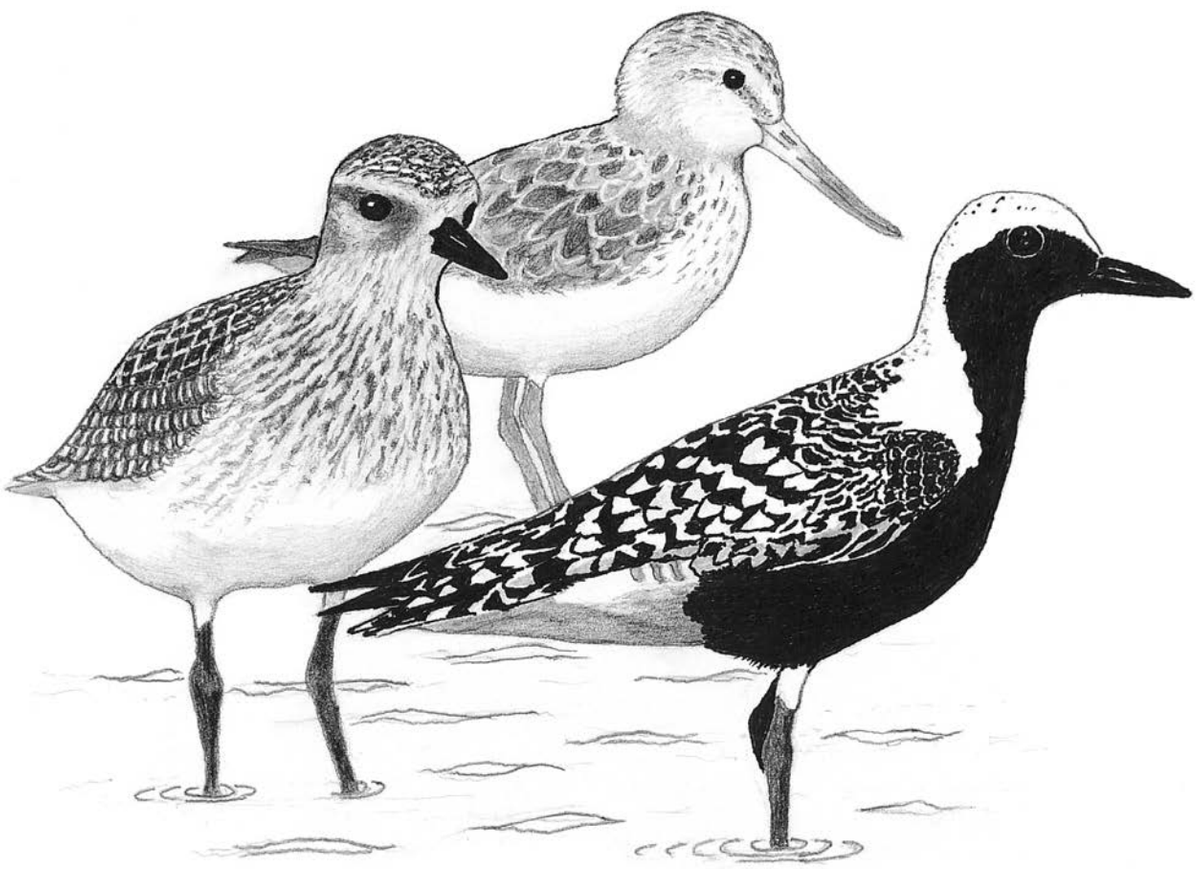
Stilt

The Journal for the East Asian-Australasian Flyway



AWSG
Australasian Wader Studies Group

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Stilt

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MISSION STATEMENT

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

OBJECTIVES

- To monitor wader populations through a programme of counting and banding in order to collect data on changes on a local, national and international basis.
- To study the migrations of waders through a programme of counting, banding, colour flagging and collection of biometric data.
- To instigate and encourage other scientific studies of waders such as feeding and breeding studies.
- To communicate the results of these studies to a wide audience through *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 *Stilt*, and the quarterly newsletter *The Tattler*. Please direct all membership enquiries to the Membership Manager at Birds Australia (RAOU) National Office, Suite 2-05, 60 Leicester St, Carlton Vic 3053, AUSTRALIA.
Ph: 1300 730 075, fax: (03) 9347 9323.
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: Annie Rogers.

CHALLENGES FOR 2008

In Stilt 50 I outlined some of the challenges that lay ahead for the AWSG. While it is pleasing to see some of these being addressed there are many for which 2008 provide particular opportunities.

One of the most important achievements last year was the establishment and operation of the Shorebirds 2020 project. As most you will be aware, this project builds on the 25 years of population monitoring that has been carried out by the AWSG and is designed to provide robust data from an expanded range of sites around Australia. It is supported by WWF and the Australian government and is managed by Birds Australia under the leadership of Jo Oldhand and Rob Clemens. This summer provided the opportunity to recruit new counters, visit additional sites, pilot new techniques and map sites in more detail. In addition the team has been reviewing data from the last 25 years and ensuring the database is as accurate as possible. These activities have required the contribution of a huge number of people and I would like to add my thanks to all who have participated this year. It is of course helpful if people can submit count results as early as possible as this enables the publication of summary counts in Stilt and the early analysis and reporting of short and longer term trends.

One of the key challenges for 2008 is to make an effective contribution to the Conference of Parties to the Ramsar Convention which will be held in Korea in October 2008. Studies by our Group and others have shown the importance of the Yellow Sea as a refuelling stopover for many of the eight million migratory shorebirds in the East Asian- Australasian Flyway. The extent and quality of staging sites in the Yellow Sea are vital for the birds' survival and breeding success. During migration, the Yellow Sea supports at least 30% of the EAA Flyway breeding populations of 18 species and for eight of these the region supports almost the whole Flyway population, including most, if not all, of the world populations of the now Critically Endangered Spoon-billed Sandpiper *Eurynorhynchus pygmeus* and the Endangered Nordmann's/Spotted Greenshank *Tringa guttifer*. The Yellow Sea also supports a high percentage of the EAA Flyway populations of six shorebird species during the non-breeding period. Despite thirty nine sites in the Yellow Sea having been identified as being of international importance for one or more shorebird species in accordance with Ramsar Convention criteria, only four have been designated as Ramsar sites. Furthermore, extensive reclamation and habitat changes continue to proceed around the coasts of the Yellow Sea. It is therefore essential for the AWSG to collaborate with other organisations to ensure all delegates to the Conference of Parties are aware of these problems and are committed to ensuring the wise use of the intertidal wetlands surrounding the Yellow Sea.

Finally I would make a plea for members to submit papers and reports to Stilt for publication. We all applaud the tremendous success of Stilt 50 which gathered together so much of the important work of the AWSG over 25 years. However, it does not stop there; I would like to encourage more of you to submit papers and reports of work which is being carried out throughout the flyway. It is only by publishing and sharing this work that information can be disseminated and utilised. The editor of Stilt, Dr Roz Jessop, is keen to discuss any such proposals with intending authors. Our journal is one of the vital contributions that our Group makes to shorebird knowledge throughout the flyway and I seek your support in achieving this.

Ken Gosbell, Chairman

NEW AWSG COMMITTEE 2008 TO 2010

As a result of the recent call for nominations for the AWSG Committee I am pleased to advise the following results. In accordance with our Rules the new Committee is appointed for the period 1 July 2008 to 30 June 2010. The Committee will be:

Name	Position	State of residence
Ken Gosbell	Chair	Victoria
Phil Straw	Vice – Chair	NSW
Roz Jessop	Editor, Stilt	Victoria
Penny Johns	Secretary	Victoria
Ann Lindsey	Conservation Officer	NSW
Danny Rogers	Chair, Scientific Committee	Victoria
Brian Speechley	Treasurer	NSW
Maureen Christie	Committee Member	SA
Peter Collins	Committee Member	WA
Chris Hassell	Committee Member	WA
David Milton	Committee Member	Queensland
Clive Minton	Committee Member	Victoria
Adrian Riegen	Committee Member	New Zealand
Jennifer Spencer	Committee Member	NSW
Paul Wainwright	Committee Member	SA
Doug Watkins	Committee Member	ACT

To those leaving the Committee in June we say a sincere thank you for your contribution to the committee in various ways over a number of years. We hope that you will remain actively involved with the Group and allow us to utilise your skills in the future as particular situations arise. To the newly elected members, Paul and Jennifer, we say a warm welcome and look forward to your contribution.

The next two years pose a number of challenges to the Group and I look forward to the new Committee working together to achieve the objectives we have set ourselves.

Ken Gosbell
Chair

TREASURER'S REPORT FOR 2007

The consolidated accounts show that receipts exceeded payments by $10,245 during 2007, however this included an excess of contract income over contract expenditure of $23,694. The balance of $111,287 carried forward at 31st December 2007 includes commitments for future expenditure on contracts of $88,081 and non-contract accumulated funds of $23,206.

Australasian Wader Studies Group
Consolidated Accounts
Statement of Receipts and Payments
1 January 2007 - 31 December 2007

RECEIPTS			PAYMENTS		
Item	**2007 $**	**2006 $**	**Item**	**2007 $**	**2006 $**
Balance brought forward	101,041.26	134,757.89	Stationery/Printing	13,139.81	6,094.44
			Advertising & promotion	150.00	0.00
Subscriptions	8,202.25	4,449.10	Postage/Courier	8,131.60	8,320.87
Contracts - Federal Govt.	72,000.00	16,000.00	Consultants/Contracts	63,381.22	61,012.10
Contracts - State Govts.		9,272.73	Field expenses	626.36	1,137.60
Contracts - Other	47,069.44	27,260.53	Conferences/Meetings	8,679.54	435.80
Sales		809.68	Phone/Fax	57.27	192.60
Conferences	11,577.25	0.00	Equipment (consumable)	305.45	521.00
Grants and Donations	9,161.00	11,127.35	Travel & accommodation	42,293.00	23,902.61
			Admin fee (BA)	1,000.00	1,000.00
			Depreciation		19.00
Total income	148,009.94	68,919.39	Total expenses	137,764.25	102,636.02
			Balance carried forward	**111,286.95**	**101,041.26**
	249,051.20	**203,677.28**		**249,051.20**	**203,677.28**

Research Fund:

The Research Fund comprises Specific Donations and is included in the Consolidated Accounts.
In accordance with the Rules the following is a Report for the Fund for the year ended 31st December 2006.

Brought forward from 31/12/06	$11,933.09	
Donations 2007	$3,115.55	Note 1
Total Research Fund 31/12/07	$15,048.64	

Note 1: excludes special donations of $6,045.45 utilised for nominated purpose.

Membership Statistics for 2007:

The membership at the end of 2007 was:

Australia/New Zealand	213
Overseas (excl. NZ)	33
Institutions	15
Complimentary	58
Total	319

The Consolidated Accounts are not audited, but are an extract of receipts and payments from the audited accounts of Birds Australia, which relate to the Australasian Wader Studies Group. I would like to express my thanks to the staff at Birds Australia who have again provided such excellent service in processing accounts and memberships.

Brian Speechley, Treasurer.

NOTES ON THE BREEDING RECORDS OF THE WHITE-HEADED STILT IN THE FLOODPLAIN OF OGAN KOMERING LEBAKS, SOUTH SUMATRA, INDONESIA

M. IQBAL

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This paper provides a summary of the breeding records of White-headed Stilt *Himantopus leucocephalus* on the floodplain of the Ogan Komering Lebaks, South Sumatra, Indonesia. The floodplain of is only known breeding site of White-headed Stilt in Sumatra. The surveys confirm the presence of the White-headed Stilt on the floodplain of Ogan Komering Lebak between June-September or during the summer and southward migration periods. Only one record was made during the winter migration period. The regular observations of nests and juveniles between 2000-2006 show that the species is a breeding visitor on the floodplain of Ogan Komering Lebaks.

INTRODUCTION

The floodplain of Ogan Komering Lebaks ($03^{0}30$'S and $104^{0}45$'E) is an Important Bird Areas (IBA) and Wetland Site in Indonesia (Holmes and Rombang 2001 and Wibowo and Suyatno 1998). Administratively, the area is located in Ogan Komering Ilir and Ogan Ilir District, South Sumatra Province. The total surface is c.500.000 ha in February (rain season), compared with only 5,000 ha in August (dry season). They occur especially along the middle section of the Ogan Komering River, South Sumatra Province, Indonesia. The lebaks (backswamps along the rivers) become flooded during the rainy season to depths of four or five metres above the lowest dry season level.

There is a marked seasonality in both fish biomass and density, with adult fish migrating into the lebaks during the wet season, where ideal condition exist for the fish to spawn. As the water level recedes, the fish become concentrated in pools and attract many fish-eating birds. The lebaks are intensively used for inland fisheries and rice cultivation (Verheught et al. 1993).

The floodplain of Ogan Komering Lebaks has a large population of waterbirds, possibly in the order of 100,000 birds. The fauna includes Yellow, Schrenk's and Black Bittern (*Ixobrychus sinensis, I. eurhytmus, I. flavicollis*), Cotton Pygmy Goose Nettapus coromandelianus and Pheasant-tailed Jacana Hydrophasianus chirurgus, which on Sumatra are more or less confined on this habitat (Danielsen and Verheught 1990).

The first breeding record of White-headed Stilt *Himantopus leucocephalus* in Sumatra was reported by Verheught et al. (1993) in Lebak Pampangan on 8 September 1988, when an adult bird and two juveniles (less than four weeks of age), were seen feeding on a swampy meadow near the river. Based on this record, Holmes amd Rombang (2001) stated that Lebak Pampangan is the only known recent breeding area in Sumatra (and also possible for the Greater Sunda), but there was question whether the birds regularly breed or this was just coincidence.

This paper contains our data on the breeding records of White-headed Stilt in the floodplain of Ogan Komering Lebaks. This report gives additional information on breeding records of the White-headed Stilt and confirms their breeding status in Sumatra. It is also hoped that this information will stimulate further surveys of White-headed Stilt in Indonesia, especially Sumatra.

White-headed Stilt

White-headed Stilt or Australian Stilt *Himantopus leucocephalus* are sometimes treated as a subspecies of Black-winged Stilt *Himantopus himantopus*. In Indonesia, the bird is rare breeding visitor in the coast of Java and Bali and uncommon visitor to Southern Sumatra and Kalimantan (Mackinnon et al. 1998), uncommon visitor in Wallacea (Coates and Bishop 2000) and very common non-breeding visitor for Papua (Beehler et al. 2001).

Marle and Voous (1988) considered White-headed Stilt, presumably non-breeding summer visitors, from Australia or else accidental visitors from West Java where it breeds, but based on the occurrence of this species in Way Kambas National Park and a breeding record reported by Verheught et al. (1993), Parrot and Andrew (1996) considered the bird is resident with seasonal movement according to water conditions. In Sumatra, the bird inhabits coastal and freshwater swamps (Marle and Voous 1988). There are some several records of White-headed Stilt in Sumatra, but most records are from South Sumatra and Lampung Province (Marle and Voous 1988; Parrot and Andrew 1998; Verheught et al. 1993), and only one record from West Sumatran Island (Kemp 2000).

RESULTS

Surveys for White-headed Stilt were carried out in the floodplain of Ogan Komering Lebaks between 2000-2007. All sites were surveyed on foot or by boat/canoe. Based on this survey, the occurrence of White-headed Stilt in the floodplain of Ogan Komering Lebaks confined to summer (May-July) and southward migration (August-October). Detailed records by years are below.

2000

On 7 June 2000, eight adults and juveniles were observed in Lebak Pulau Bayas-Beti. In Lebak Pulau Layang, four adults and five juveniles were observed on 8 June 2000. A total of two adults and one juvenile were observed in Lebak Kuro on 9 June 2000.

2001

A total of 30 adults and five juveniles were observed in Lebak Deling on 17 August 2001. On 18 August 2001, six adults and one juvenile were observed in Pulau Layang. On 19 August 2001, two adults and two juveniles were observed in Pulau Layang.

2002

Two adult birds (a pair ?) observed on 5 February 2002 in Lebak Kuro. This record is the only winter migration period record.

2005

In second-third week of September 2005, an observation of White-headed Stilt was made in Pulau Layang and Deling Lake. A total of 30 adult and eight juveniles were observed in Lebak Pulau Layang and in Deling Lake, a total of 48 adult and 15 juveniles were observed. In addition, eggs were found at two separate locations at Deling Lake. One egg was found at first location and three eggs at second location (Figure 1).

2006

On 15 August 2006, approximately 50 adults and 10 juveniles observed in Pulau Layang Lake. A pair of bird observed mating (see Figure 2).

DISCUSSION

During these surveys, most observations of White-headed Stilt in the floodplain of Ogan Komering Lebak were made between June-September or during the summer and southward migration periods. Only one observation was recorded during the winter migration period, when two adult birds observed on 5 February 2002 in Lebak Kuro.

Between summer and southward migration periods, water levels in the floodplain of Ogan Komering Lebaks recede. The lebaks are dry in the summer and southward migration periods. This condition is suitable habitat for White-headed Stilt for roosting, feeding and also breeding.

The change of water level could be 1-3 m compared with the winter migration period or rainy season (December-January). During the rainy season, all of lebaks are flooded.

This survey confirms the breeding status of of the White-headed Stilt in Sumatra. The regular observations between 2000-2006 show that the birds regularly breed in the floodplain of Ogan Komering Lebaks. From accumulated breeding records of this species between summer- southward migration and absent or lacking observational data between winter and northward migration periods, it is concluded that the birds are a breeding visitor in the floodplain of Ogan Komering Lebaks.

Figure 1. A nest of the White-headed Stilt with three eggs.

ACKNOWLEDGEMENTS

I would like to thank Hidayat (formerly Birdlife International Indonesia Programme) and Dian Agista (Burung Indonesia) for helping me to obtain a grant for conducting bird research in the Ogan Komering Lebaks in 2001. Many thanks to many kind local people of floodplain of Ogan Komering who helped our logistic and accommodation in the field, especially Wak Cak, Abdul Basith, Ipah, Mangujuk Muhammad, Halim, Jubair, Dul, Jef and Sairi.

