover	*Pluvialis fulva*	2	-	2
Wood Sandpiper	*Tringa glareola*	2	-	2
Asian Dowitcher	*Limnodromus semipalmatus*	1	-	1
Black-fronted Dotterel	*Charadrius melanops*	1	-	1
Long-toed Stint	*Calidris subminuta*	1	-	1
Pin-tailed Snipe	*Gallinago stenura*	1	-	1
Sanderling	*Calidris alba*	1	-	1
Waders (29 species)		**2490**	**285**	**2775**
TERNS				
Little Tern	*Sterna albifrons*	33	2	35
Whiskered Tern	*Chlidonias hybridus*	29	1	30
Gull-billed Tern	*Sterna nilotica*	6	-	6
White-winged Black Tern	*Chlidonias leucopterus*	3	-	3
Common Tern	*Sterna hirundo*	1	-	1
Terns (5 species)		**72**	**3**	**75**
TOTAL (34 species)		**2562**	**288**	**2850**

[1] Excludes *c*.200 released unbanded.
[2] Excludes 26 (inc. 6 juveniles) released unbanded but flagged.

There are interesting comparisons with the similar data emerging from catches in south-east Australia this season. Curlew Sandpipers in both regions appear to have fared relatively well in the 2004 breeding season. Red-necked Stints have produced a lower proportion of young in both regions, but especially so in Victoria. It is unusual for Red-necked Stint to have a lower proportion of juveniles than Curlew Sandpiper, and especially for this to occur in both SEA and NWA in the same year. Whilst Bar-tailed Godwit have done well in Victoria, they have done only poorly in north-west Australia. The different outcomes may have occurred since the north-west Australian birds breed on the central northern coasts of Siberia (Yakutia) while those from south-east Australia breed in Alaska. On the limited data available, Ruddy Turnstone from both NWA and SEA appear to have had a moderate breeding season.

Table 2: NWA 2005 – Catch Summary

Date	Location	Group	New	Retrap	Total
13-Feb-05	Roebuck Bay – Sandy Blowout	Waders	111	17	128
14-Feb-05	Roebuck Bay – Wader Beach	Waders	111	30	141
15-Feb-05	Roebuck Bay – Greenshank Corner	Waders	54	15	69
16-Feb-05	Roebuck Bay – Quarry Beach	Waders	3	3	6
		Terns	32	2	34
17-Feb-05	Roebuck Bay – Sandy Blowout	Waders	51	13	64
18-Feb-05	Taylor's Lagoon (Mist Netting) (10 species)	Waders	50	2	52
		Terns	1	–	1
21-Feb-05	80 Mile Beach – 65km S of Anna Plains	Waders	124[1]	2[2]	126
21-Feb-05	80 Mile Beach – 7.5km S of Anna Plains (12 species)	Waders	121	4[3]	125
22-Feb-05	80 Mile Beach – 5km S of Anna Plains	Terns	10	–	10
23-Feb-05	80 Mile Beach – 10km S of Anna Plains (12 species)	Waders	262	15	277
		Terns	3	1	4
24-Feb-05	80 Mile Beach – 14km S of Anna Plains (11 species)	Waders	171	13	184
		Terns	4	–	4
25-Feb-05	80 Mile Beach – 27km S of Anna Plains (11 species)	Waders	317	22[4]	339
		Terns	3	–	3
26-Feb-05	80 Mile Beach – 32km S of Anna Plains	Waders	376	9	385
26-Feb-05	Anna Plains – 4km N of Station (Mist Netting)	Waders	138	–	138
28-Feb-05	Anna Plains – Station Bore	Waders	3	–	3
		Terns	18	–	18
02-Mar-05	Roebuck Bay – Two Dog Hermit	Waders	148	49[5]	197
		Terns	1	–	1
03-Mar-05	Roebuck Bay – West Quarry Beach	Waders	77	12	89
04-Mar-05	Roebuck Bay – Greenshank Corner	Waders	97	7	104
05-Mar-05	Roebuck Bay – Stilt Viewing	Waders	302[6]	72	374
Totals		**Waders**	**2516**	**285**	**2801**
		Terns	**72**	**3**	**75**

[1] Includes 26 Bar-tailed Godwits flagged and processed but not banded.

[2] Includes one Bar-tailed Godwit from China.

[3] Includes one Grey-tailed Tattler from Japan.

[4] Includes one Great Knot from China.

[5] Includes one Great Knot from Korea.

[6] Excludes *c*. 200 unbanded Great Knot released straight from the net.

