VICTORIAN WADER STUDY GROUP

STUDY GROUP

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BULLETIN NO. 8 MAY 1984

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EDITORIAL

It is customary for editors to apologise for late publication. However the material must be there to publish and for the present we live from hand to mouth. We hope before too long to have a stock pile of articles. This would help not only eliminate erratic publication but would also reduce the stress felt by editors who watch the closing dates come and go without anything to put together. Not that we want the stock pile to become too big : delay between submission and publication can lead to negative thoughts about editors.

Readership is not confined to members of the VWSG, the Bulletin finding its way to many organisations, groups and individuals throughout Australia and overseas : we would like to hear from them.

The Bulletin does not wish to restrict itself to recording the activities of the VWSG and to publishing its findings, although this should remain its primary purpose. We are trying to encourage contributions from as many people as possible, non-members as well as members. The scope is enormous and could cover not only papers on research work, on the techniques of catching and processing, on sexing and ageing but also field notes and short reports on interesting sightings and behaviour, on promising areas for future field-work, on sightings or recoveries of colour-dyed birds and on new publications. In fact anything that is relevant and interesting.

Twitchers and others may wish to bone up for next season on the Buff-breasted Sandpiper: there have been two unchecked reported sightings, one at Point Cook and another, in late Summer, at Seaford Swamp.

For the next two years or so we will have a man in Thailand. Jon Stark left recently to help in the Interwader South-east Asia Study Project and has promised to keep in touch and to let us know about his work and experiences. As he will be taking part in a wader catching and ringing programme it may not be too bold for us to hope for some sightings or recoveries of our own birds.

On 1 July 1984 responsibility for the Australian Bird-Banding Scheme and Australian Bat-Banding Scheme will be transferred from the CSIRO to the Australian National Parks and Wildlife Service. How this, and the possible radar-tracking of migrating birds and a national computer data system, will affect our lives is difficult to say.

PRELIMINARY RESULTS FROM BANDING LATHAMS SNIPE (GALLINAGO HARDWICKII) IN SOUTHERN VICTORIA

by Brett A Lane & Berrice S Forest

INTRODUCTION

Between 1958 and 1983 only 498 Lathams Snipe (Gallinago hardwickii) had been banded in Australia. The numbers banded in each state are; Queensland, 1; New South Wales, 237; Australian Capital Territory, 4; Victoria, 82 (plus 20 in Feb. 1984); South Australia, 2 and Tasmania, 171. Lane (1978) describes results from New South Wales and Milledge (1975) from Tasmania.

The VWSG together with one of the authors (BSF) banded 95 between 17th February, 1979 and 19th February, 1984. Not much is known of the migration strategy of this species. A review of aspects of the species biology was undertaken by Frith, Crome and Brown (1977) based on detailed examination of 501 specimens collected in the Cooma - Jindabyne area and at Raymond Terrace in New South Wales. More recent work by the Tasmanian National Parks and Wildlife Service (summarized in Naarding, 1983) and in South Australia (Cox 1978) has shown that its population probably numbers in the vicinity of 20,000. Furthermore, Naarding (1983) thinks that most of these reside in Victoria during the non-breeding months. Research on this species in Victoria is thus of considerable importance to understanding the species and in the formulation of a conservation programme.

This paper presents an analysis of the weight, primary moult and morphometric data collected during the course of banding in southern Victoria. As well, the northward migration strategy of this species is discussed. Table 1 shows that most have been caught at Seaford Swamp in the outer south-eastern suburbs of Melbourne and more recently at Point Henry near Geelong.

METHODS

Catching Technique

Lathams Snipe were best caught just before dawn. Large mesh (2 1/4 inch) mist nets were better than smaller mesh nets as the birds can walk out of the pockets of the latter. Nets were set in marshy ground where snipe were known to occur, the preceeding afternoon and closed overnight. Well before first light they were opened and about an hour later - just before dawn - birds which had arrived from their nocturnal feeding area were flushed. Some of the birds in the area were caught. There should, if possible, be over 50 birds in the area for all the effort to yield a worthwhile result. Nets were placed at right angles to one another in various places where the snipe were known to occur in highest density. They caught better if placed near to tall vegetation such as reed beds. The arrangement of the nets however varied with the site, as snipe can behave differently. Different techniques are still being tried in an effort to improve the catch rate.

Data Collection

Birds caught were banded (CSIRO stainless steel, size 6) and the following measurements taken; wing length, culmen length, total head length, weight and primary moult. Recently, tarsus, tail length, and moult in other feather tracts have been recorded. For a full description of these techniques see Roberts (1982). Insufficient data are yet available for analysis of these more recent data.

RESULTS AND DISCUSSION

Weight

Table 2 gives the sample size, mean, standard deviation and range for the non-migration period (Sept. to Nov.) and four periods of a fortnight to three weeks leading up to their expected departure in mid to late February (Naarding, 1983). A small number of birds were putting on weight by the second half of January. However, at no stage after this time were birds caught weighing as much as those examined by Frith et al at Raymond Terrace (central northern New South Wales) in March. Frith et. al. found the following for Raymond Terrace in March; males: sample size, 12; mean, 229g; standard deviation, 30; range, 175g-277g; females: sample size, 12; mean, 234g; standard deviation, 19; range, 203-272. These weights are about 36% heavier than the departure weights of birds in southern Victoria. Interestingly, Frith et. al. found in the Cooma-Jindabyne area of New South Wales a similar level of limited pre-migratory fattening prior to their earlier mid to late February departure from this area. Frith et al proposed that:

> "These data suggest that although birds in the highlands (Cooma-Jindabyne area) had started pre-migratory fattening, the bulk of fattening takes place in coastal and/or more northern areas...."

Figure 1(a) and 1(b) based on data tabulated in Naarding (1983) show that the vast majority of Latham's Snipe have left the study sites by the end of February. Data presented by Naarding show that they have also left most other sites in Victoria and Tasmania by this time. In all probability, the Lathams Snipe at Seaford Swamp and Point Henry and possibly throughout Victoria, southern New South Wales and Tasmania are only fattening enough to enable them to fly to another pre-migratory fattening area probably further north. Using the non-migration period mean weight of 157.1g and a probable take off weight of about 190g (the upper range of weights in January and February) the flight range of most snipe can be calculated using the formula proposed by McNeil and Cadieux (1972). This yields a probable flight range of about 2,200 kilometers. They could therefore easily reach parts of eastern Queensland where they have been recorded on migration. By comparison the Raymond Terrace birds could fly about 4,900 kilometers, assuming a take-off weight of 245g. This would enable them to reach the Phillipines where they have been recorded on migration (McClure, 1968).