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Figure 2. A pair of White-headed Stilt mating

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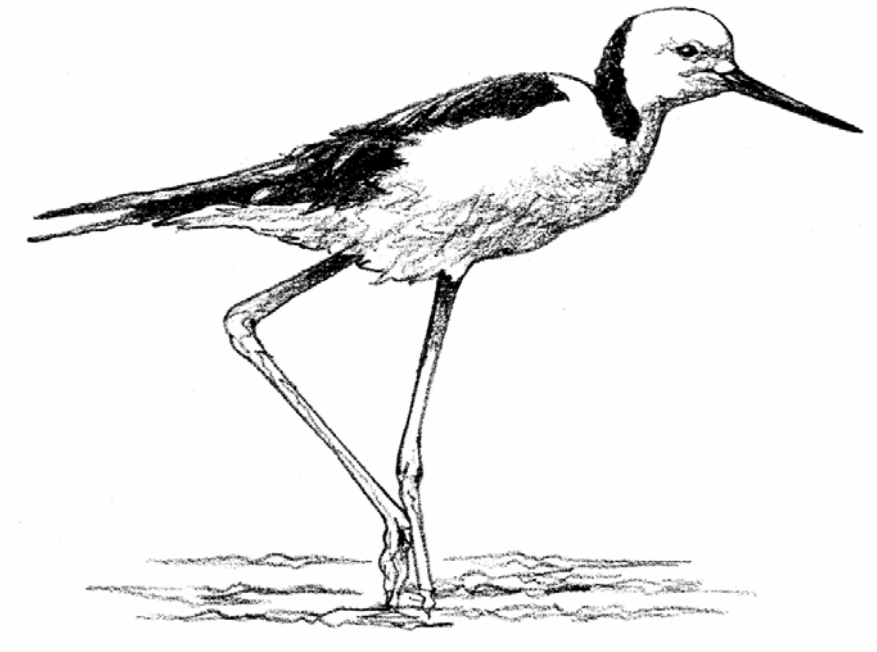

HOODED PLOVER *THINORNIS RUBRICOLLIS TREGELLASI* BREEDING DATA FROM WESTERN AUSTRALIA

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In Western Australia, Hooded Plover, *Thinornis rubricollis tregellasi*, breeds both on coastal beaches and at inland salt lakes. Sites investigated in this study were located at Cranbrook and Yalgroup National Park. The Cranbrook salt lake system was found to have a sedentary population of 30-40 birds and a breeding population of around six pairs. The lake acts as a refuge when the surrounding districts dry out and 330 individuals were counted in December 2007, the highest single count in Western Australia for ten years. Yalgorup National Park is located along the coast between Mandurah and Myalup and contains a number of salt lakes. It has a core breeding population of around 20 pairs and a total population that varies, depending on the season but peaks over summer with up to a maximum of 170 birds. Beach nesting sites of Hooded Plover were found from Cape Naturaliste on the Indian Ocean to Cape Arid National Park.

INTRODUCTION

In Western Australia Hooded Plover *Thinornis rubricollis tregellasi* occupy two distinct habitats, inland salt lakes and coastal beaches. They can be found in varying densities along the south-west coast between Cape Naturaliste and Eyre. Little is known about their behaviour at inland sites. Information presented here relates mainly to the populations that reside on a 37.5 ha salt lake system near Cranbrook (34° 18' S, 117° 33' E) and at Yalgorup National Park (32° 51' 26" S, 115° 40' 19" E), Western Australia.

Breeding records were collected from 189 nests between 2000 and 2008. A breeding record was defined as a nest with eggs or the sighting of a downy and flightless runner (pullus). Data was supplemented from field notes provided by observers who conducted the annual Hooded Plover survey in Western Australia.

TIMING AND LOCATIONS OF BREEDING

Hooded Plover in Western Australia have been recorded breeding in every month of the year (Figure 1). However, the main breeding season peaks over the summer months from November through to February. The September peak shown in Figure 1 relates to an earlier start to the breeding season along the south west coast (Figure 2). Details of the breeding season at Yalgorup National Park are shown in Figure 3. The distribution of breeding sites in Western Australia is shown in Figure 4.

INLAND SITES

Cranbrook

The salt lake system located north east of Cranbrook covers approximately 37.5 ha and was monitored each month for three years by S.Elson. The lakes are fringed by extensive open white sandy beaches that are bordered by belts of vegetation which consist mainly of paperbarks (*Melaleuca cuticularis*). To the north are pastures and to the south are low heath lands consisting mainly of native grasses, samphire (*Sarcocornia* spp. and *Arthrocneum* sp.*)* and *Melaleuca viminea*. In the south west corner are a seasonal creek and lake systems. There are a number of spits and islands within the lake.

Between 2006 and 2008 the system supported a sedentary population of 30-40 Hooded Plover. The most productive feeding sites within the lakes were around peninsulas, coves, entrances to creek lines and the uneven shoreline supporting spits and small islands systems. Birds were found at these sites located at the south-west end of the lake 90% of the time feeding in shallow water up to eight metres from the shoreline. They were found feeding in association with Red-necked Stint *Calidris ruficollis*, Curlew Sandpiper *C. ferruginea*, Red-capped Plover *Charadrius ruficapillus* and Black-winged Stilt *Himantopus himantopus*.

Hooded Plover were also observed feeding on and sometimes chasing flies that in turn were feeding on decomposing aquatic vegetation that was being exposed as the water in the lake receded. The decaying aquatic vegetation was most prevalent at the south western corner of the Cranbrook lake.

A pair of Hooded Plovers with two chicks was found in an area, 150 m from the main lake that contained large open areas of low lying vegetation, mostly introduced Cape Weed, *Arctotheca calendula* and a few large single live *Melaleuca* spp. This area covered around six hectares and the pair were observed searching for insects among the Cape Weed. Exploitation of this type of introduced vegetation has not been previously recorded. The pastures in south-west Western Australia have a high Cape Weed content so could represent potential foraging areas for this species if adjacent to salt lakes.

The salt lake system contains water and suitable feeding grounds throughout the year and acts as a refuge when all the other salt lakes in the district dry out. Water levels in 2006 and 2007 were higher than 2008. The lake supported 167 Hooded Plovers over the period 17 January 2007 to 27 May 2007 after which the numbers dropped to 23 birds with six pairs commencing breeding. This confirms that Hooded Plover flocking behaviour can take place at an inland salt lake during the summer and autumn months and that birds can remain inland throughout the year rather than moving to coastal areas.

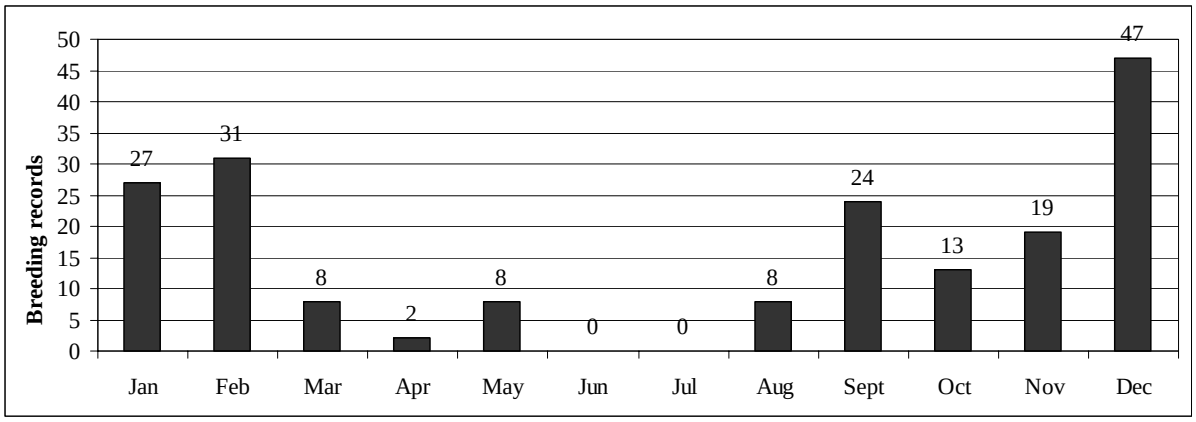

Figure 1. Hooded Plover breeding records from Western Australia (2000-2008)

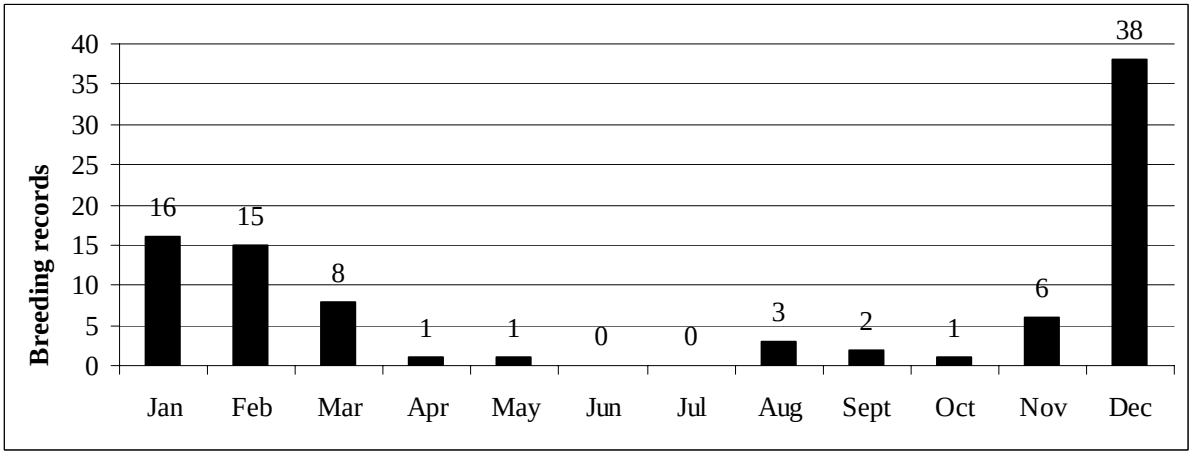

Figure 2. Hooded Plover breeding records from Yalgorup National Park. (1998-2008)

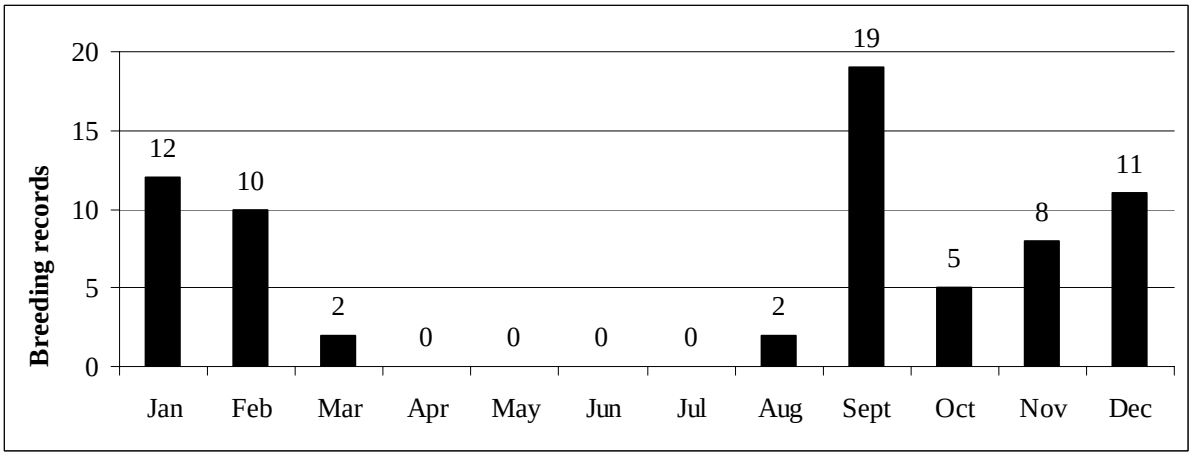

Figure 3. Hooded Plover breeding records from the south-west coast of Western Australia. (2000-2007)

In the days leading up to the start of the winter rains, increased Hooded Plover aggression was observed at the Cranbrook salt lake system. On 15, 21 and 22 May 2007, observations were made of a group of Hooded Plover in the main flock of 167 birds. Up to 12 birds suddenly started bowing to one another with their bodies arched to the front and their tails fanned out and at the same time facing one another. Their barking call increased and became quite intense whilst their beaks were pointed down. The birds seemed to be sizing one another up for a confrontation. These actions were repeated on several occasions but not always by the same birds. The behaviour lasted for up to two minutes. It was also noted that sub-adult birds were involved in these "confrontation displays" (Figure 5). This behaviour had not been observed earlier in the year and one week later the birds dispersed. A later survey showed that pairs of Hooded Plover had settled at lakes in the surrounding district.

On 18 December 2007 several large flocks of Hooded Plover moved on to the lake over a two week period

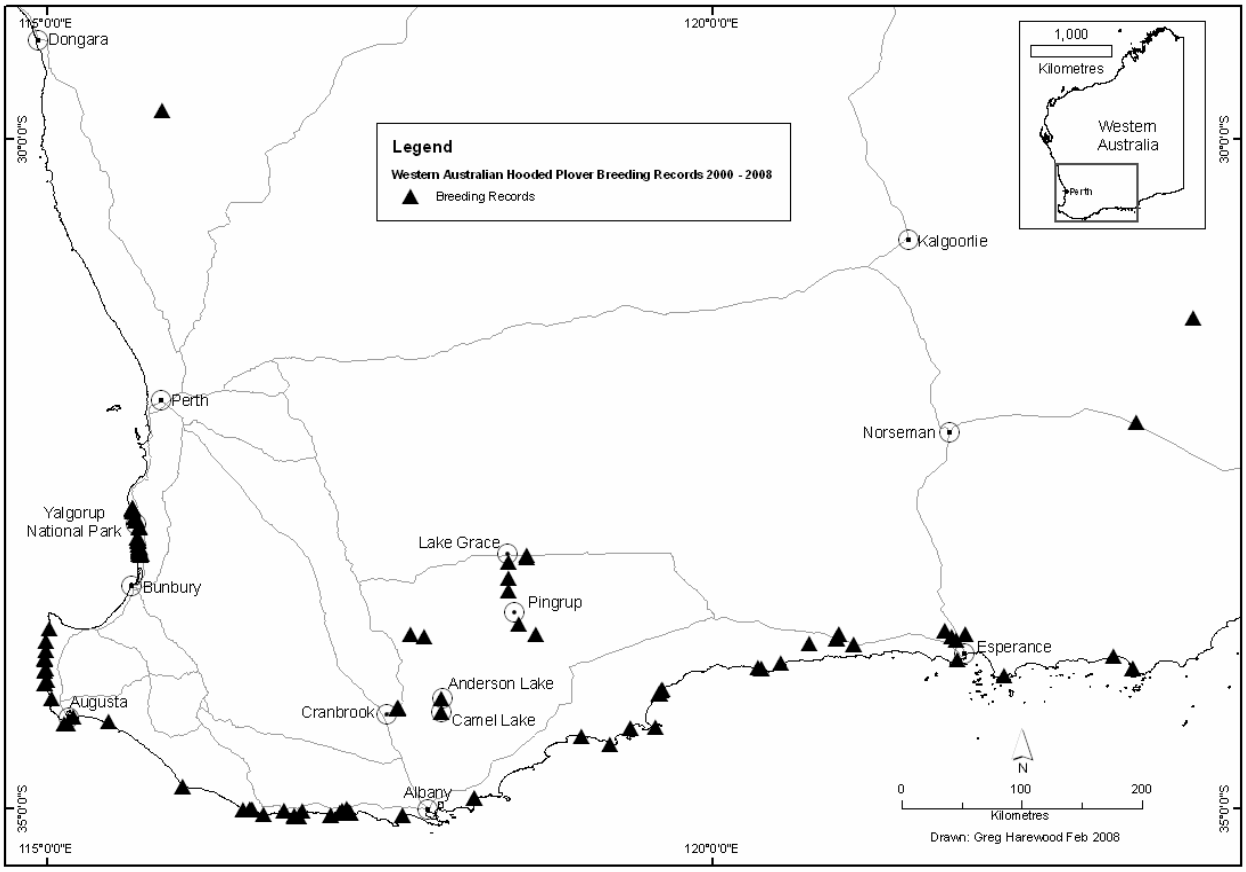

Figure4. Breeding sites of the Hooded Plover in Western Australia.

culminating in a total of 330 birds. At the same time flocks of Banded Stilt *Cladorhynchus leucocephalus* (consisting of 50-200 birds) also arrived at the lake. The birds probably came from the surrounding district. At the time of this influx several Hooded Plover pairs continued to breed around the lake at nest sites away from the main feeding areas of the larger flocks of Hooded Plover.

Nesting

Nesting at Cranbrook was recorded during late July into August, September, October, November, December, January and February. Clutches found in the last three months (December, January, February) all contained only two eggs. Nests were found as close as one metre to the water's edge and as far away as 150 metres. Observations from 2005 to 2007 showed that some nest sites were 40 to 50 metres apart.

At inland sites, Hooded Plover nests were found on lime stone base, clay base and granite shore lines. Nests found in porous soils tended to be less water logged whilst nests in clay soils or compacted soils were found to be more frequently water logged. All nests that became water-logged were eventually abandoned and on many occasions pairs were observed constructing another nest near the recently abandoned nest. Most of the nests found flooded contained only one egg.

At least seven nests were found close to fallen timber or in the fork of a fallen branch of *Melaleuca* spp. which may have provided shelter or protection. Dead tree branches also seemed to play an important role in chick protection as four runners were observed spending most of their time near fallen timber well away from the water's edge. Also noted was a flock of Hooded Plovers that moved away from the water's edge during certain periods of the day seeking shelter by sitting in slight depressions in the sand among the fallen branches. Birds were also observed using the white beach sands as day time resting sites where they were well camouflaged.