Table 3: Percentage of juveniles in cannon net catches of the main monitoring species during NWA 2005

Species	Total	Juveniles	Juveniles%	SE(Juv%)
Great Knot	1037	33	3.2	0.55
Greater Sand Plover	351	74	21.1	2.18
Bar-tailed Godwit	270	18	6.7	1.52
Terek Sandpiper	231	32	13.8	2.27
Grey-tailed Tattler	208	22	10.6	2.13
Red-necked Stint	152	20	13.2	2.74
Curlew Sandpiper	150	32	21.3	3.34
Black-tailed Godwit	52	2	3.8	2.67
Red Knot	24	3	12.5	6.75
Ruddy Turnstone	24	4	16.7	7.61

Note. The standard error of the juvenile percentage is calculated assuming that juveniles are randomly distributed within catches.

OLD RETRAPS

There were 285 recaptures of previously banded waders during the expedition and all but five of these were banded in previous years. Detailed data on the history of these birds will take a little while to assemble, but some examples are given below of the oldest birds which were recaptured (data extracted by Chris Hassell).

Rather surprisingly, a medium-sized wader, the Greater Sand Plover, produced the largest number of recaptures of birds which were 11 or more years old (14 birds). The two oldest were at least 17 years old, there was also a 16 year old

bird, and two birds at least 15 years old. There were 10 Great Knot which were more than 11 years old, the oldest being at least 15, with another at least 14. In four old Grey-tailed Tattlers, two were at least 13 years old and another specifically 13 years old. The oldest Ruddy Turnstone was at least 14 years old, there was a 14 year old Curlew Sandpiper, two Red Knot which were at least 12 years old, and a Terek Sandpiper at 11 years old. The oldest tern was a Little Tern which was now at least 11 years old.

The oldest retrap was a Greater Sand Plover banded as an adult on the 3 April 1990. It appears therefore that most of the birds banded in the initial years of studies in north-west Australia (1981-1989) have now died but, judging by experience in Victoria, the occasional bird up to 20 years old may still be around to be recaptured in the future.

ENGRAVED FLAGS

Table 4 gives details of the number of engraved leg flags which were put on different species at Broome during NWA 2005. It is pleasing that so many (951) were able to be deployed right at the outset of this new survival rate measurement project. Dedicated searches for these individually marked birds will be made in the future by expedition member Alice Ewing, who will be commencing her PhD studies at Melbourne University in May. Her efforts will be supplemented by local wader experts, staff and visitors to Broome Bird Observatory, and future expeditions.

AVIAN-BORNE DISEASES

John Curran of the Australian Quarantine and Inspection Service in Broome (and a longstanding member of the BBO Management Committee) participated in the catching programme from 1 to 4 March. As in previous years he collected blood samples and took cloacal swabs from a variety of wader species. These will be checked for viruses and various other avian-borne diseases. Samples from previous years have shown an extremely low infection rate in migratory waders.

Table 4: Engraved Flags put on at Roebuck Bay, Broome during NWA 2005

Species	**Number**
Great Knot	368
Bar-tailed Godwit	128
Grey-tailed Tattler	125
Greater Sand Plover	119
Terek Sandpiper	108
Black-tailed Godwit	50
Red Knot	24
Ruddy Turnstone	23
Common Greenshank	5
Asian Dowitcher	1
Total	**951**

CONCLUSION

NWA 2005 was again one of our most successful expeditions, following a similar highly productive one in NWA 2004. All the principal objectives were more than fully met.

FUTURE EXPEDITIONS

A key objective of wader studies in NWA will continue to be the monitoring of the annual breeding success of those populations which spend the non-breeding season in that region. This will necessitate annual wader catching expeditions in the November to early March period when virtually all the juveniles have arrived and before the adults commence their northward migration. The last two expeditions have been in the January-early March period, and it is considered that we should now revert to the earlier November-December period for the next monitoring visit. One reason for this proposed change is that a visit at this time will impinge slightly less on the parallel wader age monitoring program in south-east Australia. Another consideration is that an earlier visit is less likely to be adversely affected by cyclones or severe thunderstorm activity. We have been extremely lucky to have avoided these during our NWA 2004 and NWA 2005 expeditions.

One consequence of such a change of date for the next expedition is that it will mean that two NWA expeditions take place in the same calendar year (2005). This will present financial and availability problems for some people; this is strongly regretted as there are considerable advantages in having as stable a team as possible from one expedition to the next. It is hoped therefore that people who have taken part in previous expeditions, but not in NWA 2005, can make themselves available for the proposed expedition in November-early December 2005. Taking into consideration the need to include two sets of spring tides during a visit, and the constraint imposed by the AWSG conference being held in New Zealand from 10 to 13 December 2005, it is proposed that the next NWA expedition be held from Saturday 12th November to Saturday 3rd December 2005.