The Cooma-Jindabyne results and those for this study in southern Victoria show that the bulk of the population (i.e. that in Victoria) uses a more northerly fattening area within eastern Australia. Thus, to conserve the population, both Victorian and more northerly habitats

must be preserved.

There is a distinct possibility that the northern migration is protracted with birds progressively putting on weight as they move northwards. This is supported by Gill's data (in Frith et al, 1977) (see Figure 1(c)), showing the main northward passage in March and April.

The strategy of using areas further north in eastern Australia for the bulk of pre-migratory fattening could be a response to the seasonal conditions of wetlands. In March, many wetlands in south-eastern Australia are in the final stages of drying out after the dry summer. In contrast, those to the north have recently filled as a result of the wet season there and are presumeably very productive enabling snipe to build up fat reserves rapidly.

If the Lathams Snipe can fly to the Phillipines from as far south as Raymond Terrace, they need only fatten to a weight of about 195g in the Phillipines before completing their migration to Japan. Since the data for Raymond Terrace suggest that they can put on weight at a rate approaching two grams per day, they would need only 18 days at most in the Phillipines to do this before departing. Therefore, birds departing northern New South Wales in March would be capable of reaching Japan by early April, the date they in fact arrive there (Frith et al, 1977). This scheme is illustrated in Figure 2.

Clearly the main pre-migratory fattening areas in New South Wales and Queensland as well as in the Phillipines need to be identified. Furthermore, the extent of pre-migratory fattening in areas of Queensland should be studied. Nothing is known of the species' southward migration strategy.

Moult

Table 3 shows the proportion of Latham's Snipe in primary moult at various times of year. These data concurred with those of Frith et al (1977) for the timing of the end of the moult. Birds began moulting soon after they arrived in September and the majority have completed moult by mid-January at which time they were starting to fatten for migration. A similar relationship between moult and pre-migratory fattening was found in other migratory waders handled by the VWSG. Samples were not large enough to enable a more detailed analysis.

Morphometrics

Figure 3 shows the frequency distribution of culmen (a), total head (b) and wing length in non-moulting birds caught in January and February (c). Table 4 gives the relevant statistics. Although Frith et al (1977) found a significant difference in wing length between the sexes on preserved birds they found none on the field measurement. They did find a significant difference in culmen length between the sexes. Total head length is the only measurement in this sample to show a good bimodal distribution. Using graphical techniques described by Griffiths (1968) the relevant statistics for the two sexes was ascertained. Using Chi-squared tests the expected distribution of values derived from three possible points of inflexion (P values of 43%, 44% and 45%) was compared to the observed values. The lowest Chi-squared value was obtained for a P value of 44%. The sample therefore, most probably represents 28 males and 36 females.

The statistics are presented in Table 5. Total head length is the best measurement to take for sexing other waders (e.g. Eastern Curlew, Numenius madagascariensis, Rogers, 1982) and other birds (see Coulson et al, 1983). More data need to be collected before a final assessment can be made. Frith et. al. found there was a significant difference between the sexes in the length of the outer tail feather. This is related to display behaviour on the breeding grounds. This measurement should therefore be taken in future.

CONSERVATION AND FUTURE RESEARCH

Lathams Snipe enjoy complete protection in New South Wales and South Australia. In Victoria and Tasmania they are still shot, although the season has been postponed this year (1984) awaiting the results of current government research. In Queensland, where they occur on passage, there is still an open season. In view of the very likely possibility that a substantial proportion of the population is touching down in Queensland on migration as the results of this work suggest, the open season there should be reviewed.

There is a need to catch and band more Lathams Snipe in Australia. In Victoria, this is particularly neccessary in the months leading up to the pre-migratory fattening period in order to document more fully the moult of the birds. There is a need to identify more stringent ageing criteria based on plumage and soft parts, something which can be facilitated by catching juveniles soon after they arrive and are obvious because of their fresh plumage.

These results show that work is needed in New South Wales and Queensland to identify important pre-migratory fattening areas and to band birds and determine the extent of pre-migratory fattening. More research in Tasmania is needed to determine where they are capable of flying to from that state.

ACKNOWLEDGEMENTS

Our thanks go to members of the Victorian Wader Study Group who assisted with catching operations; John Dawson, Angela and Ros Jessop, Bruce Male, Clive Minton, Ken and Annie Rogers and family and Jon Starks. Ken Rogers assisted with the statistical analysis and with Stephen Davies, commented on a draft of this paper.