The range of materials used to line nests at inland sites was considerably greater than nests found on ocean beaches which were often bare hollows in the sand. Some nests were unlined while others were lined with small amounts of quartz grains or shells. Nests in the Cranbrook, Katanning and Pingrup area had *Coxiella* shells at the base of the nest scrapes. One Hooded Plover was seen collecting small shells that had been deposited or washed up next to drift wood only centimetres from the nest site. When the nest lining was later checked it contained a small amount of pinkish white shells. Records collected on 38 Hooded Plover nests in the afore mentioned inland study sites showed that ten nests contained no lining, seven were lined with small pieces of quartz, four were lined with small pieces of rock and pieces of dry vegetation and the remaining 17 nests were lined with pink to pinkish white shells. Several Hooded Plover nests were found to use dried aquatic vegetation to line their nests. High

Figure 5. Hooded Plover displaying head bowing behaviour. Photo by Stephen Elson.

concentrations of *Coxiella* shells were washed up along the north east end of the Cranbrook salt lake.

Both adults in a pair were observed making nest scrapes and constructing nests on two occasions. These adults were observed for several hours and appeared to be checking out potential nest sites. One bird would stop, squat and start scratching out a bowl, then walk off again. There was similar behaviour suggesting potential nesting. For example Hooded Plover would constantly walk a short distance then suddenly squat, this was repeated several times. The birds were also noted to increase their barking, piping call to one another. The number of nest scrapes discovered at some locations possibly indicated that this species makes several nests scrapes before making a final choice.

One active Red-necked Avocet *Recurvirostra novaehollandiae* nest was found 8.5 metre from a Hooded Plover nest although this was not at the Cranbrook site.

Hooded Plover have to contend with unpredictable weather patterns during their breeding season. When it comes to selecting a nest site birds frequently select a site close to the water's edge. Salt lakes are generally shallow and in summer strong easterly winds cause the shallow surface water to surge. This process can push water a considerable way up the gently sloping embankments of the lakes, effectively flooding the foreshore breeding areas. Water levels in salt lakes may rise rapidly in response to either direct rainfall or to water flowing in from catchment areas. In addition cyclones may change into rain bearing depressions after they cross the north western coast and deposit large amounts of water inland at salt lakes such as those near Cranbrook. These events can result in flooding which was identified as a frequent cause for nest failure. Birds often lost their first clutch, but would lay a second or third clutch. Second and third clutches were recorded at the Cranbrook salt lake system.

The summer heat causes rapid evaporation and small salt lakes will dry out quickly restricting suitable conditions and time available to raise a brood. This process probably explains why Hooded Plover nests are sometimes found on apparently dry lake beds.

Yalgorup National Park

Yalgorup National Park is located along the coast between Mandurah and Myalup and has a core breeding population of around 20 pairs and a total population that varies, depending on the season but peaks over summer with up to a maximum of 170 birds. The breeding population could be higher as the eastern shoreline of Lake Preston and Lake Clifton have not been extensively surveyed.

The salt lakes that characterise the Park lie in depressions between a series of coastal dunes. Ten lakes form three distinctive lines parallel to the coast. Lake Preston is extremely elongated and lies closest to the coast. 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 and the nearest to the Old Coast Road. It too is extremely elongated.

The Yalgorup Lakes are groundwater sinks fed by groundwater and precipitation, but they are saline or hypersaline due to high evaporation rates.

Lake Preston

At Lake Preston the majority of nests are begun from the first week in December through to the last week in February. (Figure 2). In south-western part of the lake nests were usually one to one and a half kilometres apart and with a few exceptions located on the main shore, on hard headlands very close to the waterline or on soft beach sites

approximately equidistant from the waterline and the nearest substantial vegetation. Only three pairs were discovered nesting amid scattered low vegetation, approximately 30, 80 and 100 metres from the water's edge. Water levels seem to influence the breeding pattern.

Seepage from surrounding land and high water levels in the lake can keep some beaches soggy and damp well into summer. Birds did not nest at these sites until they were at least firm if not absolutely dry on the immediate surface. The improved 2003 winter rain average led to a higher lake level for longer into January 2004 than in the previous three years. More ground water than usual seeped from the dune lens into the soft beaches, many of which remained waterlogged or just damp. The effect seemed to have been that some breeding pairs delayed nesting. In 2003 two nest sites were located on slightly elevated mud mounds. These mud mounds had been created by a vehicle getting bogged on the beach in the previous year. The other nest was on top of the remnants of a mud castle built by children in the south-west pocket of Lake Preston.

Some Hooded Plover at Lake Preston used the same breeding territories in consecutive years. One pair that was colour banded early in the 2002 - 2003 breeding season returned to the same territory at the beginning of the 2003 - 2004 breeding season. Another bird distinguishable by its missing foot also returned to the same territory after having been away from the area for at least four months. Nests were also often located in close proximity to nests from previous years.

On the western shore of Lake Preston a Hooded Plover nest was discovered on a wet and soggy beach on 12 December 2007. The two eggs in the nest bowl seemed dry, although the uneven nest appeared damp and soggy. It rained overnight on 16 and 17 December 2007 and when the nest was revisited, it was found to be partly flooded. The eggs were submersed in up to 30% water which would have drained away in due course. Nevertheless the adult bird continued brooding for nine days after the flooding, up to 27 December 2007, after which a fox compromised the nest. This may indicate that Hooded Plover eggs are quite resilient to temporary exposure caused by flooding?

In Yalgorup National Park some Hooded Plover commenced their replacement clutch between 11-18 days after the failure of their first clutch. Second and third clutches were recorded as at the Cranbrook site.

Middle Lakes

The smaller lakes in Yalgorup National Park such as Lake Pollard, Martins Tank and Newnham Lake often support multiple breeding pairs of Hooded Plover.

In 2007 – 2008, one pair bred on each of the Newnham Lakes (north and south), both in scrapes in sandy clay, with the nests about 500 metres apart. One pair raised two chicks and the other one. In this latter nest, one egg is known not to have hatched.

In the same season on Martins Tank, four pairs probably bred but only two hatched chicks. One of the nests which apparently failed had three eggs while the other had two. The nests were probably less than 1 km apart in a straight line. These nests were all in sandy limestone or among scattered limestone rocks. Nests are usually about 20 metres from the waterline at the start of nesting but the distance increases as the water level drops. They are usually about 40 metres from the line of fringing *Melaleucas*.

An average nest at Martins Tank is a scrape in sandy limestone or broken lime stone in a sand base.

Nests at Lake Pollard are usually among limestone rocks and tend to be closer to vegetation and water because of earlier nesting meaning reduced width of shoreline. One pair at Pollard hatched one chick this summer (2007/2008) and a second egg in the nest is known not to have hatched.

Lakes north of the Stirling Range

Lake Anderson

At Lake Anderson a nest with two eggs was found in the middle of a dry lake, opposite the main lake supporting water. (2008). Birds within Yalgorup National Park were observed to avail themselves of “opportunistic” nesting sites such as pre-existing hollows/cavities formed by a kangaroo footprints left in soft-mud and depressions left by cattle hooves. For example a nest and two eggs were found placed in a depression of a kangaroo foot print at Lake Anderson. (2008).

Camel Lake

The water level at Camel Lake often reaches the vegetation line and there are no extensive open dry sandy areas especially during winter and spring. This limits the availability of suitable nest sites at Camel Lake and is reflected in the poor breeding results. During the 2006 and 2007 breeding season all nests were flooded due to the nest placement being in areas subject to flooding. The nests were either directly or indirectly affected from both a sudden rise of surface water and rain filling in nest cavities.

ISLAND BREEDING

There are three records of Hooded Plover breeding on islands one at Helms Lake, one 20 km south of Lake Grace along the Pingrup/Lake Grace Road and the other at Lake Preston.

At Helms Lake a Hooded Plover nest was found on a small island of sand, 0.5 square metre in size, and 15 metre from the shore line. (9 October 2003). Two weeks later water levels had subsided at and the nest was on a small rise surrounded by wet sand.

In winter, water levels at Lake Preston conceal some large islands that begin to emerge in early to late December as water levels drop. Clusters of islands occur on the western side of the lake at intervals north of Myalup. The majority of the exposed islands remain barren throughout summer. These islands were confirmed as breeding sites for Hooded Plover. On 12 December 2003 a 3 egg nest was found on a small island furthest from the mainland. This clutch went missing and a replacement clutch was laid on a larger island 100 meters to the east. On 10 February 2004 a feathered runner was found here with its parents.

Details from the nest site 20 km south of Lake Grace, along the Pingrup/Lake Grace Road, were clutch size four eggs stained or coated with mud. Mud possibly transferred to eggs by sitting bird. The nest site consisted of a small scrape in white sand on an island 20 metre from the mainland. The

water depth surrounding the island ranged from 48 cm at the deepest point to 15 cm close to the shoreline. The small island measured 16 metre long and 5 metre in width.

BEACH BREEDING SITES

Hooded Plover breed on Western Australia's beaches from Cape Naturaliste on the Indian Ocean to Cape Arid National Park although sightings have been made as far east as Eyre. On the beach nests are generally located above the high water mark and consist of not much more than a cup shaped scrape in the sand. Nest sites on the beach are exposed. Breeding sites include the base of dunes, high up on the dune face and even on top of a dune. Other locations have been on sand ledges fronting the beach. These sand ledges can be two metres from ground level. Some beach nests were found on elevated sand mounds or sand banks raised above ground level. One nest was found on a bed of shell grit that had collected between large granite boulders at Peaceful Bay and another on shells exposed in a split in a dried algae mat at the Wellstead estuary foreshore.

Hooded Plover breeding sites on beaches were often found in the vicinity of a fresh water source such as a small creek flowing across the beach to the ocean, small river inlet, large inlets and fresh water soaks emerging from the base of dunes.

There was one beach record, at Windy Harbour, of Hooded Plover making a second breeding attempt after they lost their first clutch.

CONSERVATION ISSUES

In May 2006 one pair of Hooded Plover were observed making three attempts to nest around the edge of a small salt lake. The site was fenced and contained a large number of sheep >200. The site seemed over stocked and the ground was covered with sheep pellets. Over a two month period six visits were made to this lake and this revealed that the pair were unsuccessful in any of their breeding attempts.

Foot prints left in the soft and sometimes muddy ground facilitated the identification of predators. Fox activity at all survey sites was very high during November and December. At some sites fox tracks could be seen leading from Hooded Plover nests. Foxes may also be a problem around Lake Pollard in Yalgorup National Park. They and/or their tracks are frequently seen at the lake. The area is not baited as it is a control site for a Western Ring-tailed Possum release program.

Other threats although to a lesser extent were Australian Raven *Corvus coronoides* which were observed to patrol the edges of the Cranbrook lake though less frequently than Silver Gulls *Larus novaehollandiae*. Australian Ravens were more evident at sites that supported vegetation around salt lake systems.

Farmers driving their vehicles and running livestock on or within Hooded Plover nesting sites posed a threat. Lake Preston also endures incursions by quad bikes and four-wheel drive vehicles that trespass onto the fragile lake foreshore.

There were two reports where the congregation of large numbers of water fowl seemed to have crowded out a breeding pair of Hooded Plover. At Cranbrook one area were Hooded Plover nested was a major resting/roosting site for large numbers of water fowl mostly Black Swan *Cygnus atratus*, Grey Teal *Anas gracillis*, Australian Shelduck *Tadorna tadornoides* and Pacific Black *A.. supercillosa* Duck. (August 2006) The presence of large numbers of water fowl may have contributed to the Hooded Plover pair abandoning their nest. A similar observation was made at Lake Preston were many moulting Australian Shelduck seemed to have overwhelmed a Hooded Plover breeding attempt. (January 2002).

INLAND BREEDING FOLLOWING CYCLONE CLARE

Severe tropical cyclone Clare crossed the Pilbara coast on Monday 9 January 2006. The remains of the cyclone caused signifigant flooding around Lake Grace where 224 mm of rain was recorded in a 24 hour period during 12-13 January 2006. This was further exacerbated by rain from tropical cyclone Daryl a week later. After the heavy inland flooding, an explosion of breeding activity took place among ducks, grebes and waders, including Hooded Plovers.

The cyclone resulted in many small inland salt lakes being filled up and areas previously unknown to have lakes now supported lakes. Most Hooded Plover selected nest sites within the small lakes and were very secretive, especially during the egg laying period. Field observations indicated that these smaller lakes were less frequently patrolled by predators than the larger lakes, which supported high numbers of nesting water birds such as Red-necked Avocets, Red-kneed Dotterels *Erythrogonys cinctus*, Eurasian Coots *Fulica atra* and Hoary-headed Grebes *Poliocephalus poliocehpalus*.

Hooded Plovers may have commenced breeding as soon as suitable conditions became available in the Lake Grace area, as some nests that were found had eggs that were stained or coated with mud and one nest was slightly flooded. Eight Hooded Plover nest sites were monitored in mid-May 2006 from Lake Grace to south of Pingrup. Two clutches contained four eggs and there was one sighting of a batch of four chicks only days old (Figure 6). Generally, Hooded Plover clutches consist of three eggs, occasionally four. However, there seem to be no records of clutches with four eggs in Western Australia prior to these observations. Johnstone and Storr (1998) mention that clutch size in Western Australia is mostly three eggs, occasionally two. Marchant and Higgins (1993) mention mostly two to three eggs per clutch, occasionally four. The nests containing four eggs and the four runners were recorded after the summer cyclone of 2006. It is possible that the cyclone may have created optimum breeding conditions that Hooded Plovers took advantage of by increasing their normal clutch size. The only other record of a four eggs clutch during this study was made on 28 August 2006 near Cranbrook.

CONCLUSION

The Hooded Plover breeding cycle is tied to the fluctuating water levels at inland sites. Water levels at the salt lakes determine the availability of suitable breeding and feeding

Figure 6. Clutch of four Hooded Plover chicks near Pingrup. Photo by Stephen Elson.

habitat which in turn governs the start and success of the breeding season. Hooded Plover have an extended breeding season that covers a large part of the year and this is partly due to the frequent loss of their clutches from inundation and the resulting replacement clutches.

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DUNLIN FLAGGED AT CHONGMING-DAO RESIGHTED IN YUKON-KUSKOWIN DELTA, ALASKA

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An adult Dunlin *Calidris alpina* with Black/White flags on the tibia was seen about 1km south of the Tutakoke River mouth (approx. 61°13'N, 165°22'W) on 28 August 2006 by DSM. The bird, which was still largely in breeding plumage with a bright red back indicative of the race *arcticola*, was with a flock of Dunlin which visited a shallow freshwater pool about 200m from the coast. Measurements of Dunlin caught at Tutakoke in late August 2006 indicated that post-breeding *arcticola* were present in the area as well as locally breeding *C. a. pacifica* (DSM unpublished).

The leg flag combination indicated that the bird had been banded at Chongming Dao, Shanghai, China (approx. 31°27N, 121°55'E), during the northward migration that year (when this flag combination was first used).

McLean and Holmes (1971) suggested that Dunlin breeding in northern Alaska wintered in East Asia and this was supported by early band recoveries (Norton 1971). Morphometric data from Hong Kong (DSM unpublished) suggest that Alaskan Dunlin winter in Hong Kong, which is supported by mitochondrial DNA studies (Wenink & Baker 1996). There is one record of an adult Chongming Dao-banded bird trapped on the nest near Barrow, Alaska (Lanctot 2005) and Dunlin leg-flagged on Alaska's North Slope have been re-sighted in South Korea, Japan, Taiwan and there are 4 records from mainland China (M. Barter in prep).

Our observation is consistent with Warnock and Gill (1996), who noted that after breeding most *arcticola* are thought to move from North Alaska to the Yukon-Kuskokwin Delta before migrating to Asia in September or October. Previously, plumage-dyed Dunlin marked on the Y-K Delta have been recorded from Japan and Taiwan (Anon. 1999).

DSM is grateful to Bob Gill for the opportunity to work at the Tutakoke field camp. We thank Mark Barter for sharing his marked Dunlin database with us.

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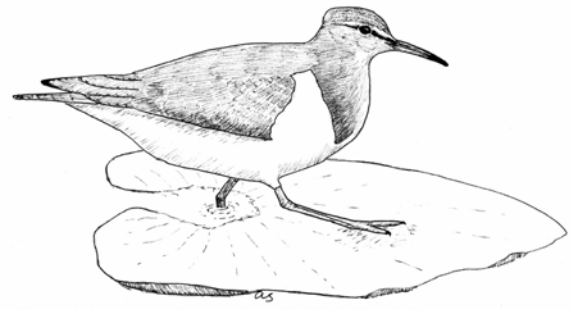

A FURTHER INSTANCE OF HOODED PLOVER *THINORNIS RUBRICOLLIS* CHICK PREDATION BY NANKEEN KESTREL *FALCO CENCHROIDES*

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The decline of the Hooded Plover *Thinornis rubricollis* has been largely attributed to its low reproductive success, particularly at the chick stage (Dowling and Weston, 1999; Schulz and Bamford 1987; Weston 2005). While predation is commonly listed as one of the main causes of this, evidence of actual predation events is rare, and the fate of most chicks remains unknown (Schulz & Bamford 1987; Schulz 1992; Weston 1998; Singor, 1999, Burke et al. 2004).

Whilst undertaking an observation of a brood of Hooded Plover chicks within the Mornington Peninsula National Park, Victoria, Australia on the 15th of November 2006 as part of a study into the effectiveness of shelters in improving Hooded Plover chick survival, the following incident was witnessed, and recorded on a Dictaphone.

The brood under observation was located at Koonya Beach East on the Mornington Peninsula, and was comprised of two chicks less than 10 days old, accompanied by two adult birds. The day was heavily overcast, with a strong wind and frequent showers. The observation began at 16.00 (AEST), and the first half hour consisted mainly of adults tending to chicks by brooding them, or standing close-by as the chicks foraged amongst the seaweed that was scattered high on the beach. Once during this initial half hour period a Nankeen Kestrel (*Falco cenchroides*) was seen to fly along the edge of the dunes, causing both adult Hooded Plovers to suddenly fly from their chicks to the water's edge and both chicks immediately dropping to the sand and flattening their bodies, in an attempt to camouflage themselves.