Because this is only eight months away, it is necessary to start immediately in trying to assemble the team. Twenty is the ideal team size – less than this leaves us unable to do all the necessary things to expeditiously handle a catch in hot conditions, and more than this leads to logistical complexities, possible inefficiencies, and financial problems (e.g. a need for additional expensive hired vehicles). Would anybody therefore who has a reasonable chance of being willing and able to participate please try and let us know as soon as possible of their potential availability?

ACKNOWLEDGEMENTS

The results reported here could not have been achieved without the considerable input and physical efforts of the team of participants and helpers who spent 22 consecutive days in the field for up to 16 hours each day. This demanded considerable perseverence and endurance in the hot and humid climate; the dedicated effort by everyone made this one of the best team performances ever.

An enormous thank you is also given to John Stoate, the owner of Anna Plains station, for so generously providing accomodation, cool storage facilities, and access to all part of Anna Plains station and 80 Mile Beach. The owners of Mandora and Wallal Downs stations also kindly gave us permission to visit their properties.

Broome Bird Observatory was our base location for the two periods when the expedition was operating in Roebuck Bay. The management committee, the warden and the two assistant wardens are all greatly thanked for allowing us to be based at BBO and for much help and kindness in a variety of ways. Helen MacArthur again kindly provided a portfolio of menus for us to base our victualling on, and provided more of her wonderful home-made cookies and relishes. Expedition member Birgita Hansen is also greatly thanked for her management of all food purchasing and catering activities.

Trailers to assist the group transport its equipment in the field and to/from Anna Plains were kindly loaned by BBO, Liz Rosenberg, Alan Ralph and CALM. And finally a big thank you to car owners Ros Jessop/Pete Collins, Maureen Christie, Birgita Hansen, Chris Hassell and Barbara Warren, as well as to Richard Norman who hired a rental 4WD. Without such assistance expeditions would not be financially viable at the cost rates currently paid by participants.

Australian Quarantine and Inspection Service is thanked for a financial contribution to the expedition costs.

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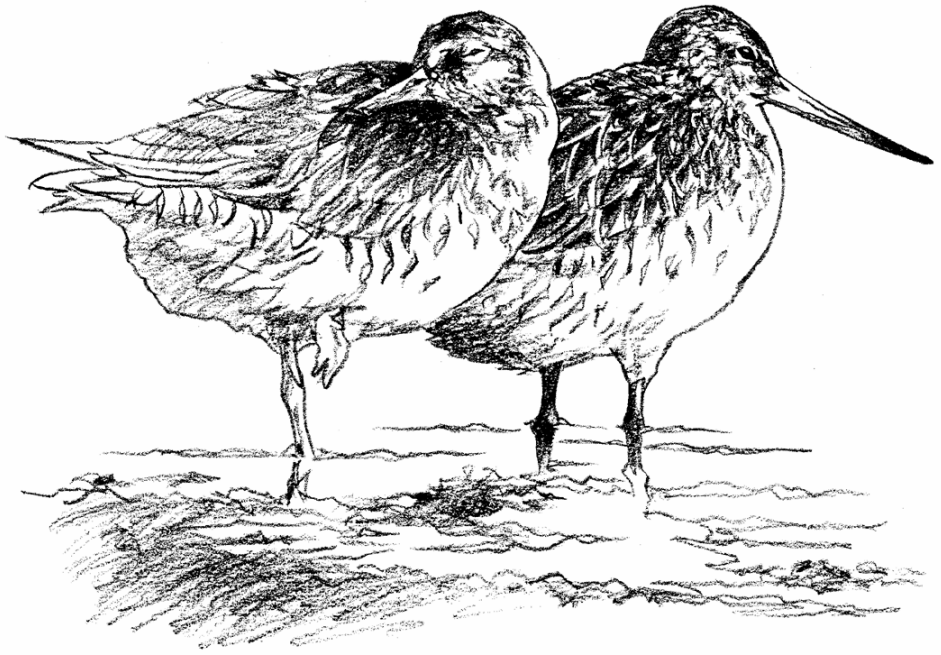

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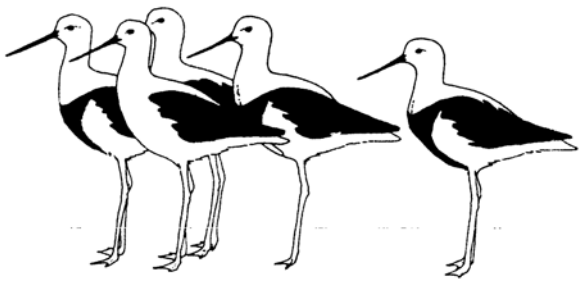
The closing dates for submission of material are **1 March** and **1 September** for the April and October editions respectively. **Extensions to these dates must be discussed with the Editor.** Contributors of research papers and notes are encouraged to submit well in advance of these dates to allow time for refereeing. Other 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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