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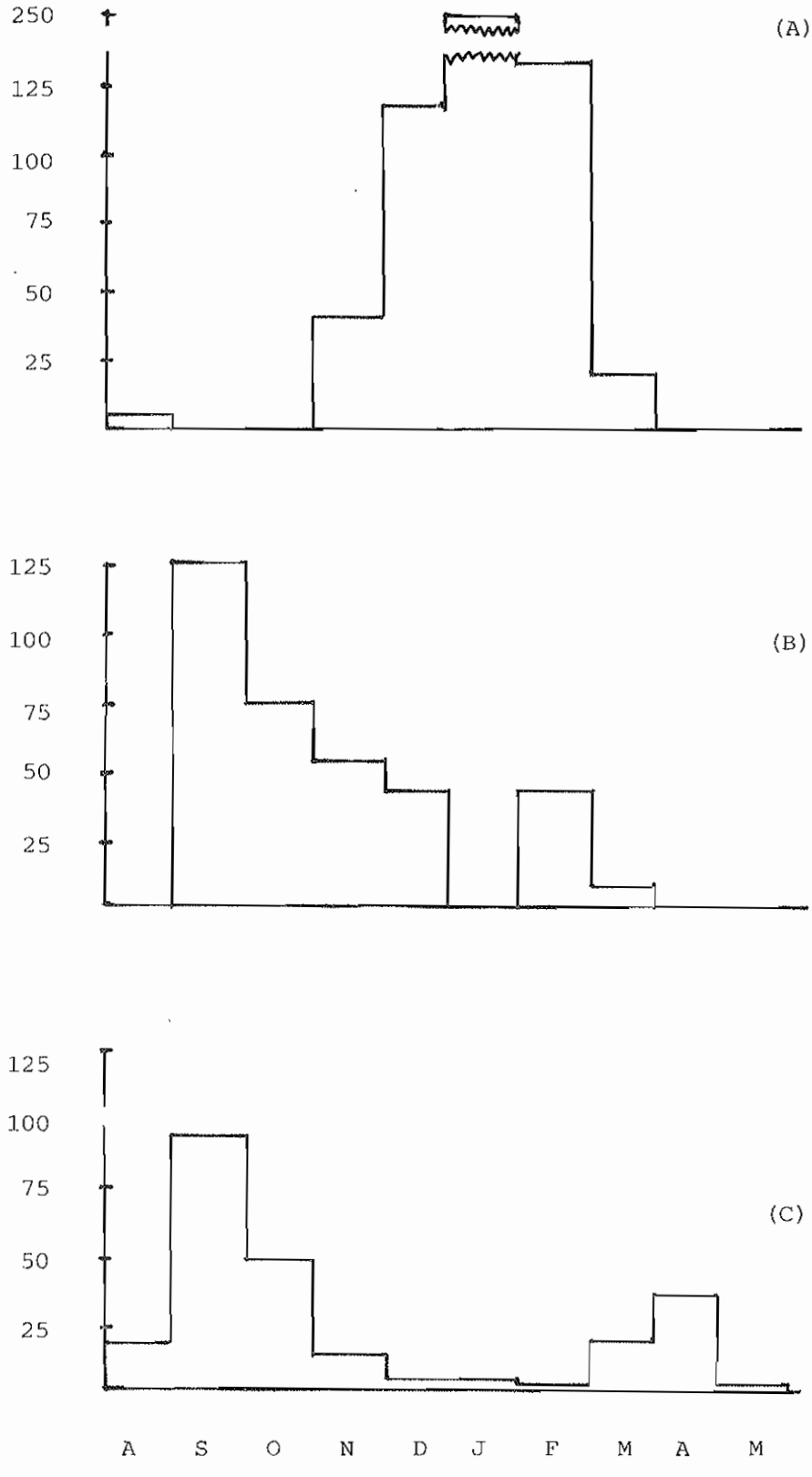
FIGURE 1: FLUCTUATIONS IN NUMBERS OF LATHAM'S SNIPE



(A) = Seaford Swamp, maximum monthly counts (1979-81, BOC data from Naarding, 1983

(B) = Point Henry, same data and source

(C) = Innisfail, North Queensland, from data by Gill in Frith et al (1967)

FIGURE 2: SCHEMATIC REPRESENTATION OF THE ANNUAL CYCLE OF LATHAM'S SNIPE.

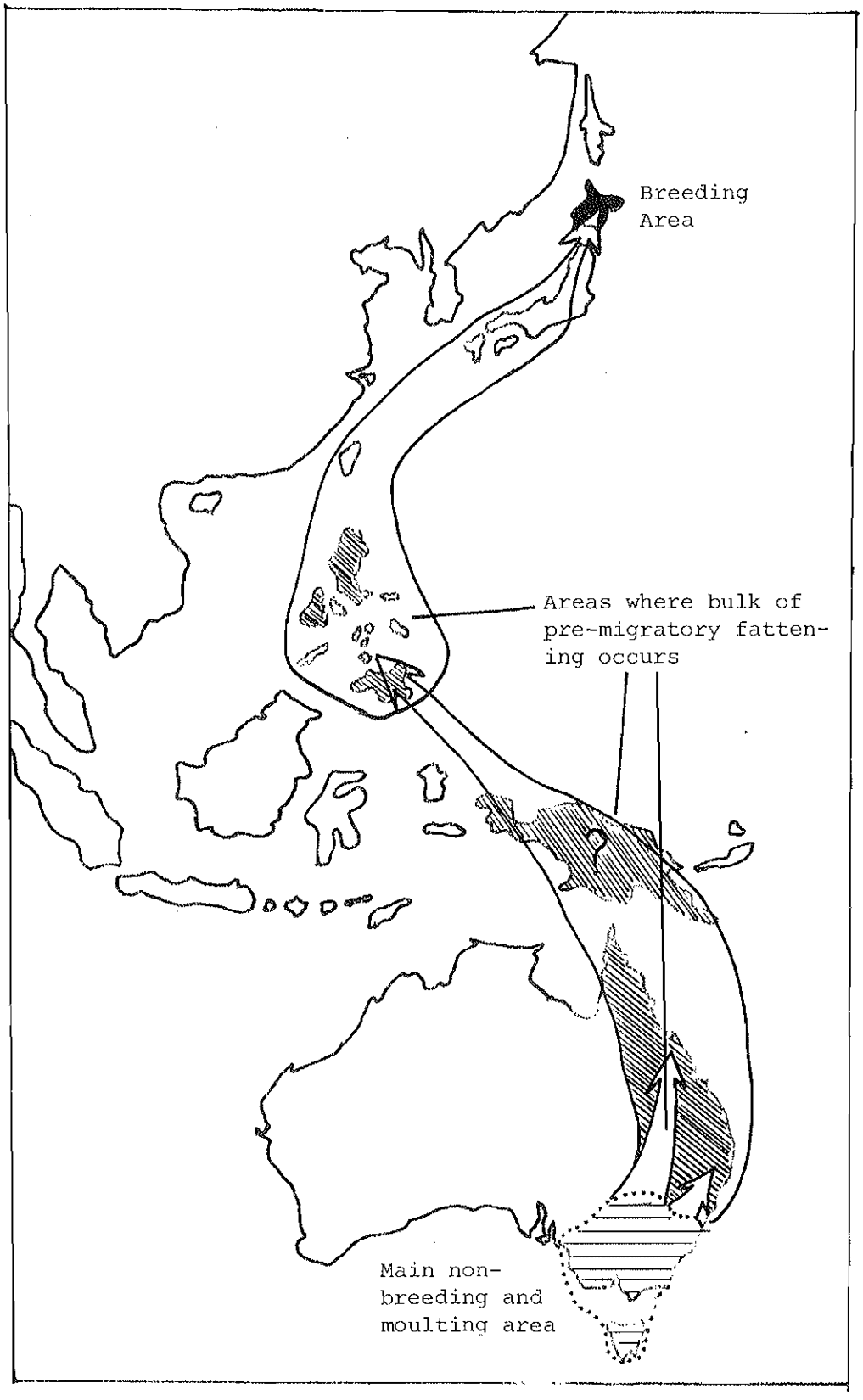


FIGURE 3: CULMEN, TOTAL HEAD AND WING LENGTH FOR LATHAM'S SNIPE CAUGHT AT SEAFORD SWAMP AND POINT HENRY (in MM.)