At 16:36 one chick had taken cover in the grass that blanketed the edge of the nearby dunes, while the other, accompanied by both parents, foraged amongst the seaweed high on the beach. Suddenly, both parents took flight, heading straight to the waters edge, and the chick ran quickly to a nearby clump of seaweed before dropping down and taking cover. Immediately after, a Nankeen Kestrel landed where the chick had been foraging. The kestrel then began to pick at the surrounding seaweed with its beak. As the kestrel came close to the location of the chick, both adult Hooded Plovers flew at it, in an apparent attempt to distract or frighten the raptor away from their chick. This however, had no obvious affect on the kestrel, as it continued searching; with both adults now standing within one metre of the raptor. The kestrel continued picking at another large clump of seaweed, when suddenly the hidden chick stood and began to run along the beach, flanked closely by both parents on foot. The kestrel at first seemed oblivious to this, but upon noticing, flew low, directly at the chick, taking it in its talons and quickly gaining altitude before flying off.

Within 10 minutes both adults moved to the grassy area before the dunes, coaxing the remaining chick from hiding. One parent then began brooding the remaining chick for over an hour. As the weather worsened, the two adults and one chick moved back into the dunes and did not re-emerge for the remainder of the observation time (approximately 15 minutes).

While predation by Nankeen Kestrels has been observed before, this event serves to verify the predation of Hooded Plover chicks (pre-fledging) by these birds, and suggests that it may be commonplace where the territories of both birds overlap (Weston 1998).

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2007 BREEDING SUCCESS, BASED ON JUVENILE RATIOS OF NORTHERN HEMISPHERE WADERS WHICH SPEND THE NON-BREEDING SEASON IN AUSTRALIA

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INTRODUCTION

Demographics are becoming of increasing importance given that nearly half the world populations of waders on which count data is available have shown marked declines over the last 20 years (IWSG 2003): Data on the reproductive success of waders, especially those breeding in the Arctic or remote parts of Siberia and Asia, is difficult to obtain, particularly on a long-term basis and on a wide variety of species. Collection of data on the proportion of juvenile/first year birds in catches of waders on the non-breeding grounds is at present the main method used for obtaining an annual breeding success index for wader populations which use the East Asian/Australasian Flyway.

Such information has been systematically collected from cannon-net catches of waders in Victoria and adjacent areas of south-east Australia back to the 1978/79 non-breeding season. On Red-necked Stint and Curlew Sandpiper the data set now covers 30 years, while on another five species it is more intermittent in the early years but almost continuous since the early 1990s.

In north-west Australia annual monitoring in the core of the non-breeding season, when wader populations are relatively sedentary, was only commenced in the 1998/99 season. Some data exists from earlier years but much of the cannon-net catching was in the March/April and August/October migration seasons in the early years after catching was commenced there in August 1981. Eight species are now monitored annually, and several other species less frequently (because catching these species in adequate quantities cannot be achieved every year).

Data from previous years has been published annually in Arctic Birds since Issue 2 in 2000 (Minton *et al.* 2000, Minton *et al.* 2005, Minton *et al*. 2007). In interpreting the results it needs to be borne in mind that the figures are only a proxy/index of annual reproductive success. This is partly because of the non-homogeneous distribution of the age groups of some species on the non-breeding grounds (especially Red Knot and Bar-tailed Godwit in south-east Australia). It is also because the data is collected on average six months after young birds fledge, and therefore after completion of their first migration during which significant mortality may occur. There are also potential errors and biases associated with this assessment method, especially the vagaries of cannon-net catches at high tide roosts, and these have been detailed in earlier papers. Maximising the number of samples collected for each species each year is one method of trying to even out the effects, and also of quantifying the confidence limits of the estimated breeding success figures.

This paper presents the data on the proportion of juveniles in catches made in the November 2007 to March 2008 period in both south-east Australia and north-west Australia. Results are compared with earlier years and an assessment made of the relative outcome of the 2007 breeding season for each species/population.

METHODS

As usual, catching conditions were standardized as far as possible in order to maximize comparability of data between years. Only birds caught in cannon-net catches are included in the main tables (Tables 1–4), because catching method has been shown to have an effect on juvenile proportions, with mist-netting catches generally having a higher percentage of young birds (Pienkowski & Dick 1976, Goss-Custard *et al*. 1981).

Birds caught between 1st November and 20th March are incorporated into the north-west Australia data. A slightly shorter period (16th November to 20th March – but February 28th for Curlew Sandpiper and Sharp-tailed Sandpiper) was used for south-east Australia because juvenile birds take rather longer to reach their non-breeding destination and adults of some species set off on northward migration rather earlier.

Data from the south-east coast of South Australia and from King Island is included with data from various locations along the Victorian coast in the information presented for south-east Australia. In north-west Australia the data is from Roebuck Bay, Broome, and 80 Mile Beach (combined).

Some mist-netting data from north-west Australia is also included, for the record. This is for species which are not normally cannon-netted and is a much smaller volume (one mist-net catch only in 07/08).

RESULTS

The data for south-east Australia for the 2007/08 season is given in Table 1. Also included are the median percentage juvenile figures for each species, derived from all years except the present one.

Good catch samples were obtained for all species except Red Knot. The Ruddy Turnstone sample size (599) was the highest ever, mainly because of an extremely successful visit to King Island during which 419 were caught over a six day period.

Attempts to catch Red Knot at both of their main locations in Victoria were unsuccessful, with only one bird being caught in the monitoring period. In lieu a detailed scan of the main flock of 600 Red Knots present at the main high

Table 1. Percentage of juvenile/first year waders in cannon-net catches in South-east Australia in 2007/2008

Species	No. of catches		Total caught	Juv./1st year		Long term median**	Assessment of 2007
	Large (>50)	Small (<50)		(#)	%	% juvenile (years)	breeding success
Red-necked Stint *Calidris ruficollis*	7	11	2502	259	**10.3**	13.8 (29)	Poor
Curlew Sandpiper *C. ferruginea*	1	7	299	99	**33.1**	9.8 (28)	Very good
Bar-tailed Godwit *Limosa lapponica*	2	0	124	70	**56.5**	15.4 (18)	Very good
Red Knot *C. canutus*	0	1	1	1	**(c.75)***	47.0 (16)	(Good)
Ruddy Turnstone *Arenaria intepres*	4	10	599	116	**19.4**	9.3 (17)	Good
Sanderling *C. alba*	2	3	391	56	**14.4**	12.4 (16)	Average
Sharp-tailed Sandpiper *C. acuminata*	1	8	201	40	**19.9**	11.1 (26)	Good

All birds cannon-netted in period 15 Nov to 28 Feb except for Red-necked Stint, Ruddy Turnstone, and Sanderling, for which catches up to 21 Mar are included.
*Obtained by scanning roosting flocks (see text)
**Does not include 07/08 figures

tide roost in Corner Inlet was made in early March when adult birds were quite well advanced in their transition into breeding plumage and before any northward migration departures had occurred. Approximately 150 Red Knot were in partial breeding plumage. The remainder were still in non-breeding plumage. Catch data from previous years suggests that all of these would have been first-year birds, because even second-year birds which are going to remain on their non-breeding grounds assume at least a partial breeding plumage. Based on this scan therefore it is estimated that around 75% of the Red Knot population were juvenile/first year birds. This figure is used therefore for an estimate of 2007 breeding success.

The north-west Australia results are given in Table 2. This includes only those species where at least 30 birds were cannon-netted. The highlight of this year's catching was achieving a total of 569 Curlew Sandpipers, a species which we have struggled to obtain in satisfactory quantities in many recent years. One catch was of 332, the highest single catch total for Curlew Sandpiper for nearly 20 years.

Percentage first-year figures for the last ten years of catches in south-east Australia and north-west Australia are given in Tables 3 and 4. These tables also give the **average** figure for each species over this ten-year period, with the figures from 07/08 also included.

Data from the single mist-net catch made in north-west Australia is given in Table 5. Although information for five species is given, to compare with similar data from the previous year, only three of these species were caught in sufficient quantity for the percentage juvenile figure to be meaningful.

DISCUSSION

South-east Australia (SEA)

It appears that the 2007 breeding season was generally a good one for wader populations which spend their non-breeding season in south-east Australia. This is in contrast to the overall poor breeding season the previous year.

The highlight was undoubtedly the extremely high proportion of young birds (33.1%) in Curlew Sandpiper samples. This is the second highest ever in 29 years of monitoring. Only the phenomenal 1991 breeding season was better, with 45.3% juveniles in the 91/92 sampling season. It was most noticeable that Curlew Sandpipers were more numerous than in other recent years at most locations.

Bar-tailed Godwits, which are from the Alaskan population, also appear to have had a very good breeding season though some caution needs to be taken with the actual figures since only two catches were involved. In one of these the catch was only made after significant "twinkling". Previous experience has shown that such attempts to get birds to move into the catching area of a cannon-net quite often result in the departure of many of the older, wiser,

Table 2. Percentage of juvenile/first year waders in cannon-net catches in North-west Australia in 2007/2008

Species	No. of catches		Total caught	Juv./1st year		Assessment of 2007
	Large (>50)	Small (<50)		(#)	(%)	breeding success
Great Knot *Calidris tenuirostris*	12	4	1506	188	**12.5**	Good
Bar-tailed Godwit *Limosa lapponica*	5	8	552	43	**7.8**	Average
Red-necked Stint *C. ruficollis*	3	1	264	54	**20.5**	Average
Red Knot *C. canutus*	0	11	138	32	**23.2**	Good
Curlew Sandpiper *C. ferruginea*	3	12	569	164	**28.8**	Very good
Ruddy Turnstone *Arenaria intepres*	1	1	70	8	**11.4**	Poor
Greater Sand Plover *Charadrius leschenaultia*	2	8	269	73	**27.1**	Good
Terek Sandpiper *Xenus cinereus*	2	6	173	22	**12.7**	Average
Grey-tailed Tattler *Heteroscelus brevipes*	3	4	231	57	**24.7**	Good
Common Greenshank *Tringa nebularia*	0	3	39	0	**0**	Very poor
Little Curlew *Numenius minutus*	0	1	38	18	**47.4**	Good

All birds cannon netted in period 1 Nov to mid-March

Table 3. Percentage of first year birds in wader catches in South-east Australia 1998/1999 to 2007/2008

Species	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	***Average (10 yrs)***
Ruddy Turnstone *Arenaria intepres*	6.2	29	10	9.3	17	6.7	12	28	1.3	19	*13.9*
Red-necked Stint *Calidris ruficollis*	32	23	13	35	13	23	10	7.4	14	10	*17.9*
Curlew Sandpiper *C. ferruginea*	4.1	20	6.8	27	15	15	22	27	4.9	33	*17.5*
Sharp-tailed Sandpiper *C. acuminate*	11	10	16	7.9	20	39	42	27	12	20	*20.4*
Sanderling *C. alba*	10	13	2.9	10	43	2.7	16	62	0.5	14	*17.4*
Red Knot *C. canutus*	(2.8)	38	52	69	(92)	(86)	29	73	58	(75)	*53.1*
Bar-tailed Godwit *Limosa lapponica*	41	19	3.6	1.4	16	2.3	38	40	26	56	*24.2*

All birds cannon-netted between mid Nov and third week in Mar (except Sharp-tailed Sandpiper and Curlew Sandpiper to end Feb only). Averages (for last ten years) exclude figures in brackets (small samples) but **do** include 07/08 figures

Table 4. Percentage of first year birds in wader catches in North-west Australia 1998/1999 to 2007/2008

Species	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	***Average*** (10 yrs)
Red-necked Stint *Calidris ruficollis*	26	46	15	17	41	10	13	20	21	20	*22.9*
Curlew Sandpiper *C. ferruginea*	9.3	22	11	19	15	7.4	21	37	11	29	*18.2*
Great Knot *C. tenuirostris*	2.4	4.8	18	5.2	17	16	3.2	12	9.2	12	*10.0*
Red Knot *C. canutus*	3.3	14	9.6	5.4	32	3.2	(12)	57	11	23	*17.5*
Bar-tailed Godwit *Limosa lapponica*	2.0	10	4.8	15	13	9.0	6.7	11	8.5	8	*8.8*
Non-Arctic northern migrants											
Greater Sand Plover *Charadrius leschenaultia*	25	33	22	13	32	24	21	9.5	21	27	*22.8*
Terek Sandpiper *Xenus cinereus*	12	(0)	8.5	12	11	19	14	13	11	13	*12.7*
Grey-tailed Tattler *Heteroscelus brevipes*	26	(44)	17	17	9.0	14	11	15	*28*	25	*18.0*
Little Curlew *Numenius minutus*	57	33	-	36	30	-	(40)	-	-	47	*40.6*

All birds cannon-netted in the period 1 Nov to mid-March. Averages (for last ten years) exclude figures in brackets (small samples) but **include** 07/08 figures

Table 5. Percentage of juvenile/first year waders in mist-net catches in North-west Australia in 2007/2008

Species	**No. of catches Small (<50)**	**Total caught**	**Juv./1st year**	**% Juv./1st year**
Sharp-tailed Sandpiper *Calidris acuminata*	1	102	9	8.8
Marsh Sandpiper *Tringa stagnatilis*	1	4	0	(0)
Wood Sandpiper *T. glareola*	1	19	7	36.8
Long-toed Stint *C. subminuta*	1	17	14	82.3
Common Greenshank *T. nebularia*	1	3	1	33.3

All birds mist-netted on Roebuck Plains near Broome on 26 Nov 2007

adults resulting in a juvenile-biased catch sample. Note also that Bar-tailed Godwit figures are always exaggerated because a proportion of the young of the New Zealand Bar-tailed Godwit population spend their first year (or two) in Australia. Breeding success fluctuations are thus magnified. Scanning data on Bar-tailed Godwits in New Zealand has only shown one count in the October/November 2007 period when the proportion of juveniles was above 5.5% (Adrian Riegen, *pers. comm.*).

Ruddy Turnstone (19.4%) and Sanderling (14.4%) breeding success improved greatly over the abysmal outcome the previous season (1.3% and 0.5% respectively).

Sharp-tailed Sandpipers had yet another good breeding year. In five of the last six years the proportion of juvenile birds has been well above the long-term (16-year) median. This phenomenal run of good breeding success has now well and truly restored populations to levels prevalent 20 or more years ago before the serious decline of the 1990s and early 2000s occurred. Not only are Sharp-tailed Sandpipers seen in larger numbers at many places they are also now occurring at sites where they have rarely been present in many recent years.

Once again the Red-necked Stint is an enigma. It was the only species with a poor outcome from the 2007 breeding season. It is amazing how the breeding success fortunes of this species have varied over the last ten years. In four of the six seasons between 98/99 and 03/04 breeding success was well above the long-term median, and in the other two years it was close to the median. In the four seasons 04/05 to 07/08 the result in three has been below this median and in the fourth was only at the median level. As previously mentioned for Curlew Sandpiper and Sharp-tailed Sandpiper marked variations in breeding success are reflected in population levels as determined by counts (and by general impressions). There was a huge peak in Red-necked Stint numbers coinciding with the period of high breeding success in the late 1990s and early 2000s. Now Red-necked Stint numbers have dropped right back to former, more normal, levels. This is apparent by reduced numbers in their core habitat areas and by a marked diminution of Red-necked Stint numbers in fringe habitats.

A key unknown is why some species have breeding outcomes in some years which are markedly different from most other species and why some species may have quite

long runs of "good" or "bad" breeding seasons. Correlations between breeding success and key factors such as June/July temperatures on the breeding grounds, predator levels and date of snow melt need further investigation. But until it is possible to pinpoint breeding areas of each sub-population more exactly and until much more detailed meteorological and predator level data is available it will remain difficult to fully explain annual differences in breeding success between species.

North-west Australia

The breeding outcome for the wader populations which spend the non-breeding season in north-west Australia was also much better in 2007 than the very poor performance recorded for the 2006 breeding season.

As in Victoria the highlight was Curlew Sandpiper (28.8% juveniles). This suggests that it was an exceptionally good year for this species widely across the breeding range (though the exact breeding area of NWA Curlew Sandpipers is not known as there have been no recoveries or flag-sighting reports of birds from NWA on or near the breeding areas). It was most noticeable, particularly at 80 Mile Beach, that Curlew Sandpipers were far more numerous and widely distributed than for many years.

Great Knot and Bar-tailed Godwit had average, or slightly above average, breeding success. There is no indication yet that the Saemangeum Reclamation Project in South Korea has had any major adverse effect on reproductive rate for these two key potentially affected species.

Several other species had good breeding outcomes, including Grey-tailed Tattler for the second consecutive year. However, as in the 06/07 season, no juvenile Greenshank were captured in spite of reasonable samples being caught (39 in 07/08 and 70 in 06/07). It is possible that juvenile birds of this species may largely go elsewhere (eg. to freshwater habitats), though catches of this species are too intermittent to be sure about this.

Little Curlew always seem to have an exceptionally high proportion of young birds. For a bird of comparable size (eg. Bar-tailed Godwit) the average percentage of young birds in the population over the last ten years has been 8.8% whereas it is 40.6% for the five years in which adequate samples of Little Curlew have been obtained. Whether this species has an unusual reproduction rate/survival rate balance or whether the high juvenile proportions are a result of some differential migration of the sexes or other segregation in the non-breeding area is unclear.

It is interesting that the Red-necked Stint population in north-west Australia seems to have had a much better level of breeding success in recent years than the Red-necked Stint population which visits south-east Australia. In the last six years the proportion of young Red-necked Stints in south-east Australia has only once been above that of north-west Australia, and in each of the last three years it has been well below.

The mist-netting samples, all from a single catch in north-west Australia, again show a high proportion of juvenile birds, as in the 06/07 season. It may be that those species which prefer freshwater habitats have a high annual production of young, but it is not possible at this stage to determine how much of the result may also be caused by the fact that the mist-netting technique tends to catch an unusually high proportion of juvenile birds.

THE FUTURE

Monitoring of annual reproduction rates of wader populations which spend the non-breeding season in Australia will continue to be a high priority of fieldwork catching and banding programs in the November to March period each year. The quite marked variations in recent years between overall annual breeding success, together with individual species being markedly different from the main trend, should hopefully improve the chances of future analyses determining the relative importance of the various possible causes of these variations. The improved wader monitoring count programs in Australia (Shorebirds 2020 Project) and the additional data emerging from censusing at key stopover locations in Asia should also permit better examination of the relative importance of reproductive rate in governing wader population levels. Parallel studies estimating survival rates from capture/recapture, engraved leg flag and colour-band resighting data – now under way – will be complementary to these reproductive rate studies in helping build up a fuller understanding of wader demographics in the East Asian/Australasian Flyway.

ACKNOWLEDGEMENTS

The principal credit for the collection of this huge mass of data on the ages of waders in the non-breeding populations in Australia goes to the very large number of people who have put in countless hours of time, much physical effort and at significant financial cost to themselves, to catch waders in south-east Australia (Victorian Wader Study Group) and north-west Australia (Australasian Wader Studies Group annual NWA Wader Expeditions and North West Wader Study Group). Their preparedness to so strongly support fieldwork, even at short notice and often under arduous climatic conditions, has been absolutely vital.

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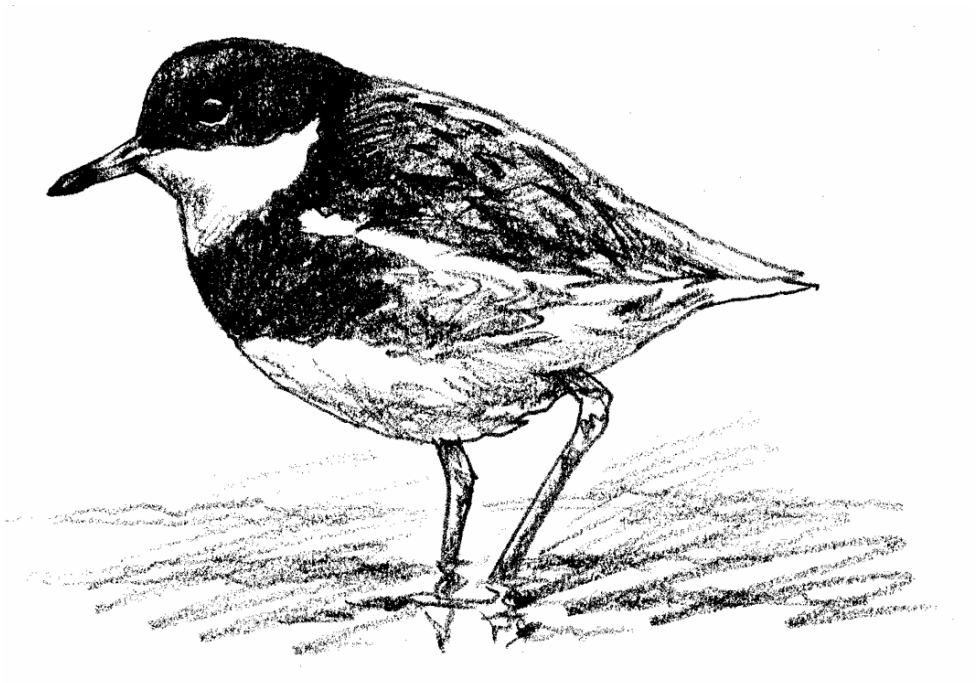

A NOTE ON ESTIMATING THE BIOMETRICS OF BAR-TAILED GODWIT IN AUSTRALIA

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INTRODUCTION

Wilson et al. (2007) give information on the biometrics of the two subspecies of Bar-tailed Godwit *Limosa lapponica menzbieri* and *L. l. baueri* that occur in Australia. The authors used the SHEBA programs (Rogers 1995 a, b, c) to separate the sexes and develop a sexing criterion which assigned sex correctly to almost all individuals. Biometrics by sex for measurements other than the one on which the sexing criterion was developed were then calculated using the assigned sexes. This approach is only possible for Bar-tailed Godwit because of the large size differences between the sexes. This note describes an alternative method, using SHEBA rather differently, which makes better use of the data and can be applied in cases where the sex size differences are not so extreme. The method is illustrated using Australasian Wader Study Group data on 9,254 birds of *L. l. menzbieri* caught in north-west Australia up to 30 December 2005.

PARAMETER ESTIMATION

Head-Bill and Wing Lengths

Separation of the sexes by Wilson et al. (2007) was made using the SHEBA program HUMPS_UV. This program generates maximum likelihood estimates of measurement parameters (number of birds, mean, standard deviation) for each sex. The HUMPS_UV outputs were used to calculate a sexing criterion with the program CRIT_UV; this criterion consists of the upper limit of size for birds of the smaller sex, in this case males, and the lower limit of size for birds from the larger sex. Birds between these limits are in the grey area (Rogers and Rogers 1995) in which sex cannot be assigned to the user specified minimum probability of correct sexing. This last is a required input variable; Wilson et al. (2007) used 95%.

The alternative approach is to use the program OTH_UV rather than CRIT_UV. OTH_UV calculates the probabilities that each bird is from each sex using the output of HUMPS_UV. These probabilities are summed into pre-defined histogram intervals to provide the distributions of the other measurement for each sex. Calculation of the distributional parameters is straightforward.

The alternative approach is to be preferred as it discards no data and makes unbiassed parameter estimates. The Wilson et al. (2007) approach, by excluding data on birds in the grey area, introduces bias as larger birds from the smaller sex and smaller birds of the larger sex are excluded. Despite this concern, the Wilson et al. approach is tolerable for this highly sex size dimorphic species. Parameter estimates of morphometrics are given in Table 1. These figures are in close agreement with those of Wilson et al. (2007). Since the estimates for the two age groups are so similar, HUMPS_UV is run here on the combined data before running OTH_UV.

Weights

An option in program OTH_UV allows estimates to be made for subsets of the data defined by a categorical variable e.g. age of outer primary (Table 1) or month. Table 2 gives the monthly estimates of weight parameters for each sex. Of interest is that first year weights appear to increase steadily throughout their first 10 months in north-west Australia.

Table 1. Summary of morphometrics

	N	% Males	Males Mean (S.D.)	Females Mean (S.D.)
Separation of the sexes on Culmen				
Adult – This study	6596	54.8%	86.6 (4.35)	108.4 (5.44)
Adult – Wilson *et al*. (2008)	3507	58.7%	86.5 (4.3)	108.3 (4.3)
1st Year	1895	61.2%	86.8 (4.33)	108.3 (5.40)
All ages	9254	57.1%	86.6 (4.35)	108.3 (5.44)
Other parameters for 1st year birds				
Head-Bill	608	60.5%	123.2 (4.69)	146.0 (5.81)
Wing P10 = Old	614	59.1%	206.5 (6.53)	218.3 (7.33)
Wing P10 = New	84	70.4%	213.7 (5.71)	224.3 (6.49)
Other parameters for adult birds				
Head-Bill	3064	52.9%	123.2 (4.60)	146.1 (5.73)
Wing P10 = Old	1630	52.2%	215.8 (6.25)	226.9 (5.99)
Wing P10 = New	1516	58.2%	218.9 (6.00)	231.8 (6.12)
Wing P10 = New – Wilson et al. (2007)	805	57.4%	219.9 (5.4)	232.7 (5.8)

Table 2. Monthly weight parameters

	N	% Males	Males	Females
			Mean (S.D.)	Mean (S.D.)
		First year birds		
Weight - Aug	-	-	-	-
Sep	-	-	-	-
Oct	22	57.8%	199.2 (21.81)	251.6 (29.96)
Nov	148	59.7%	209.9 (23.00)	256.8 (25.87)
Dec	50	50.8%	217.8 (22.36)	258.5 (25.86)
Jan	13	59.7%	229.9 (15.19)	269.3 (20.49)
Feb	40	60.7%	227.3 (25.83)	293.3 (42.92)
Mar	434	64.3%	235.0 (24.84)	280.3 (32.95)
Apr	621	61.7%	236.6 (26.87)	283.2 (31.01)
May	180	59.1%	231.0 (20.36)	281.4 (22.32)
Jun	86	63.4%	243.1 (23.29)	284.8 (20.27)
Jul	224	59.6%	246.3 (17.48)	296.7 (21.30)
		Adults (second year and older)		
Weight - Aug	154	56.1%	247.8 (17.90)	290.8 (26.64)
Sep	653	48.7%	251.1 (21.73)	300.1 (26.32)
Oct	1104	53.2%	251.2 (20.37)	296.3 (24.25)
Nov	672	56.1%	252.7 (26.36)	298.5 (21.86)
Dec	183	60.9%	244.5 (19.14)	292.2 (33.98)
Jan	436	55.3%	276.9 (25.26)	321.9 (36.90)
Feb	332	47.8%	308.6 (33.84)	374.0 (38.25)
Mar	1240	56.5%	332.6 (47.52)	403.4 (45.51)
Apr	1379	57.8%	313.7 (53.98)	286.6 (59.69)
May	88	54.1%	246.3 (24.60)	289.3 (35.43)
Jun	59	49.1%	248.7 (17.52)	299.3 (18.92)
Jul	153	69.2%	254.0 (16.39)	313.4 (28.08)

Adult weights are steady throughout the year apart from the very obvious increases over the period January through April which are clearly associated with pre-migratory mass gain. These results are generally consistent with those of Wilson *et al*. (2007), in which the data are categorised by primary moult score and extent of breeding plumage. Although adult weight estimates increase from January onwards, the period in which adults build up fat reserves to fuel migration, mean weights are lower than those of Wilson *et al*. (2007). Examination of the estimated histograms for the "other" measurement in the output of program OTH_UV shows that these histograms are themselves double-humped as illustrated in Figure 1. The larger of the two groups is clearly birds putting on mass prior to migration. The smaller group is of second year and older birds which will not be migrating north i.e. cases of delayed maturity (Rogers 2007).

The program HUMPS_UV was written specifically to address the sexing problem but can be used to separate any mixture of two normal distributions. It is used here to separate each sex's weight histogram for each month into two components. Table 3 gives the parameter estimates obtained by doing this. The May to December parameters are base weights outside this pre-migratory weight gain period and are presented for each group. Separation using HUMPS_UV could not be achieved for January as the weight difference, although clearly present (see Table 2), was small relative to the variance. The results for this month rest on some simplifying assumptions and should be considered as indicative only. Maximum mean weights are comparable with Wilson *et al*. (2007) estimates. Interestingly, birds that do not gain weight appear to lose weight at the same time as weight gainers are gaining it. The fit by month and sex over the weight gain period is shown in Figure 2.

CONCLUSIONS

This note demonstrates an alternative approach to that applied by Wilson *et al*. (2007) for analysis of morphometrics and pre-migratory mass gain. It has two main advantages. First, it does not require sex to be assigned to individual birds, only the probability of sex, and so is available for the analysis of species for which the sex size dimorphism is less than in the Bar-tailed Godwit. Secondly, it does not require information on the extent of breeding plumage and so is likely to be useful for a wider collection of data sets.

ACKNOWLEDGEMENTS

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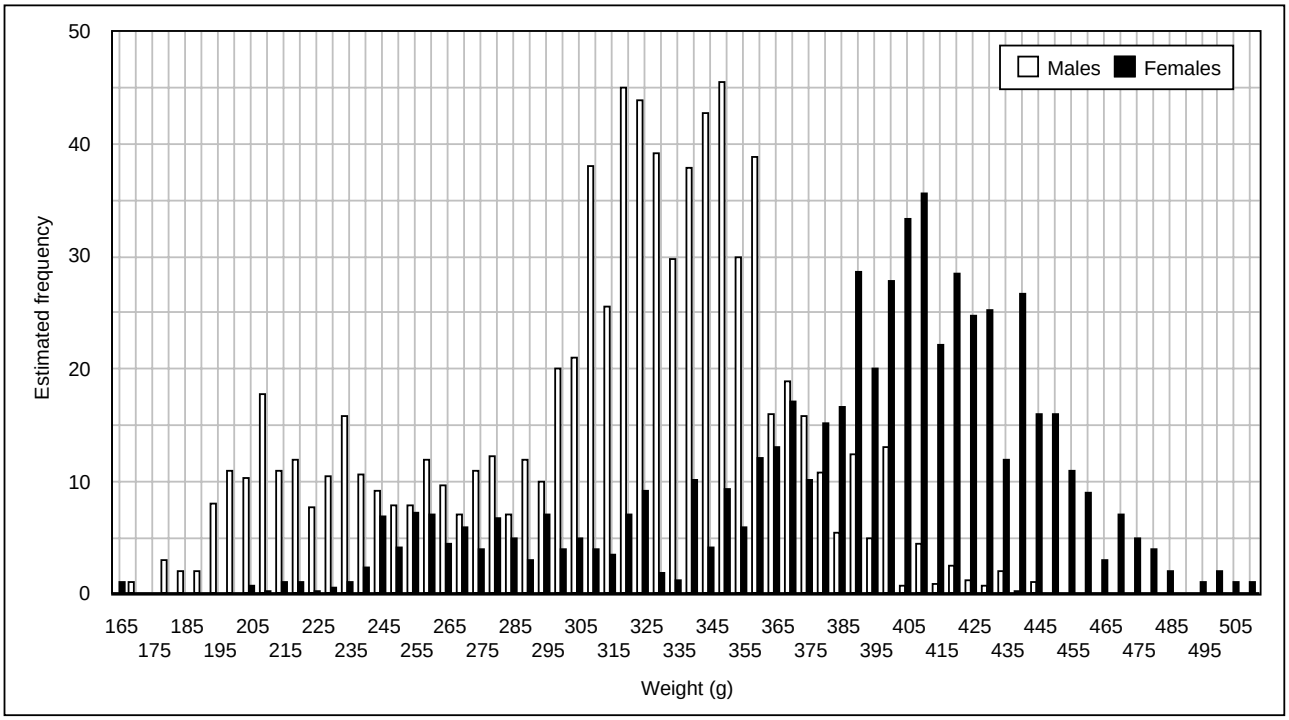

Figure 1. Estimated histograms by sex of adult Bar-tailed Godwit (subspecies *menzbieri*) weights in April.

Table 3. Separation of adult weights for January to February to those gaining and those not gaining weight.

Males	**N**	**Mean**	**N**	**Mean**
May to Dec	**1663**	**250.9 (21.90)**	**1663**	**250.9 (21.90)**
Jan	39	250.9 (21.89)	202	281.9 (22.69)
Feb	19	240.5 (16.35)	136	315.9 (21.48)
Mar	85	230.9 (20.46)	616	346.5 (30.70)
Apr	163	226.2 (22.41)	634	336.3 (33.32)
Wilson et al. (2007)[1]			374	348.4 (30.3)

Females	**N**	**Mean**	**N**	**Mean**
May to Dec	**1403**	**297.6 (25.66)**	**1403**	**297.6 (25.66)**
Jan	195	321.9 (36.90)	172	331.6 (26.46)
Feb	19	300.2 (23.09)	155	383.0 (29.46)
Mar	47	301.7 (25.07)	492	412.8 (34.30)
Apr	98	280.1 (26.38)	556	421.6 (39.71)
Wilson et al. (2007)[1]	—	—	312	417.8 (34.3)

[1] Birds with new outer primaries in period 23 March to 13 April. Males with more than 75% breeding plumage; females with more than 50%.

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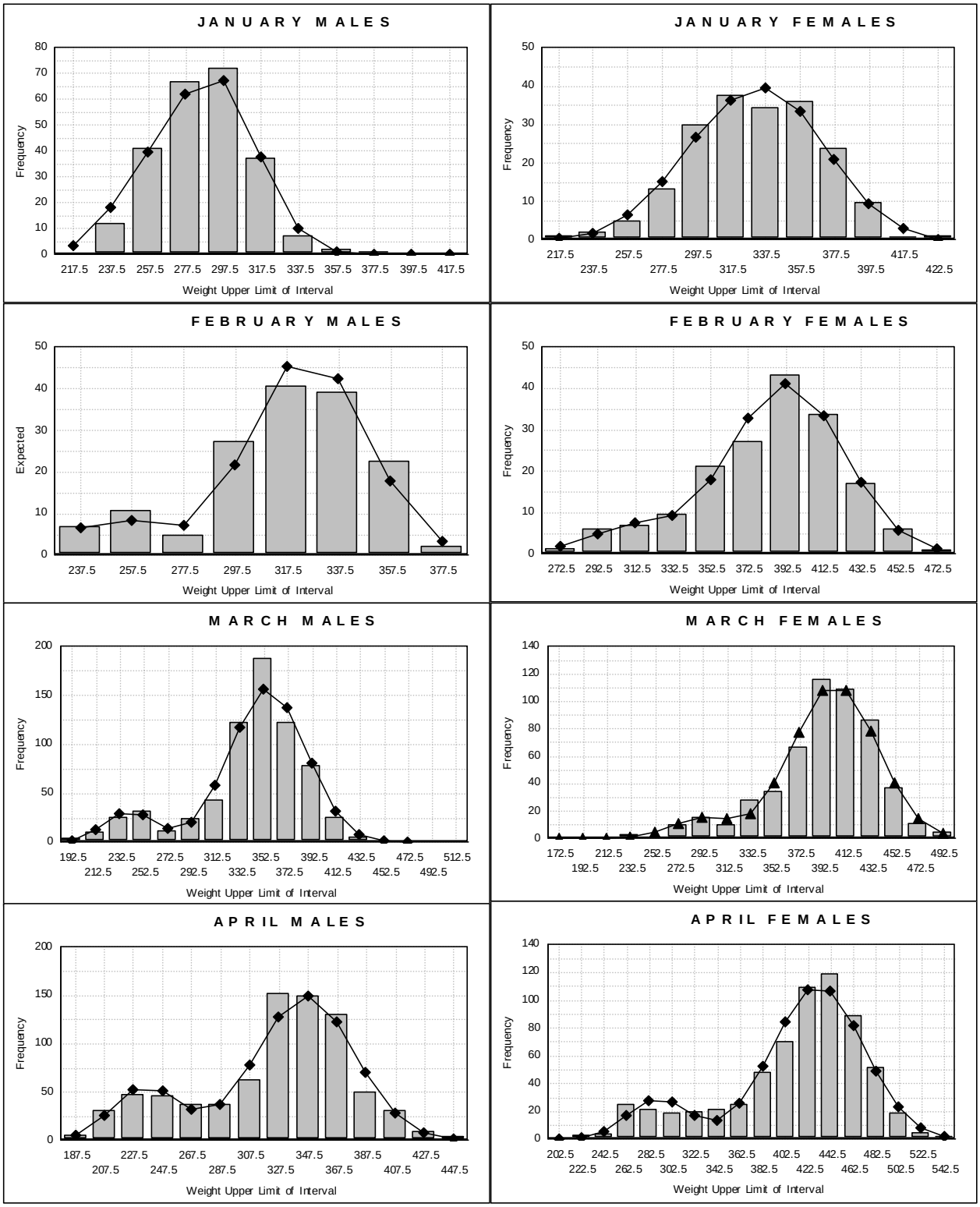

Figure 2. Separation of monthly weight histograms for each sex in the pre-migratory mass gain period.