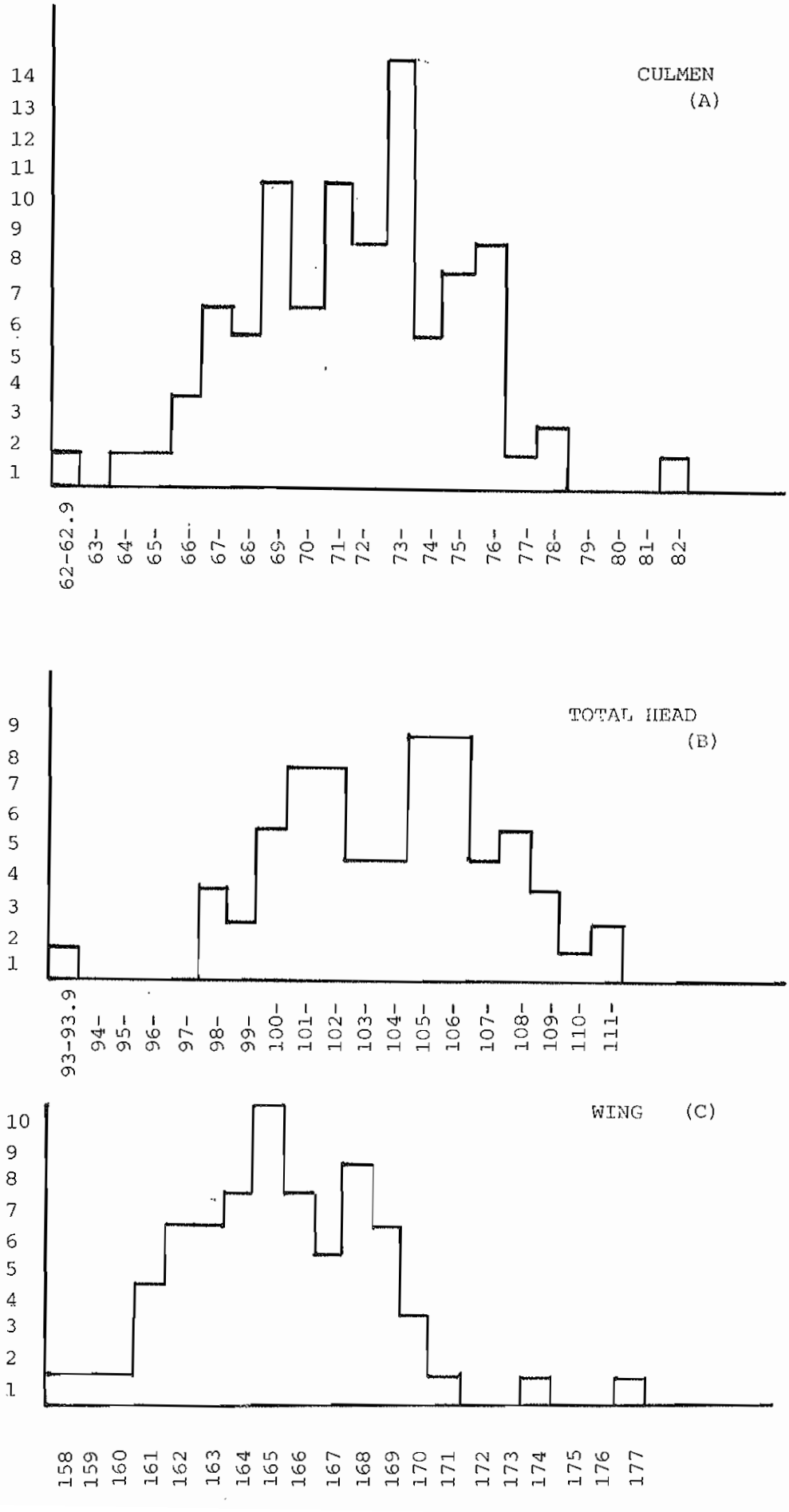


TABLE 1: CATCHES OF LATHAMS SNIPE BY VICTORIAN WADER STUDY GROUP

PLACE	DATE	NUMBER OF SNIPE CAUGHT
Seaford Swamp	17 Feb 1979	20
Rhyll, Phillip Is.	16 Oct. 1980	1
Seaford Swamp	15 Nov. 1980	5
" "	9 Jan. 1982	4
" "	17 Jan. 1982	9
" "	30 Jan. 1983	15
" "	19 Sep. 1982	6
" "	9 Oct. 1982	2
" "	29 Jan. 1983	8
Point Henry	29 Dec. 1983	5
" "	19 Feb. 1984	20
TOTAL		95

TABLE 2: WEIGHT VARIATION IN LATHAMS SNIPE (grams).

DATE	Sep.-Nov.	29 Dec.-9 Jan.	17 Jan.	29-30 Jan.	17-19 Feb.
Number	14	9	9	23	40
Mean	157.1	162.7	170.8	169.9	169.7
Standard Deviation	8.705	7.710	13.148	13.040	10.918
Range	144-176	146-173	151-197	147-203	152-193

TABLE 3: PROPORTION OF SNIPE IN MOULT

DATE	Sep.- Nov.	Dec.-Jan.	Feb.
Proportion	100%	26%	8%

TABLE 4: CULMEN, TOTAL HEAD AND WING LENGTH STATISTICS FOR LATHAM'S SNIPE AT SEAFORD SWAMP AND POINT HENRY.

STATISTIC	CULMEN	TOTAL HEAD	WING
Number	89	64	68
Mean (mm)	71.54	103.89	165.5
Standard Deviation	3.500	3.604	3.392
Coefficient of Variation (mean/s.d. x 100)	4.89	3.47	2.05

TABLE 5: TOTAL HEAD LENGTH STATISTICS FOR LATHAM'S SNIPE, MALE AND FEMALE

	n	Mean	Standard Deviation	Coefficient of Variation
MALE	28	101.5	2.173	0.0214
FEMALE	36	106.65	2.462	0.0231

FIELDWORK - JULY TO DECEMBER 1983

The total of waders caught in July to December 1983 was the lowest in any half year period since the VWSG was formed in late 1978. This was the result of three factors.

(a) the deliberate policy of aiming for selective catches of specific species rather than mass catches of the commoner smaller waders

(b) the absence of the cannon netting equipment (and key team members) on the N.W. Australia Wader Expedition for much of October and November

(c) failure to make the planned large Rednecked Stint and Curlew Sandpiper catches at Yallock Creek, Werribee and Queenscliff in late November/first half December. This was due to weather conditions ('sanded up' and then 'flooded out' at Queenscliff), equipment failure (cartridge failing to fire at Werribee), and a larger than normal dose of 'bad luck', poor judgement and unco-operative birds!!!

However, there were successes as well - in fact the period began with a huge success of 236 birds at Stockyard Point, Westernport, on 24th July. This was the largest 'winter' catch ever. It contained 106 Curlew Sandpipers - our previous grand total for the May to July period was 8! - and 74 Red Knot (the first ever in the May to August period). All were one year old birds. The cream was provided by 48 Doublebanded Plovers - more than doubling the previous grand total caught in Westernport Bay. To cap it all, there was dream weather - calm, sunny and warm - which made the 1½ mile carry of the equipment more tolerable.

A good catch of Double banded Plovers was missed at Point Wilson in late July when the wrong net was accidentally fired - red faces all round! Amends were made, however, on the 6th August when, after a superbly patient twinkle by Ira Savage, 56 Double banded Plovers were caught. Two of these birds subsequently turned up at Lake Tekapo in New Zealand - one only five weeks after banding and whilst Brett Lane was visiting the area.

A useful early catch of returning migrant waders was made at Werribee on 4th September - 80 birds, with nice samples of 35 Curlew Sandpipers and 19 Sharptailed Sandpipers. Mist netting at North Spit, Werribee, on 8th October - a time when a satisfactory Curlew Sandpiper sample is still lacking - was most unrewarding with only 52 birds caught (and 48 of these were Rednecked Stints) in spite of 27 nets being set and weather conditions being ideal. The location for mist netting was switched to the Little River Mouth for the early December visit to Werribee- with even less success (4 birds). The productive mist netting of 1978-79 (100-400 birds per night) does not appear reproducible at the present time, for reasons which are not apparent.

Two attempts to catch Eastern Curlew at Yallock Creek in late November proved abortive - on the evening tide the birds departed southwards towards Stockyard Point to roost, and on the following morning 200 of them stood all round the catching area for two hours without ever entering it - wise old owls, sorry-Curlew.

Seaford Swamp remained too dry for Latham's (Japanese) Snipe in the spring and early summer. However, the year ended with the first successful catch of Snipe (5) at Point Henry, Geelong, on 29th December.

CLIVE MINTON

WADER BANDING TOTALS

CATCHES IN VICTORIA - JULY TO DECEMBER, 1983

	NEW	RETRAP	TOTAL
Pied Oystercatcher	2	-	2
Masked Lapwing	1	-	1
Doublebanded Plover	109	16	125
Latham's Snipe	5	-	5
Bartailed Godwit	12	-	12
Red Knot	75	-	75
Sharptailed Sandpiper	19	-	19
Rednecked Stint	132	50	182
Curlew Sandpiper	174	25	199
Redcapped Plover	1	-	1
	530	91	621

LOCATION OF WADERS CAUGHT IN VICTORIA

	TO JUNE 1983	JULY-DEC 1983	TOTAL
Werribee	19,952	222	20,174
Westernport Bay	4,560	362	4,922
Queenscliff/ Pt Lonsdale	3,052	13	3,065
Corner Inlet	1,458	-	1,458
Anderson's Inlet	988	-	988
Altona	288	19	307
Bendigo (Sewage Farm)	143	-	143
Seaford Swamp	98	-	98
Mud Island	35	-	35
Seaspray (Lake Reeve)	18	-	18
Geelong (Point Henry)	-	5	5
	30,592	621	31,213

Totals include 27,170 newly banded birds and 4,043 retraps of 29 species.

VICTORIAN WADER CATCHES
1975 to 31 DECEMBER 1983

	NEW	RETRAP	TOTAL
Pied Oystercatcher	189	75	264
Sooty Oystercatcher	4	1	5
Masked Lapwing	109	3	112
Grey Plover	27	-	27
Lesser Golden Plover	38	4	42
Redkneed Dotterel	116	11	127
Hooded Plover	12	1	13
Mongolian Plover	52	2	54
Doublebanded Plover	754	55	809
Large Sand Plover	11	-	11
Redcapped Plover	325	104	429
Blackfronted Plover	47	2	49
Blackwinged Stilt	9	-	9
Rednecked Avocet	58	-	58
Ruddy Turnstone	74	-	74
Eastern Curlew	45	-	45
Greytailed Tatler	3	-	3
Greenshank	1	-	1
Terek Sandpiper	8	-	8
Latham's Snipe	31	-	31
Bartailed Godwit	317	-	317
Red Knot	396	18	414
Great Knot	120	3	123
Sharptailed Sandpiper	1945	40	1985
Little Stint	1	-	1
Rednecked Stint	17044	3102	20146
Longtoed Stint	1	-	1
Curlew Sandpiper	5420	622	6042
Sanderling	13	-	13
	27170	4043	31213

29 species

ANNUAL WADER BANDING TOTALS BY VWSG IN VICTORIA

CALENDAR YEAR	NEW	RETRAPS	TOTAL
1975	9	-	9
1976	616	4	620
1977	482	12	494
1978	1296	42	1338
1979	7436	486	7922
1980	6121	1206	7327
1981	4561	869	5430
1982	3774	796	4570
1983	2875	628	3503
Total catches in Vic to end 1983	27170	4043	31 213

WADER CATCHES IN OTHER STATES IN WHICH VWSG HAS PARTICIPATED

		NEW	RETRAPS	TOTAL
Tasmania (Hobart)	Nov 1979	1244	83	1327
Sth Aust (Adelaide)	Feb 1980	815	5	820
N.S.W. (Newcastle & Botany Bay)	Mar 1981	906	15	921
North West Aust(Broome)	Aug/Sept 1981	1183	6	1189
North West Aust (Broome/ 80 Mile Beach/ Port Hedland)	Aug/Sept/ Nov 1982	3582	124	3706
	Oct/Nov 1983	3471	110	3581
		11201	343	11544

If these birds, handled during joint operations with local groups in other States, are included the VWSG has now been involved in the catching of 42,757 waders.