RUDDY TURNSTONES *ARENARIA INTERPRES* ON KING ISLAND, TASMANIA, AUSTRALIA

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BACKGROUND

Visits to King Island, Tasmania, Australia (39^0 53'S 143^0 54'E) were initiated in March 2007 in order to increase the annual sample of Ruddy Turnstones *Arenaria interpres* available to the Victorian Wader Study Group (VWSG) for its studies of migration, reproductive and survival rates.

King Island has proved to be an ideal location with Ruddy Turnstones being the dominant wader, occurring at numerous accessible places along the shore of the western coast of the island (60 km.). Accumulations of seaweed (mainly kelp) are washed up and form nutritious feeding grounds for them, with vast numbers of fly larvae (maggots) and insects present in the rotting weed.

The first visit, between 18 and 25 March 2007, resulted in 241 Ruddy Turnstones being caught (plus 60 Red-necked Stint *Calidris ruficollis* and five Double-banded Plover *Charadrius bicinctus*). That visit, and subsequent sightings of marked birds elsewhere in the Flyway, gave an immediate boost to knowledge of the migration of Ruddy Turnstones, a species only banded in relatively small quantities throughout the Flyway. The pool of data on which annual reproductive rates are measured was also more than doubled. And the use of engraved leg flags, where each bird is individually identifiable in the field (via a telescope), laid the foundation for a long-term study of annual survival rates.

The visit from 7 to 15 March 2008 was the second of what it is hoped will now become annual counting, catching, banding and leg-flagging visits. Consideration is now also being given to interim visits during each year specifically targeting detailed visual inspection of the Ruddy Turnstone population to determine (from engraved leg flags identified) which birds are still surviving.

This report details the results obtained during the March 2008 visit and gives some of the results which have emerged, so far, from the first two seasons (just over one year) of this study.

MARCH 2008 VISIT

A team of 13 people, 12 from Victoria and one from South Australia, flew to King Island on Friday 7 March and departed on Saturday 15 March. All costs were met by the participants themselves (c$1,000 each, including $300 airfare).

The visit was blessed by exceptionally calm, warm and almost windless weather, making fieldwork much easier and more pleasant than might normally be expected on a Bass Strait island at latitude 40° south. We will obviously have to pay for this good fortune (the weather during the March 2007 visit was almost as good) at some time in the future!

The first day was spent undertaking an almost complete survey of the western coast of King Island with the group divided into three teams. On each subsequent day cannon-netting was the main menu with seven different venues being visited. Days when two catches were attempted, at different locations, were pretty full but on other days some time was available to see and explore (mostly ornithologically) other parts of the island.

THE COUNT

Fourteen different defined areas from the southernmost tip of King Island (Stokes Point) to Quarantine Bay (in the north-west of the island) were surveyed on 8 March. A total of 884 Ruddy Turnstones were counted (Table 1). The largest numbers were at Manuka (220), Surprise Bay (187) and Currie (114) – all sites visited and used for catching and banding in March 2007 - and at Whistler Point (180), in the north-west of King Island, a site not visited previously.

The table also contains data from two much less productive areas counted later in our visit – around Cape Wickham Lighthouse (0) at the north end of the Island and Lavinia Beach (9) in the north-east.

The south and east coasts of King Island have not yet been inspected by us for Ruddy Turnstones but local advice suggests that relatively few will be found in these parts because the prevailing winds do not permit the same accumulations of rotting seaweed on the beaches. Making allowance for some birds missed and birds present on the east and south coasts, it is probable that the Ruddy Turnstone

Table 1. Ruddy Turnstone count – western coast of King Island, Tasmania (8 March 2008).

Location (listed south to north)	Number of birds
N.E. Seal Bay	20
Stokes Point to Surprise Bay	70
Surprise Bay	187
Seal Rocks	0
Pearson's Lane, Cataraqui	0
Dripping Wells	40
Ettrich Beach	14
Millers Bay	0
Quarantine Bay (south end)	0
Currie (Golf Course and Harbour)	114
Manuka (north, central and south)	220
Bungaree Creek	30
Bungaree Lagoon (shore)	0
Whistler Point	180
Cape Wickham Lighthouse	0
Lavinia Beach	9
TOTAL	**884**

population of King Island is between 1200 and 1500 birds. This confirms the guestimates made after the 2007 visit and also confirms that the Ruddy Turnstone population on King Island is probably greater than at any other location in the East Asian/Australasian Flyway, being larger than that on the south-eastern shoreline of South Australia.

CATCHING AND BANDING

a) Catches

Details of the eight cannon-net catches, made in five different areas (seven sites), are given in Table 2. They were remarkably consistent in size ranging from 34 to 81 Ruddy Turnstones, with an average of just over 50 and a total of 419 (Table 3). This is probably the third largest number of Ruddy Turnstones ever caught anywhere in the world in a limited period. Only at Delaware Bay (USA), during the last 12 years, and on the Pribiloff Islands off S.W. Alaska, in the mid 1960s, have larger catch totals been achieved in a week of fieldwork.

Seven Double-banded Plovers (cf. five in 2007) but no Red-necked Stint (60 in 2007) were caught (Table 3). It is not clear why so few Red-necked Stints were present this year given that data from mainland (Victoria) indicates relatively normal population levels and at least some breeding success. Seven Pied Oystercatchers and one Sooty Oystercatcher were also caught (none in 2007), but as bands had not been brought to King Island with us for these species only the two controls (both banded in Victoria) are included in the totals.

Cannon-netting was mainly carried out with a large, 4-cannon, large-mesh net (30 m. x 13 m.), because Turnstones are usually well spread out at their feeding/high tide roosting locations on the shore. However at two sites where space was restricted a half size, 2-cannon, version of this old style net was used. The now frequently used small-mesh cannon-nets, which will not fire effectively into even a moderate wind, were not taken to King Island because of the expected (but not realised) windy conditions.

b) Controls and Retraps

Sixty-five banded Ruddy Turnstones were caught (Table 3). Four of these were "controls", i.e. birds originally banded elsewhere. Amazingly the first catch contained a bird from Japan (banded in August 1999) and another from Taiwan (banded in August 2004) (Table 4). Two birds marked by VWSG in South Australia were also recaptured, one of these having been also recaught at the same location on King Island in March 2007.

Forty-nine Ruddy Turnstones banded in March 2007 – 22 at Surprise Bay, 15 at Currie and 12 at Manuka – were also recaptured (Table 5). All but four of these were at exactly the same location as they had originally been banded, suggesting a high degree of site faithfulness for Ruddy Turnstones in their non-breeding season.

Twelve Ruddy Turnstones originally banded during the first part of the week were also again captured later in the week, all but one at exactly the same location.

The two Pied Oystercatchers which were recaptured carrying bands put on in Victoria had originally been marked as adults in 2001 and 2002 in Western Port. Both these birds were identified by their colour-band combinations in the

Table 2. Shorebird catches on King Island, Tasmania (7-15 March 2008) by location.

Date	Location	Species	New	Retrap	TOTAL	Juveniles	Nets fired
9	Whistler Point (south) (*1 from Japan and 1 from Taiwan)	Ruddy Turnstone	77	4*	81	17=21.0%	1
10	Whistler Point (*1 from South Australia, 6 from previous day)	Ruddy Turnstone	55	7*	62	14=22.6%	1
11	Stokes Point	Ruddy Turnstone	47	1	48	10=20.8%	½
11	Surprise Bay	Ruddy Turnstone	58	21	79	11=13.9%	1
12	Manuka (North)	Ruddy Turnstone	35	0	35	7= 20.0%	½
		Double-banded Plover	4	0	4		
		TOTAL	**39**	**0**	**39**		
13	Manuka (Central)	Ruddy Turnstone	33	5	38	5=13.1%	1
13	Currie (Golf Course)	Ruddy Turnstone	28	14	42	5=11.9%	1
		Double-banded Plover	3	0	3		
		TOTAL	**31**	**14**	**45**		
14	Manuka (North)	Ruddy Turnstone	21	13	34	6=17.6%)	1
	*not banded (no bands)	Pied Oystercatcher	5*	2**	7		
	**both from Victoria	Sooty Oystercatcher	1*	0	1		
		TOTAL	**27**	**15**	**42**		

Table 3. Total shorebirds by species caught at King Island, Tasmania (7-45 March 2008)

	New	Retrap	Total	Juveniles
Ruddy Turnstone	354	65	419	75=17.9%
Double-banded Plover	7		7	0
Pied Oystercatcher	0	2	2	0
TOTAL	**361**	**67**	**428**	

Note: Unbanded Pied & Sooty Oystercatcher excluded. 8 cannon net catches (6 with large net, 2 with small net)
Three catches at Manuka, two at Whistler Point and one at each of Surprise Bay, Stokes Point & Currie Golf Course.
Ruddy Turnstone – sexes of adults – 181 male, 163 female.

Table 4. Shorebirds banded at other locations and caught at King Island, Tasmania (7–15 March 2008)

Species	Band Number	Age at banding	Banded	Location and date of recapture
Ruddy Turnstone	JAPAN 5A-28657	2^+	10 Aug 99 Nemuro, Hokkaido, JAPAN	9 Mar.08 Whistler Point (South)
Ruddy Turnstone	TAIWAN D-30008	2^+	28 Aug 04 Chang Wha, TAIWAN	9 Mar 08 Whistler Point (South)
Ruddy Turnstone	052-29956	2^+	13 April 06 Brown Bay, South Australia	10 Mar 08 Whistler Point
Ruddy Turnstone	052-03817	1	11 Dec 06 Brown Bay, South Australia	21 Mar 07 Currie (Golf Course) 13 08 Currie (Golf Course)
Pied Oystercatcher	101-07493*	3^+	4 Aug 01 Rhyll, Phillip Island, Victoria	14 Mar 08 Manuka (North)
Pied Oystercatcher	101-21174*	3^+	14 April 02 Stockyard Point, Western Port, Victoria	14 Mar 08 Manuka (North)

*Both of these birds were sighted at the same location on previous days

Table 5. Retraps of Ruddy Turnstone on King Island, Tasmania (7-15 March 2008)

Location banded	Location re-caught (March 2008)					
	Whistler Point	Manuka	Currie	Surprise Bay	Stokes Point	**Total retraps 2007-2008**
Manuka	1	11	0	0	0	12
Currie	1	1	13	0	0	15
Surprise Bay	0	0	0	21	1	22
TOTAL	**2**	**12**	**13**	**21**	**1**	**49**

In addition a South Australian banded bird originally retrapped at Currie in March 2007 was caught there again in March 2008. Also 12 birds banded in March 2008 were retrapped within days. 11 were originally banded at the same location (6 Whistler, 5 Manuka) but one bird had moved, from Whistler to Manuka in 4 days.

days preceding their recapture. It has already been well established through sightings of colour-marked birds made by Nigel and Mavis Burgess over the years that many Pied (and Sooty) Oystercatchers which breed on King Island spend their immature years and non-breeding seasons on the Victorian coast. Only a minority of adults remain on King Island throughout the year.

c) %Juveniles

Juvenile/first year Ruddy Turnstones were separable from adults in several ways. Firstly they either had a complete set of slightly worn unmoulted juvenile primaries (obtained when they first fledged in July 2007) or they were in active wing moult (changing all, or just some, of their primaries). In contrast all adult birds had a complete set of fresh, newly moulted, primaries. Some unmoulted wing coverts were also present in juveniles but this was not a useful asset to ageing as such coverts were not particularly distinct. The lack of breeding plumage on juvenile birds (a few had just a trace) was also helpful in ageing birds. In the austral winter most immature turnstones gain a little breeding plumage, but never approach the breeding plumage level of adults.

The average percentage of juvenile/first year Ruddy Turnstones in catches was 17.9%. This was fairly consistent between catches, ranging from 11.9% to 22.6% (Table 2). This is well above the average level of juveniles in Victorian/South Australian catch samples where the long-term average is 9.3%. It is also much better than the almost complete breeding failure in 2007 (1.3% in Victoria/South Australia and 0% in King Island birds). However this year's King Island rate of 17.9% is rather lower than the 22.8% for Victoria/South Australia in 07/08, though in the latter the total sample size (180) was much smaller than that of King Island (419).

One consequence of the much better breeding season for Ruddy Turnstones in the 2007 arctic summer is that there should now be a small population of one year old birds overwintering on King Island this year. Last year there were none.

d) Turnstone Sexes

Males Ruddy Turnstones can be easily distinguished by their very white heads and a patch of almost pure ginger/chestnut on their wing coverts and back. Females have much browner heads and much less colour on their wing coverts and back, being relatively more like birds in non-breeding plumage. Of the 334 adults caught, 181 were sexed as male and 163 as female (Table 6). The percentage of male birds (52.6%) was marginally above the level in March 2007 (51.9%).

There was a wide variation in the proportion of the sexes in the catches made at the different locations, ranging from 34.2% males at Stokes Point to 63.6% males at Manuka (Central). Table 6 shows the proportions of each sex at each location and, for comparison, data from catches made in March 2007. At three of the four sites the proportion of males was above 50% in both years. However this was not the case at the fourth site where there were 63.6% males in March 2008 and only 44.0% in March 2007. It will need several more years of data before it will be possible to say with confidence whether some sites have a proportion of males and females which differs consistently from the 1:1 ratio.

Table 6. Sexes of adult Ruddy Turnstone at different locations on King Island, Tasmania (March 2007 & 2008)

Location (listed from south to north)	Date	Male	Female	% Male in March 2008	% Male in March 2007
Stokes Point	11 Mar 08	13	25	34.2	
Surprise Bay	11 Mar 08	45	23	66.2	51.2
Currie (Golf Course)	13 Mar 08	22	15	59.5	53.6
Manuka (Central)	13 Mar 08	21	12	63.6	44.0
Manuka (North)	12 Mar 08	15	13	57.1	70.0
Manuka (North)	14 Mar 08	17	11	-	-
Whistler Point (South)	9 Mar 08	31	33	48.4	-
Whistler Point	10 Mar 08	17	31	35.4_	
TOTAL		**181**	**163**	**52.6%Male**	**51.9% Male**

FLAG SIGHTINGS AND RESIGHTINGS

a) Flag sightings

During the visit several birds which had been colour marked at other locations were seen at King Island, mostly during the recce day on 8 March (Table 7).

A total of five Ruddy Turnstones carrying the orange over yellow flag combination from South Australia were seen in the area of Whistler Point on 8 March. One was seen well enough for the engraved inscription to be read. It had been banded as a second year bird at Port MacDonnell on 6th August 2006.

Even better was the sighting of a Turnstone with a white flag (on the tibia) on 12 March at Manuka. It had been originally flagged in North Island, New Zealand. This adds to the growing evidence that there is not only quite a marked movement of Turnstones through south-eastern Australia to New Zealand but that there is also some interchange of non-breeding area.

The other marked birds – one with an engraved white flag, which it was not possible to read, and the other with a unique colour band combination - were Sooty Oystercatchers. The first would have been marked at Flinders in Victoria and the other had been banded on 13 June 2002 in Corner Inlet. This bird had also previously been reported on King Island in January 2007. These two sightings further confirm the strong connection between oystercatchers on King Island and oystercatchers on the coast and bays of Victoria.

b) Flag resightings

A wonderful collection of sightings, mainly overseas, have already accrued from birds marked on King Island (Table 8).

In 2007 two Ruddy Turnstones were reported, one in Taiwan, on both northward and southward migration, and the other in northern Japan, on southward migration. Already in 2008 four King Island flagged Ruddy Turnstones have been seen in Asia on northward migration. One was the same bird (XO) seen there twice in 2007. So this is the third consecutive migration season in which it has been seen making a stopover in Taiwan. Of the other three birds in Taiwan in April 2008 two had been banded on the visit in March this year and one in March 2007.

An unusual Ruddy Turnstone movement was a bird banded on 13 March this year and seen only 12 days later at Nene Valley, near Carpenter Rocks, in South Australia. This bird had a weight at the low end of the range of adult birds when caught. It would therefore appear likely that it was not a bird which has come down prematurely on migration (due to bad weather) but one which was deliberately moving a little closer to its end destination in the Northern Hemisphere before carrying out the fat deposition necessary for the very long first leg (probably to the Taiwan area direct) of its northward migration

Subsequently two more of this year's King Island engraved flagged Ruddy Turnstones were seen at Nene Valley in South Australia. One (1Y/B) had been banded at Surprise Bay on 11 March. Its weight was also relatively low (129 g.) compared with other birds caught on that day. The

Table 7. Flag sightings of colour marked shorebirds from other locations on King Island, Tasmania (March 2008).

Species	Flag colours	Resighting date & location	Location banded
Ruddy Turnstone	(5 birds) Orange/Yellow	08 Mar 08 Whistler Point (south)	South Australia
Ruddy Turnstone	(one Orange JN/Yellow) = 052-22243	08 Mar 08 Whistler Point (south)	06 Mar 08 Port MacDonnell (Age 2) South Australai
Ruddy Turnstone	White (on tibia)	12 Mar 08 Manuka (north)	New Zealand
Sooty Oystercatcher	Colour Bands Green.metal/red.green.lightgreen	08 Mar 08 Quarantine Bay (also previously reported nearby on 18 Jan 07)	13 June 02 Roussac Point, Corner Inlet, Victoria
Sooty Oystercatcher	White flag (number not read)	08 Mar 08 Whistler Point (south)	Flinders, Victoria

There were also sightings of two Pied Oystercatchers colour marked in Victoria. As these birds were later caught they are listed under 'controls'

Table 8. Movements of birds flagged on King Island

Species	Band & Flag Number/combination	Flagged	Resighted
Ruddy Turnstone	052-52378 Orange 93/B	13 Mar 08 Manuka (North)	25 Mar 08, Carpenter Rocks, South Australia
Ruddy Turnstone	052-51886 Orange XO/B	24 Mar 07 Currie	4 & 8 May 07 Hanbou, TAIWAN 3 Aug 07 Hanbou, TAIWAN 17 April 08 Hanbou, TAIWAN
Ruddy Turnstone	052-51862 Orange S8/B	22 Mar 07 Surprise Bay	8 Aug 07, Hokkaido, JAPAN
Ruddy Turnstone	052-52039 Orange 4H/B	9 Mar 08, Whistler Point	5 April 08, Han Pao, TAIWAN
Ruddy Turnstone	052-52405 Orange 2M/B	10 Mar 08,Whistler Point	12 & 13 April 08, Tao Yuan, TAIWAN
Ruddy Turnstone	052-51724 Orange E1/B	20 Mar 07, Manuka (North)	17 April 08, Han Pao, TAIWAN
Ruddy Turnstone	052-52277 Orange 1Y/B	11 Mar 08, Surprise Bay	20 April 08 Nene Valley, South Australia
Ruddy Turnstone	052-52203 Orange 5B/B	9 Mar 08,Whistler Point (south)	20 April 08 Nene Valley, South Australia
Red-necked Stint	O/B	March 07 Manuka or Currie	20 April 07 Nene Valley, South Australia

Reports up to 20 April 08

other (5B) had been banded as a juvenile on 9 March at Whistler Point. Some first year waders, of several species, make partial northward movements for their first austral winter. It will be interesting to see if this bird remains in the Nene Valley area.

A Red-necked Stint appeared to make a similar (to the first two Turnstones) movement in 2007, being seen on 20th April at Nene Valley in South Australia, less than a month after it had been banded on King Island.

There is no doubt that leg flagging, especially with engraved flags, is greatly increasing the amount of data generated on migratory movements. Let us hope that the especially keen group of wader re-sighters in the Taiwan Wader Study Group find some more of our marked birds from King Island during future migration seasons.

OTHER BIRD SIGHTINGS

A full list of species observed was recorded for submission to the Bird's Australia Atlas Project. Species included numerous Wild Turkeys *Meleagris gallopavo*, Peacocks/Pea Hens *Pavo cristatus* and Ring-necked Pheasants *Phasianus colchicus* which were introduced to Australia, post European settlement and have established feral populations on King Island. A search was made for the endangered Orange-bellied Parrot *Neophema chrysogaster* but none were found.

The most exciting sighting was 146 Banded Lapwing *Vanellus tricolor* on a newly ploughed field and an adjacent heavily grazed pasture at Egg Lagoon on 12 March. Banded Lapwings breed on King Island but are usually only seen in small numbers. Nigel Burgess (Tasmanian Parks Ranger) and Max McGarvie (who wrote The Birds of King Island in 1972) have both said they have never seen more than about 20 Banded Lapwings together at any one location at any time in the past – and both have lived on King Island for more than 50 years.

Marchant & Higgins (1993) list a small number of occasions – in inland New South Wales, South Australia, Victoria and Queensland, plus one flock of 200 in Tasmania – where large flocks of Banded Lapwings have been recorded. But it is obviously an uncommon occurrence and this particular sighting is unique for King Island. It certainly suggests that a large part of the exceptional number of Banded Lapwings seen at Egg Lagoon were immigrants from elsewhere. This might have been more expected if the severe drought had still been continuing, but it has now ameliorated somewhat in many of the areas of the Banded Lapwings' range.

THE FUTURE

As mentioned earlier it is planned to continue this study for a number of years if possible so that the best possible quality of data for survival rate calculations on Ruddy Turnstones can be generated. This will entail a major banding visit each year and one, or more, separate visits to search for surviving birds carrying engraved leg flags. It is also hoped that local King Island ornithologists will gradually take an interest in this aspect of the study and themselves make regular searches for flagged birds.

ACKNOWLEDGEMENTS

These visits to King Island could not have taken place at all, never mind the scientific success and enjoyment they've achieved, without the huge help and support of Mavis and Nigel Burgess. They most kindly lent us a 4WD vehicle and a trailer for the duration of the visit and kindly brought these to the airport to meet us. They also collected our vehicle from the docks at Grassie and returned it to there at the end of our visit. In addition they assisted us to find accommodation. And – most important of all for some – they provided vast quantities of the most delicious King Island cheeses!

A number of other King Island residents also took part in the banding activities, in both years, and their help has been greatly appreciated. It was also a great pleasure to meet up with Max McGarvie, now aged 86, who had been a prominent member of the RAOU (now Birds Australia) in the 1960s, taking part in major exploratory ornithological expeditions to remote parts of Australia (including Broome, where he saw huge numbers of waders but didn't specifically identify Great Knot, and Anna Plains, where they did not venture on to 80 Mile Beach!). Critical also to the financial viability was Angus Roberts, who arranged for the transportation of, free of charge by sea, all our cannon-netting and banding equipment in Clive Minton's Land Cruiser from/to Melbourne.

Tasmanian Parks and Wildlife Service are also thanked for the provision of the necessary Banding Permits for King Island.

Finally a Thank You to the whole of the team, especially to Penny who did most of the logistical planning, for their huge contribution before, during and after the visit.

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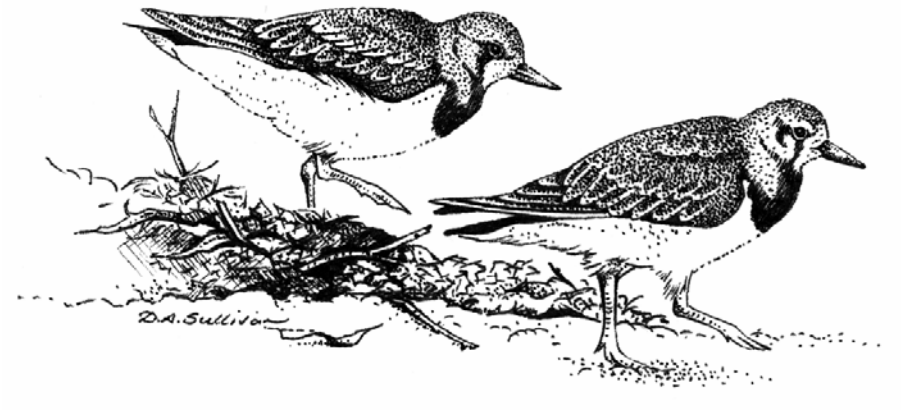

WHERE HAVE ALL THE RED-NECKED STINT GONE?

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Anderson's Inlet 38º 38' S, 145º 47' E is located on the southern coast of Victoria, Australia near the township of Inverloch. It achieved International Bird Area Status in 2007 and has four species of shorebird in numbers of International Significance the Double-banded Plover *Charadrius bicinctus*, Eastern Curlew *Numenius madagascariensis*, Red-necked Stint *Calidris ruficollis* and Sharp-tailed Sandpiper *C. acuminata* and an additional two species of National Significance Common Greenshank *Tringa nebularia* and Pacific Golden Plover *Pluvialis fulva* (Watkins 1993). Counts have been conducted at this site for over 20 years (AWSG unpublished data, Campbell 1992, South Gippsland Conservation Society 1987, Whitelaw & Whitelaw 2002, Wilson 2001).

The introduced intertidal weed *Spartina* now dominates 95% of the shoreline leading to a change in roosting areas (Whitelaw & Whitelaw 2002) and diminished numbers of some species in particular Sharp-tailed Sandpiper. Red-necked Stints are the most common species seen in the inlet with counts of over 5,000in the austral summer (Whitelaw and Whitelaw 2002).

The current series of regular boat based bi-monthly summer and winter counts commenced in January 2000 and are continuing as part of the AWSG's 2020 Shorebird monitoring project. There have now been 40 counts. 31 were `wader season' counts between September and March inclusive. The surveys have covered waders and all other waterbirds/waterfowl/gulls and terns and total survey time is about 2.5 hours.

Roost sites not visible from land-based counts include extensive spreads of mangrove (*Avicennia marina*) - *Spartina* islands, and mangroves themselves (Minton & Whitelaw 2000). In recent years a sand island has built up near the inlet entrance and has provided an extra roost site for the Red-necked Stint (and some other waders and seabirds), notably on the morning high tide.

The average Red-necked Stint observed across those 31 'wader season' counts was 3230 with the highest total of 6390 on 7 March 2005; the lowest of 16 on 6 September 2007. 15 counts were between November and February inclusive when the population is considered stable as all juveniles have arrived and birds on passage departed. The average Red-necked Stints seen at this time was 4082 with the highest count of 6107 on 17 January 2004 and the lowest, 2575, on 20 November 2000.

The shorebird survey of Andersons Inlet on the 18 February 2008 produced a mystifying result for the inlet's wader counters. The Red-necked Stint count was zero.

The previous survey on 2 November 2007 produced 3475 Red-necked Stint. Since that date the large flock hasn't been seen at any of the roost sites that can be checked on foot, or in with binoculars or telescopes. Small groups numbering mere low hundreds at most were seen from November through to mid-January.

During the 2 November 2007 count two small groups of Red-necked Stint were observed roosting at their usual sites (390, 85) but the main flock (3000) was roosting on a man-made land-fill extension to a property functioning as a small-scale private boat charter/marina.

One possible explanation for the lack of stints during the February 2008 count is that the birds were roosting in an area that the boat cannot reach. One such area is inside the spread of mangrove-spartina islands east of Fisherman's Jetty. However their usual roosting and high-tide feeding preferences for the past eight years have been on the mangroves (on a very high tide) or on the muddy island edges, often with Curlew Sandpiper, Sharp-tailed Sandpiper, Pacific Golden Plover, Common Greenshank. Perhaps they have found another roost site along creek or riverbanks not accessible or surveyed?

A search of the low-tide feeding grounds was suggested. The boat was unavailable, but three searches covered everything possible around and from the inlet's shores, with binoculars/telescope. The ocean beach at Venus Bay was also checked. No Red-necked Stint were found.

We believe this February 2008 Red-necked Stint zero count should be put on the record, in case the flock's absence proves to be a pointer to a conservation problem or the start of an unwelcome trend.

ACKNOWLEDGEMENTS

We are grateful to Brian Martin and Parks Victoria for providing boat transport to roost sites.

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NORTH-WEST AUSTRALIA WADER AND TERN EXPEDITION 2007 (10TH NOVEMBER TO 1ST DECEMBER 2007)

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INTRODUCTION

Each year that we visit north-west Australia as part of the AWSG long term study of waders and terns we say that "this year's expedition was the best". So, again, it seemed to be in November 2007. We achieved all our principal scientific objectives, we had a large and very hard working team throughout the three-week period, fieldwork was extremely successful with the highest total of birds caught yet for a three-week expedition, we operated within budget, and everyone thoroughly enjoyed being part of an efficient and happy team.

Detailed below, for the benefit of expedition members and others, are some of the main results achieved during the expedition. This report also serves as a permanent record of the November 2007 visit to north-west Australia.

MAIN ACHIEVEMENTS

In early years (1981–mid 1990s) the focus of the banding activities of NWA expeditions was trying to find out migration routes, destinations, and stopover locations of the waders which visit north-west Australia for the non-breeding season or stage there on migration to/from southern Australia. Collection of biometric, weight and moult data was an integral part of this. In more recent years the primary focus has gradually switched to demographics – obtaining estimates of annual breeding success and survival rates. The population count data, which this information helps to explain, is now largely generated separately from the expeditions by a team of locally based counters from Broome.

The main achievements in relation to the objectives of this expedition, as detailed in the original documentation sent to participants, are outlined below.

a) A total of 3939 waders (29 species) and 107 Terns (seven species) were caught during 18 days in the field between 11th and 30th November (Table 1). The total of 4046 was slightly higher than in November 2006 (4001).

b) Birds were caught in 18 cannon-net catches and one mist-net catch. The pattern of catching in the three separate periods (Broome/80 Mile Beach/Broome) was remarkably similar to the previous year (Table 2). The 1785 caught at 80 Mile Beach was a record for a visit to that area. Nine cannon-net catches were made at each location. The average cannon-net catch size of 211 was almost the same as the previous year (209).

   The largest catch was 595 at 80 Mile Beach on 22nd November. This contained 332 Curlew Sandpipers, the largest single catch of this species for 20 years. Other notable species totals in a catch were 275 Great Knot, 219 Bar-tailed Godwit and 68 Ruddy Turnstone.

   The mist-net catch of 243 in one night at Lake Eda was a record also. This occurred in the middle of a peak of intense, and exhausting, fieldwork activity on 26/27th November when almost 1000 waders were caught in two daytime cannon-net catches and the overnight mist-netting, a period of 36 hours almost non-stop fieldwork!

c) Great Knot (1412) again topped the list of species totals (Table 3). Other species to feature strongly, as usual, were Bar-tailed Godwit (432) Greater Sand Plover (268), Red-necked Stint (265), Grey-tailed Tattler (231) and Terek Sandpiper (172). But extremely pleasing was the massive total of 567 Curlew Sandpipers, the largest total for this species for many years. Part of the reason for this was the exceptionally good breeding success achieved by Curlew Sandpipers in 2007 with almost a third of the birds caught being identified as juveniles. As this species has shown the largest and most sustained reduction in population levels throughout Australia over the last 25 years it is particularly valuable for it to have had such a bumper breeding success this year.

   Other notable species totals were Red Knot (135), Sharp-tailed Sandpiper (104), Ruddy Turnstone (68), Little Curlew (38), Grey Plover (17) and several species primarily caught by mist-netting including Black-fronted Plover (32), Black-winged Stilt (29), Wood Sandpiper (19), Long-toed Stint (17) and Red-kneed Dotterel (11). This was the first year for quite a while that we have been able to successfully cannon-net Little Curlew.

   In contrast only low numbers of Black-tailed Godwit (1), Oriental Plover (1) and Eastern Curlew (7) were caught and no Whimbrel, Pied Oystercatcher or Oriental Pratincole. Several attempts were made to cannon-net Oriental Plover when they came down on to 80 Mile Beach from the grasslands of Anna Plains during the heat of the day. They looked easy to catch, being extremely approachable. But they were almost non-twinklable, with many going back to the plains when disturbed, and the rest preferring not to associate closely with the other flocks of shore waders roosting on the beach. There needs to be further development in our technique if we are to be able to sample regularly the huge population (many tens of thousands) of Oriental Plovers which peaks in November in the 80 Mile Beach/Anna Plains region each year.

Table 1. NWA 2007 Expedition Catch Totals

CATCHES	LOCATION	NEW	RE-TRAP	TOTAL	Comments
11/11/2007	Broome	249	47	296	
12/11/2007	Broome	314	64	378	
13/11/2007	Broome	282	64	346	(including 1 tern)
14/11/2007	Broome	140	48	188	
Sub-total		***985***	***223***	***1208***	
16/11/2007	80 Mile Beach	7	-	7	
17/11/2007	80 Mile Beach	8	-	8	
18/11/2007	80 Mile Beach	346	7	353	(including 1 tern)
19/11/2007	80 Mile Beach	76	1	77	(including 12 terns)
20/11/2007	80 Mile Beach	103	11	114	(including 1 tern)
21/11/2007	80 Mile Beach	99	3	102	(including 37 terns)
22/11/2007	80 Mile Beach	557	38	595	(including 1 tern)
23/11/2007	80 Mile Beach	162	18	180	
24/11/2007	80 Mile Beach	332	17	349	
Sub-total		***1690***	***95***	***1785***	
26/11/2007	Broome	247	61	308	
26/11/2007	Lake Eda	229	14	243	(including 12 terns)
27/11/2007	Broome	293	114	407	(including 2 terns)
28/11/2007	Roebuck Plains	38	-	38	
29/11/2007	Broome	5	2	7	
30/11/2007	Broome	49	1	50	(including 40 terns)
Sub-total		***861***	***192***	***1053***	
TOTAL		**3536**	**510**	**4046**	(including 107 terns)

18 cannon net catches and 1 mist net catch (Lake Eda)

Summary

3939 waders (30 species)

107 terns (seven species)

Excludes other species marked with Broome Bird Observatory bands- Green Pygmy Geese, various ducks, passerines etc.

Table 2. Comparison of Catches during the 2006 and 2007 Expeditions

CATCHES	YEAR	NEW	RE-TRAP	TOTAL
Broome	2006	857	174	1031
	2007	985	223	1208
80 Mile Beach	2006	1619	55	1674
	2007	1690	95	1785
Broome	2006	1120	176	1296
	2007	861	192	1053
TOTAL	**2006**	**3596**	**405**	**4001**
	2007	**3536**	**510**	**4046**

d) The weather during the expedition, particularly when we were based at Broome, was the hottest yet experienced during our November expeditions. On the second and third days of fieldwork it was the hottest place in Australia (45 and 44°C) and several members of the team suffered various forms of heat stroke. A really pleasing feature of the expedition was the continued development of cannon-net catching techniques which can be successfully employed in such climatic conditions. At Broome only small-mesh cannon nets, from which birds can be extracted extremely quickly, were used. Furthermore on most days one of these was set well down the beach, below the expected high tide mark, and a catch was often made on the rising tide. A second net was set just above the high tide mark and this net was used if the lower net position failed to catch. It was always possible to set the keeping cages on the cooler sand wetted by the previous night's higher tide. And with the large team it was possible to erect shade over the keeping cages more quickly than in the past. The net result was that we experienced no heat stress problems with any of the waders caught.