NUMBERS OF WADERS "PROCESSED" BY VWSG IN VICTORIA IN EACH MONTH TO 31 DECEMBER 1983

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

	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
Pied Oystercatcher	4	13	82	28	30	62	7	-	2	4	9	19	260
Sooty Oystercatcher	-	-	3	-	-	2	-	-	-	-	-	-	5
Masked Lapwing	1	2	77	-	-	13	-	-	-	2	5	10	110
Grey Plover	-	-	4	3	-	-	-	-	2	18	-	-	27
Lesser Golden Plover	2	3	1	1	-	-	-	-	-	-	-	18	25
Redkneed Dotterel	-	10	-	20	-	44	11	14	12	8	7	-	126
Hooded Plover	-	-	-	-	-	12	-	-	-	-	-	-	12
Mongolian Plover	41	-	2	7	-	-	-	-	-	-	-	-	50
Doublebanded Plover	-	-	32	41	164	261	95	219	-	-	-	-	812
Large Sand Plover	11	-	-	-	-	-	-	-	-	-	-	-	11
Redcapped Plover	2	41	19	108	96	40	54	-	8	8	8	2	386
Blackfronted Plover	-	-	-	-	11	16	6	9	2	-	4	7	55
Blackwinged Stilt	-	6	-	-	-	-	-	-	-	1	1	1	9
Rednecked Avocet	3	-	-	-	-	-	-	-	2	6	45	2	58
Ruddy Turnstone	14	-	22	27	-	2	-	-	1	1	-	5	72
Eastern Curlew	8	-	-	-	-	-	-	-	-	34	-	3	45
Greytailed Tatler	-	-	-	3	-	-	-	-	-	-	-	-	3
Greenshank	-	-	1	-	-	-	-	-	-	-	-	-	1
Terek Sandpiper	2	1	-	-	2	-	-	-	-	-	-	3	8
Latham's Snipe	29	21	-	-	-	-	-	-	-	1	4	8	63
Bartailed Godwit	-	-	-	1	-	4	-	-	34	23	33	217	312
Red Knot	29	30	56	34	-	-	73	-	3	62	35	92	414
Great Knot	-	-	3	-	-	-	-	-	15	14	-	91	123
Sharptailed Sandpiper	384	142	61	2	-	-	-	1	394	145	197	479	1805
Little Stint	-	-	-	-	-	-	-	-	-	-	1	-	1
Rednecked Stint	1229	684	3136	1623	65	124	194	72	385	736	2168	1889	12305
Longtoed Stint	-	-	-	-	-	-	-	-	-	1	-	-	1
Curlew Sandpiper	401	462	724	60	1	3	110	16	116	146	440	608	3087
Sanderling	11	-	-	-	-	-	-	-	-	-	-	2	13
													20199

The majority of the 1327 birds caught in Tasmania (Nov 1979), 820 birds in South Australia (Feb 1980), 921 birds in New South Wales (Mar 1981) and 8476 in West Aust (Aug/Sept 1981 & Aug/Sept/Nov 1982 & Oct/Nov 1983) were also processed.

RECOVERIES OF BANDED BIRDS

Rednecked Stint

032-35985	1 year old	4.12.82	Yallock Creek, Westernport	
	Shot	25.4.83	Kompang Binsuloh, SABAH, EAST MALAYSIA	5900 kms N.W.

Our first Rednecked Stint recovery in Malaysia - the timing fits in well with other recoveries on northward migration in April/early May in China, Hong Kong and Vietnam.

032-20181	Adult	18.11.79	Werribee	
	Recaptured	18.9.83	Hobart, Tasmania	620kms S.S.E
032-28255	Juvenile	7.12.80	Werribee	
	Recaptured	18.9.83	Hobart, Tasmania	620kms S.S.E

The adult bird appears to have changed its "summering" grounds, having been in wing moult when originally banded at Werribee. The juvenile could perhaps have still been on southward migration when first banded.

Curlew Sandpiper

040-7765	Juvenile	15.10.82	Kooragang Island, Newcastle, NSW.	
	Recaptured	24.7.83	Stockyard Point, Westernport	810kms S.W.

A nice recovery of an overwintering one year old bird which was presumably on its first southward migration when banded.

Silver Gull

082-40785	Pullus (chick)	31.12.79	off Mann's Beach, Corner Inlet	
	Band number read with telescope	4.2.84	Port Albert	6kms W.S.W

One of our own birds - over 4 yezrs after banding.

081-79140	Pullus	26.10.80	Mud Island	D.G.Nicholls
	Recaptured	8.10.83	Werribee	32kms N.W.
081-82536	Pullus	1-.10.82	Mud Island	D.G. Nicholls
	Recaptured	8.10.83	Werribee	32kms N.W.

All three recoveries illustrate the generally sedentary nature of the Victorian population of this species.

Crested Tern

071-51133	Adult	5.3.83	Queenscliff	
	Retrapped-breeding	3.12.83	Stonywell Is.Coorong S.A.	510kms WNW
071-00055	Adult (breeding)	16.12.67	Stonywell Is.Coorong S.A.)	
070-33187	Pullus	19.12.71	")	**
071-34284	"	14.12.75	")	

** all three recaptured on 25.2.84 at Queenscliff, 510kms E.S.E.

WADERS CAUGHT 22/10 TO 10/11/1983 IN NORTH WEST AUSTRALIA

	NEW	RETRAP	TOTAL
Curlew Sandpiper	833	27	860
Great Knot	581	7	588
Rednecked Stint	541	20	561
Large Sand Plover	505	35	540
Bartailed Godwit	209	-	209
Broadbilled Sandpiper	192	3	195
Red Knot	129	3	132
Terek Sandpiper	116	-	116
Sharptailed Sandpiper	114	1	115
Greytailed Tatler	90	4	94
Redcapped Plover	57	2	59
Oriental Plover	35	-	35
Turnstone	25	1	26
Mongolian Plover	23	1	24
Rednecked Avocet	13	-	13
Marsh Sandpiper	12	-	12
Blacktailed Godwit	4	-	4
Whimbrel	4	-	4
Blackwinged Stilt	3	-	3
Grey Plover	2	-	2
Asiatic Dowitcher	2	-	2
Greenshank	1	-	1
Common Sandpiper	1	-	1
Rednecked Phalarope	1	-	1
24 species	3493	104	3597

LOCATION OF WADERS CAUGHT 22/10 TO 10/11/1983

Broome	1085	63	1148
80 Mile Beach	1469	22	1491
Port Hedland	939	19	958
	3493	104	3597

ANNUAL GENERAL MEETING

The A G M is generally held in August. Sounds dull but in fact is one of the best days of the year. The formal parts are kept to a minimum. It's an all day affair starting in the morning and usually ending in the late evening and provides a great opportunity to meet people.