These small mesh, three cannon, nets introduced in the last two years, have enormously improved the

Table 3. NWA 2007 Expedition - Wader and Tern Catch Details

SPECIES	Catch Totals		
	New	**Retrap**	**Total**
Great Knot *Calidris tenuirostris*	1219	193	1412
Curlew Sandpiper *Calidris ferruginea*	521	46	567
Bar-tailed Godwit *Limosa lapponica*	330	102	432
Greater Sand Plover *Charadrius leschenaultii*	240	28	268
Red-necked Stint *Calidris ruficollis*	224	41	265
Grey-tailed Tattler *Heteroscelus brevipes*	201	30	231
Terek Sandpiper *Xenus cinereus*	157	15	172
Red Knot *Calidris canutus*	123	12	135
Sharp-tailed Sandpiper *Calidris acuminata*	102	2	104
Ruddy Turnstone *Arenaria interpres*	47	21	68
Common Greenshank *Tringa nebularia*	42	-	42
Little Curlew *Numenius minutus*	38	-	38
Black-fronted Plover *Elseyornis melanops*	22	10	32
Black-winged Stilt *Himantopus himantopus*	25	1	26
Wood Sandpiper *Tringa glareola*	19	-	19
Grey Plover *Pluvialis squatarola*	15	2	17
Long-toed Stint *Calidris subminuta*	16	1	17
Red-capped Plover *Charadrius ruficapillus*	14	1	15
Marsh Sandpiper *Tringa stagnatilis*	11	-	11
Red-kneed Dotterel *Erythrogonys cinctus*	11	-	11
Sooty Oystercatcher *Haematopus fuliginosus*	9	1	10
Broad-billed Sandpiper *Limicola falcinellus*	8	1	9
Sanderling *Calidris alba*	8	-	8
Masked Lapwing *Vanellus miles*	8	-	8
Eastern Curlew *Numenius madagascariensis*	5	2	7
Lesser Sand Plover *Charadrius mongolus*	6	-	6
Australian Pratincole *Stiltia isabella*	5	-	5
Black-tailed Godwit *Limosa limosa*	1	2	3
Oriental Plover *Charadrius veredus*	1	-	
Waders (29 species)	**3430**	**509**	**3939**
Terns			
Common Tern *Sterna hirundo*	41	-	41
Gull-billed Tern *Sterna nilotica*	24	1	25
Whiskered Tern *Chlidonias hybridus*	15	-	15
White-winged Black Tern *Chlidonias leucopterus*	13	-	13
Crested Tern *Sterna bergii*	7	-	7
Lesser Crested Tern *Sterna bengalensis*	5	-	5
Roseate Tern *Sterna dougallii*	1	-	1
Terns (7 species)	**106**	**1**	**107**
Total	**3536**	**510**	**4046**

catching efficiency and safety of cannon-netting operations in north-west Australia. At 17 to 20 m. long and a full 10 m. wide they are larger than earlier small-mesh nets which were powered by only two cannons. They have a much more adequate reach and can be fully camouflaged with sand and still go out fully on the jump ropes, unless firing into the wind. However they proved less satisfactory on the vast open spaces and flat profile of 80 Mile Beach and after two relatively unsuccessful attempts there we returned to using the old-style 30 m. x 13 m. large mesh four cannon nets.

e) A total of 509 waders already carrying bands were recaptured during the expedition. This represents a retrap rate of 12.9% overall. There was however a marked difference in the retrap rates between Roebuck Bay, Broome (18.3%) and 80 Mile Beach (5.3%). This reflects the much larger wader populations present at 80 Mile Beach and the more sustained banding efforts throughout each year at Roebuck Bay.

A particularly welcome feature of this year's expedition was the unprecedented number of Chinese-banded birds recaptured – nine Great Knot, a Bar-tailed Godwit and a Curlew Sandpiper (Table 4). Many additional Chinese-flagged birds were also seen in the field. This is the result of the hugely successful wader banding activities at Chongming Dao, in the Yangtse Estuary near Shanghai, over the last four years.

In addition a Bar-tailed Godwit originally banded in Hong Kong was also caught (twice, on successive days, at different locations some five km. apart). Two Great Knot and a Grey-tailed Tattler originally banded at Broome were recaptured at 80 Mile Beach and several Great Knot, Red Knot and Bar-tailed Godwit with

Table 4. Oldest Recaptures during NWA 2007

SPECIES	DATE BANDED	BANDING LOCATION	AGE AT BANDING	RETRAP DATE	RETRAP LOCATION	MINIMUM AGE AT RETRAP
Greater Sand Plover	24/09/1992	80 Mile Beach	3+	23/11/2007	80 Mile Beach	17
Ruddy Turnstone	1/09/1992	Roebuck Bay	2+	27/11/2007	Roebuck Bay	16
Ruddy Turnstone	31/03/1994	Roebuck Bay	2+	27/11/2007	Roebuck Bay	15
Ruddy Turnstone	27/03/1990	Roebuck Bay	2+	27/11/2007	Roebuck Bay	19
Grey-tailed Tattler	13/10/1992	Roebuck Bay	3+	27/11/2007	Roebuck Bay	17
Terek Sandpiper	17/04/1994	Roebuck Bay	2+	12/11/2007	Roebuck Bay	15
Bar-tailed Godwit	3/10/1992	Roebuck Bay	2	26/11/2007	Roebuck Bay	17
Bar-tailed Godwit	26/07/1991	Roebuck Bay	1	27/11/2007	Roebuck Bay	17
Bar-tailed Godwit	9/04/1990	Roebuck Bay	1+	27/11/2007	Roebuck Bay	18
Great Knot	8/04/1990	Roebuck Bay	2+	11/11/2007	Roebuck Bay	19
Great Knot	5/03/1994	Roebuck Bay	2+	11/11/2007	Roebuck Bay	15
Great Knot	12/10/1992	Roebuck Bay	2+	11/11/2007	Roebuck Bay	17
Great Knot	23/03/1988	Roebuck Bay	2+	27/11/2007	Roebuck Bay	21
Red-necked Stint	13/10/1992	Roebuck Bay	3+	12/11/2007	Roebuck Bay	17
Curlew Sandpiper	2/04/1990	80 Mile Beach	1	22/11/2007	80 Mile Beach	18

engraved flags or individual colour band combinations put on at Broome were seen at 80 Mile Beach. This suggests that the movements between these two locations, 200 km. apart, may be slightly more frequent than we've previously detected.

During the expedition 15 birds with a minimum age of 15 years were retrapped – four Great Knot, three Bar-tailed Godwit, three Ruddy Turnstone, a Grey-tailed Tattler, a Terek Sandpiper, a Curlew Sandpiper, a Red-necked Stint and a Greater Sand Plover (Table 4). The oldest was a Great Knot now at least 21⅓ years old. The next two oldest birds were another Great Knot and a Ruddy Turnstone which were more than 19 years old.

f) Good catch samples were obtained of all the nine species for which we attempt to monitor breeding success annually via the percentage of juveniles (Table 5). Overall it seems to have been a much better breeding year in 2007 for the wader populations which spend their non-breeding season in north-west Australia. 2006 was an exceptionally poor year for breeding success so this was a welcome improvement.

Particularly important was the very high proportion (28.7% against a nine-year average of 17.0%) of juvenile Curlew Sandpipers. This species has suffered a large and sustained reduction of population size (- 75%) over the last 25 years, at least partly the result of below average breeding success rates, and this good result for 2007 should help halt that trend. It was most noticeable at 80 Mile Beach that Curlew Sandpipers were more numerous than usual and this was borne out by the counts carried out by Chris Hassell et al just prior to the expedition.

Four other species had good (i.e. significantly above average) breeding success, and two more had average breeding success. Only Bar-tailed Godwit (6.0% juvenile) and Ruddy Turnstone (10.3% juvenile) seem to have fared poorly in the 2007 Arctic breeding season.

Comments have been made in previous reports and elsewhere about the problems of obtaining accurate percentage juvenile data because of the sometimes non-homogenous distribution of juveniles and adults in the high tide roosting flocks. There were some particularly good examples of this in Great Knot. Two good catches at Broome, only two days apart, had 7.3% juveniles in one catch (of 259 birds) and only 1.1 % (in a catch of 183) at a location only four km. away on the northern beaches of Roebuck Bay, only two days later. Another example occurred at 80 Mile Beach on the 18th November when two nets 100 m. apart were both fired and the catches were kept separate. 52% of the 107 Great Knot from one net were juveniles but only 23% of the 168 in the other net. In all species we try to maximise the numbers of catches we make at a variety of locations so that, hopefully, these flock segregations are evened out.

g) Engraved leg flags, primarily intended for survival rate determination, were again placed on most shore waders caught at Roebuck Bay (except Red-necked Stint). This year a number of species were added to the target list and these included the use of engraved leg flags at inland locations such as Lake Eda. Thus species such as Black-winged Stilt, Masked Lapwing, Wood Sandpiper and Gull-billed Terns were fitted with engraved flags for the first time and Marsh Sandpipers and Greenshank at inland locations.

Intensive observations by Alice Ewing (whose Melbourne University Ph.D. is centered on survival rate determination for four key species), Chris Hassell, Adrian Boyle and others have now resulted in some 80% of birds marked with engraved leg flags (ELFs) being re-sighted. In addition Chris Hassell, on behalf of Theunis Piersma, is individually marking Bar-tailed Godwit, Great Knot and Red Knot with colour-band combinations, in a parallel study. Whilst most re-sightings are intentionally made at or close to the original marking location there have now been nearly 100 sightings of ELF and colour-banded birds overseas, thus adding valuable recovery data on migration routes and stopover locations.

Table 5. % Juveniles in N.W. Australia Cannon-net Catches 11-30 Nov 2007

SPECIES	No. of Catches	Total Catch	Total Juv.	% Juv.	Average % Juv 98/99-06/07	Assessment of 2007 breeding success
Great Knot	13	1412	180	12.7	9.8	Good
Bar-tailed Godwit	11	432	26	6.0	8.9	Poor
Red Knot	10	135	31	23.0	16.9	Good
Grey-tailed Tattler	7	231	57	24.7	17.1	Good
Terek Sandpiper	7	172	22	12.8	12.7	Average
Curlew Sandpiper	12	565	162	28.7	17.0	Very good
Red-necked Stint	4	264	54	20.5	23.2	Average
Ruddy Turnstone	1	68	7	10.3	13.1	Poor
Greater Sand Plover	9	268	73	27.2	22.3	Good

h) By coincidence, rather than design, interesting or unusual birds have quite frequently been seen during north-west Australia expeditions e.g. Spotted Redshank, Blue and White Flycatcher, Arctic Warbler (in 2006). And everyone has always been hoping they would see another Nordmann's Greenshank following the one seen last year by Adrian Boyle when counting on 80 Mile Beach.

This year it was Chris Hassell's turn to come up trumps. During a "twinkle" on 80 Mile Beach he spotted a Eurasian Curlew, the first for Australia. It was seen well by many of the twinkling team, and photographed. Most of the rest of the team were also able to see the bird later that day or on the following day.

i) John Curran and a team from the Australian Quarantine and Inspection Service again accompanied us in the field, on 14 days, and collected a large number and variety of cloacal swab and blood samples for analysis for avian-borne diseases.

Overall the incidence of any form of avian-borne disease is very low and no examples of the highly pathogenic H5N1 Avian Influenza have been found.

j) Rather fewer terns (107) were captured during this year's expedition, although the variety was still nice (seven species). Only one Roseate Tern was present with the 34 Common Terns caught near Broome Port on 30th November. Time pressures prevented a greater effort to catch terns, even though there were excellent Gull-billed Tern catching opportunities on the Crab Creek beaches and Little Tern catching opportunities at Quarry Beach (and probably Common/Roseate Tern catching opportunities on the beaches north of Broome).

OTHER MATTERS

Participants

Thirty-six people from seven different countries participated with almost half (17) being from overseas. Additionally several people, mostly resident in Broome, assisted us on occasions. Origins were as follows:

19 Australia (7 Vic, 4 WA, 3 SA, 3 ACT, 1 NSW, 1 Qld)
5 U.K.
4 China
4 USA
2 New Zealand
1 Japan
1 Nigeria

It was particularly pleasing to have with us representatives from the two main wader locations in China – Ma Qiang from Chongming Dao and Zang Guangming from Yalu Jiang. It was also rewarding that Yahkat Barshep, a Nigerian student undertaking a Ph.D. on Curlew Sandpipers at the Avian Demography Unit in Capetown, South Africa should visit NWA in what turned out to be a "good" year for that species.

There were two other welcome features of the team in November 2007. Thirteen (over a third) of the participants were "younger generation" (i.e. under 40!). Secondly there were a good number of really experienced wader people from Australia and overseas, many of whom had been on NWA expeditions many times previously. This blend of age and experience was a perfect mix and lead to the high level of efficiency, satisfaction and enjoyment of this particular expedition.

The complete list of participants is given later in this report.

Itinerary

Nine days were spent at Broome/Roebuck Plains (based at Broome Bird Observatory), nine days at 80 Mile Beach/Anna Plains (based at Anna Plains Station) and two days were occupied with transferring between these locations.

Finances

The estimated income is $31,103 and the total expenditure is likely to be around $30,000, giving a comfortable surplus which will be carried forward for future expeditions.

The final outcome for the NWA 2006 Expedition was an income of $29,788 and an expenditure of $29, 678, i.e. within $110 of the targeted break-even situation.

Equipment

The cannon-netting and associated equipment in NWA has been steadily improved, especially in recent years, and we strongly benefited this year in terms of catching success and

the efficiency of banding and processing of catches. Now that the small mesh three-cannon nets have been proved to be extremely suitable for Broome conditions a further net will be purchased.

Habitat Creation and Maintenance

The lagoon specially created near Anna Plains Station in 2006 was filled with water by the station before our arrival. 200 Brolgas used it each day, with small numbers of various waders. However the overall Little Curlew population in the area was too low for it to have become a prime 'heat of the day' roosting location at which we could try to cannon-net this species.

Subsequent to our departure the ever-rapidly growing bush around part of the Hot Bore Pool was cleared by the Anna Plains grader to enable the area to remain suitable for birds which prefer open areas for their drinking/roosting locations (Brolgas, Little Curlew etc.). This pool remains a jewel in the crown as far as bush and water birds are concerned, and also for birds of prey.

Passerines

A total of 64 birds of ten species were caught in three early morning mist-netting sessions at Anna Plains Hot Bore Pool. This was rather fewer than usual, but did contain a Pallid Cuckoo and other species which had not been seen in the hand previously by many members of the expedition. Also, the Tawny Frogmouth banded there last year was still present (with its mate) and the metal band number was read in the field!

Next Expedition

It is planned that we continue with NWA monitoring expeditions in November each year, though additional expeditions at other times may occasionally take place (?June 2009). The November 2008 expedition will take place from Saturday 8th November to Saturday 29th November. It is hoped that the main team can be identified by next April and therefore it is not too early to put your hand up (at least tentatively) now!

ACKNOWLEDGEMENTS

Every member of the expedition contributed in a hugely effective way to this year's expedition. It is invidious to mention names but four in particular stand out. Chris Hassell and his team of helpers with the cannon-netting equipment did an incredible job, often in extremely hot conditions, in sorting equipment out after each catch and preparing everything for the next day's fieldwork. Maureen Christie was her usual dedicated self in planning and organising all of the catering activities. Helen Macarthur is thanked for the initial purchasing of food supplies and cooking a meal on the first night. Frank O'Connor spent almost all his time at base camp leading teams of people making leg flags, so that we did not run out of these in the field. Finally Roz Jessop undertook the laborious task of putting all the field data into the Banding Data Base.

We again enormously thank those who assisted the expedition with accommodation and various permissions. Two separate periods were spent happily based at Broome Bird Observatory. John, David and Helen Stoate at Anna Plains Station provided *two* houses for us to use this year as well as even more refrigeration space. The swimming pool was also used more extensively than ever, because of the exceptionally hot conditions and probably because of the large younger component in the team.

The financial viability of the expedition was greatly assisted by Clive Minton, Maureen Christie, Pete Collins, Chris Hassell, Sue Abbots, Maurice O'Connor and Alice Ewing providing their vehicles for use during the expedition.

The group also greatly thanks Chris Hassell, Broome Bird Observatory, George Swann, the WA Department of Environment and Conservation and the Australian Quarantine and Inspection Service for kindly loaning trailers. These were particularly vital for the visit to 80 Mile Beach/Anna Plains and the high quality of the trailers this year meant that, for almost the first time ever, we experienced no breakdown/puncture dramas en route.

The WA Department of Environment and Conservation is also greatly thanked for its generous financial support of two of the participants from China. BBO also kindly provided free accommodation for these two visitors. AQIS made a generous contribution to costs in recognition of our assistance in providing birds for disease testing. Ian and Halina Newton, and Chris Hassell, also made most welcome donations.

List of Participants

Australia:	
VIC	Clive Minton, Roz Jessop, Prue Wright, Alice Ewing, Peter Jenkins, Xenia Dennett, Diane Emslie
WA	Chris Hassell, Frank O'Connor, Maurice O'Connor, Sue Abbots
SA	Maureen Christie, Justine Keuning, Bek Christensen
ACT	Peter Fullagar, David Drynan, Vicki Cronan
NSW	Rachel Blakey
Qld	Paul Barden
UK:	Brian Little, Nik Ward, Hugh Hanmer, Ian and Halina Newton
China:	Ma Qiang, Zhang Guangming, Li Jing, Ji Qiu
USA:	Larry Niles, Mandy Dey, Sue Rice, Dick Holmes
New Zealand:	David Melville, Julia Melville
Japan:	Naoko Takeuchi
Nigeria:	Yahkat Barshep

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Deadlines:

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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