A little light but very necessary equipment mending comes first. After that its all down hill, a sort of seminar cum barbecue with short but very good talks, the AGM meeting with reports and election of officers, a slide show, buffet lunch and dinner, supper and snacks in between.

Please bring offerings of food and drink (and slides if you wish).

Four more movements relating to birds on autumn migration in Victoria from breeding grounds in South Australia. Note that 071-00055 was recaptured more than 16 years after banding.

AUSTRALIAN BIRD-BANDING SCHEME

SHAPE OF BIRD-BANDS

Most bands are now provided opened in a 'C' shape ready to be applied to a bird's leg. However, the incoloy bands and some of the alloy and stainless steel bands are provided opened in a rounded 'V' shape. This shape helps to overcome 'spring-back' and thereby facilitates the tight butting of the ends of these bands. The method of closing V shaped bands is the same as closing 'C' shaped bands. This is :

Step 1 Fit the band in the appropriate hole of the banding pliers with the gap of the band aligned with the open jaws. Squeeze the pliers gently so that the two ends of the band are brought together. With small bands it is possible to do this step by finger pressure alone without the use of pliers.

Step 2 Ensure that the band is in the appropriate hole of the pliers, but with the gap of the band aligned at right-angles with the open jaws. Squeeze the pliers with increasing pressure. The effect of this operation is to bow out the sides of the band not already in contact with the pliers and to bring the two ends together under pressure and produce a tight butt. Sometimes, in order to achieve this tight butt, it is necessary to repeat this step with the band in a number of different positions within the appropriate hole of the pliers.

David Purchase, Division of Wildlife and Rangelands Research, C.S.I.R.O. Canberra

FURTHER SIGHTINGS OF COLOUR-MARKED BIRDS

Colour banded and/or colour dyed birds sighted away from their banding location are detailed below:

Pied Oystercatcher

- 10/7/83	Stockyard Point, Westernport One pale green banded bird from Queenscliff (moved 74km E), one blue banded bird from Werribee (moved 93km ESE) and one orange banded bird from Rhyll (banded 1/3/80 - moved 23km NE). These were in a flock of 53 birds - six other banded birds were of local origin.	Eric & Chris Jones
- 25/9/83	Reef Island, Westernport One blue banded bird from Werribee (moved 90 kms SE) - possibly the same bird seen at Stockyard Point on 10/7/83 (& 16/7/83).	Eric Jones
- 21/12/83	Mud Island One blue banded bird from Werribee (moved 32kms SE). A further light green banded bird from Queenscliff (moved 9 kms E).	Peter Menkhorst
- 1/1/84	Queenscliff One blue & pale green bird which though emanating from Werribee (moved 25 km SSE) must have subsequently been caught at Queenscliff.	Ira Savage
- 21/1/84	Shallow Inlet One blue banded bird from Werribee (moved 170 km SE), - probably the same bird as previously seen on 19/3/83. In flock of 4 birds.	Brett Lane & M.Tarrant
- 11/2/84	Mud Island Two blue banded birds from Werribee (moved 32 km SE) - in flock of 21 birds. Also 5 light green banded birds from Queenscliff (9 km E).	Peter Menkhorst

Doublebanded Plover

There were further reports of 5 more colour banded birds seen by Ray Pierce in the Lake Tekapo area of the south island of New Zealand. These correspond to movements of about 2000 km ESE from the banding sites in Port Phillip and Westernport Bays in Victoria.

(a) 6/9/83 The male bird present in the 1981 and 1982 breeding seasons was again located. It had originally been banded at Werribee or Altona in the 1981 winter. On 6/9/83 the bird was alone on a territory - it disappeared soon afterwards, after a heavy snowfall, and did not reappear.

(b) 15/9/83 A bird in a small flock had fresh yellow dyed underparts and colour bands indicating it had been banded at Werribee on 6/8/83.

(c) 9/12/83 A male bird in a small flock with colour bands indicating it had been banded at Werribee (Point Wilson) on 6/8/83.

(d) 5/2/84 A female bird seen with colour bands indicating that it had been banded at Werribee or Altona in the 1981 winter.

(e) 11/2/84 A moulting adult male bird, still with some orange/yellow dye on the underwing coverts and with colour bands indicating it had been banded in Westernport Bay at Stockyard Point on 24/7/83.

A bird bearing colour bands and with some colour dye still remaining on the underwing coverts was seen at Blue Gum Point, French Island, on 4/2/84 by Val Curtis. It had been banded at Stockyard Point on 24/7/83 and was an early returned migrant. What may well have been the same bird was seen at Stockyard Point on 11/2/84 by Eric Jones.

Red-necked Stints and Curlew Sandpipers were dyed yellow on the underparts and green on the underwings in Hobart last March.

Sightings should be reported to Australian Bird-Banding Scheme P.O. Box 84, Lyneham, Canberra A.C.T. or to Mark Barter Tel. (home) 233 3330

NEW CODE FOR RECORDING THE AGE OF BIRDS

P = pullus	(a young bird, either in the nest or out of the nest which, although it may be fledged, is not yet able to fly.)
J = juvenile	(a young bird in juvenile plumage, which has left the nest site and is able to fly.)
1 = 1st year	(a bird within its first year of life, i.e. it was hatched less than one year ago.)
1+ = 1st year or older	(a bird within its first year of life or older, i.e. it is a free-flying bird of unknown age.)
2 = 2nd year	(a bird within its second year of life.)
2+ = 2nd year or older	(a bird within its second year of life or older.)
2- = 2nd year or younger	(a bird within its second year of life or younger, i.e. it is within its first or second year of life.)
3 = 3rd year	(a bird within its third year of life.)
3+ = 3rd year or older	(a bird within its third year of life or older.)
3- = 3rd year or younger	(a bird within its third year of life or younger.)

and so on to whatever age is required.

David Purchase, Division of Wildlife and Rangelands Research, C.S.I.R.O. Canberra.

BAR-TAILED GODWIT MORPHOMETRICS

by Ken Rogers

INTRODUCTION

This paper summarises the analysis of data collected in five catches of the Bar-tailed Godwit (Limosa lapponica). Catch details are set out below;

Date	Place	Number Caught
15.11.79	Phillip Island, Victoria	14
29.12.79	Corner Inlet, Victoria	186
29.9.80	Queenscliff, Victoria	34
19.3.81	Botany Bay, N.S.W.	77
20.3.81	Botany Bay, N.S.W.	117

Each bird was aged (see Prater, Marchant & Vuorinen, 1977). Wing and bill lengths and weight were measured. Primary moult was recorded using the widespread technique described by Snow (1967). It was possible to assign a sex to the Botany Bay birds by evidence of breeding plumage. Females are larger than males (Prater et. al., 1977).

SEXING CRITERION

A sexing criterion was developed on bill length measurements of 392 adult birds. This measurement showed no major differences between the different samples. Conventional semi-graphical methods (see Griffiths, 1968) were used to calculate the means and standard deviations for males and females. Due to the difficulty of determining the proportion of each sex from a graph, the analysis was repeated for a number of estimates. It was found that a ratio of 182 males to 210 females gave the best statistical fit between the expected and observed distributions of bill length. This ratio also gave very similar coefficients of variation (ratio of standard deviation to mean) for each sex. The values found were;

No. of birds	Mean	Standard Deviation	Coeff. of Variation
182 males	82.0	4.84	0.059
210 females	106.5	6.39	0.060

Using these parameters, the probability that a bird of given bill length was a male was calculated for the range of bill lengths. This showed that a bird with a bill length less than or equal to 89 mm could be sexed as a male with 95% confidence. Similarly birds with bill length greater than or equal to 97 mm could be sexed as females.

Birds within this range cannot be sexed on bill length alone. The use of supplementary criteria based on other measurements can be of assistance.

This criterion was tested by applying it to the Botany Bay birds of known sex. In only four cases (2.25%) did this lead to the assignation of the wrong sex. It was considered that the criterion was sufficiently accurate to allow examination of other measurements, using the assigned sexes.

WING LENGTH

There are two sources of variation in wing length measurements; that due to abrasion and that due to slightly different techniques used by different measurers. The table below presents the wing length parameters for old wings (just prior to moult) and new wings (just after completion of moult) for three measurers (denoted A,B and C).

	Measurer	no.	Mean	S.D.	Coeff. of Variation
	MALES				
PRE-MOULT (December)	A	21	225.0	4.6	0.020
	B	39	221.1	5.5	0.025
POST-MOULT (March)	A	63	227.6	6.0	0.026
	C	23	225.2	6.2	0.028
	FEMALES				
PRE-MOULT (December)	A	35	238.9	5.9	0.025
	B	24	234.3	5.5	0.023
POST-MOULT (March)	A	56	241.5	5.1	0.021
	C	20	237.3	4.9	0.021

These results show differences between the measurers of between 1% and 2%. Feather abrasion reduces wing length by just over 1% for the same measurer. Clearly, there is a need for caution in develop sexing criteria on measurements subject to such variation. Their use as a secondary criterion in cases of doubt however is undoubted.

MOULT AND WEIGHT

The table below shows average and modal moult scores for the September, December and March catches. The parameters for the weight distributions for each sex are also given. Median moult scores were not calculated as the modal and mean moult scores for males and females were not appreciably different.

			SEPT	DEC	MAR
MOULT	Modal Score		0	39	50
	Average Score		5.1	38.2	49.6
WEIGHT	Males	- mean	307.5	288.6	417.0
		- st. dev.	23.7	16.2	37.5
		- C. of Var.	0.077	0.056	0.090

Females	- mean	366.7	351.3	512.6
	- st. dev.	23.1	19.7	44.6
	- C. of Var.	0.063	0.056	0.087

These results show that in the first three months, the birds lose some body weight until their primary moult is about 80% complete (by whole feather replacement not feather material replacement). In the succeeding 2 1/2 to 3 months primary moult is completed and there is a dramatic increase in body weight, prior to migration.

CONCLUSIONS

Bill length measurements of Bar-tailed Godwits provide a good sexing criterion. This measurement should always be taken. However, as this measurement is somewhat difficult due to feather wear at the base of the bill, it is suggested that total head length measurements, not subject to this variation and more easily replicated might provide a more robust criterion. Wing lengths should also be measured.

All the results show consistency in the coefficients of variation for the two sexes. There is no a priori reason why the spread of wing lengths relative to the mean should differ for males and females. It is suggested that this parameter should be examined when developing a sexing criterion and seeking an explanation of any major discrepancies.

The moult timing of this species is well filled out but greater definition is needed on the start and finish of moult. Given the vulnerability of the species to capture myopathy (Purchase and Minton, 1982) the value of collecting this information is questionable.

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Shallow Inlet, Victoria, as a Wader Resort

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This is primarily a report on a year's high-tide counts of waders in Shallow Inlet, which lies on the west flank of the isthmus connecting Wilson's Promontory to the mainland, opposite the much vaster Corner Inlet. Seventeen full counts have been made over the period February, 1983 to February, 1984, and several other days have been spent in the field. Indeed, Shallow Inlet is the largest (10 x 2 km.) inter-tidal wader resort now being counted regularly (at least once per month) in the state. The data gathered since the winter '83 National Wader Count are now stored in the RAOU computer. The present paper offers a history and critical review of previous wader observations, and notes and discusses the 1983 findings.

The Inlet appears to be a flood feature. Much of the western side of the main basin is reclaimed marshland, protected by a dyke and fringed with salt marsh in front of mudflats. The eastern side gives directly onto inter-tidal mud. The northern end is particularly shallow and is difficult of access. At high tide the entire basin fills with sea water from the southerly entrance, peaking earlier at the southern end, but on the lower high tides plenty of mudflats are left exposed. The southern half is a narrower channel with sand on both sides and with the entrance into Waratah Bay on the south-west. Between this channel and the Bay is a large sand plain and dune system, Sandy Point proper. This exposed sand spit is dotted with debris and patches of shell. A characteristic of the whole locality is thus that waders often have a wide choice of feeding and roosting areas. Very high tides and/or the strong winds of the 'Orkneys of Australia' can,however,drastically curtail the effective choice.

History of observations.

Many birdwatchers have reportedly dismissed the locality after seeing little on brief visits. Shallow Inlet is easy to underestimate, both in terms of what is present and, once the potential is suspected, in terms of the difficulty of completing a count. Much of the basin is not visible from any parking spot and at low tide the sandy mud can

stretch away emptily, dotted only with a few oystercatchers (spp.) and curlew.

Presumably some older data do exist in private notebooks, but perhaps seldom anything approaching full counts. The Bird Observers' Club appears to have none of these, and our 1983 counts were made available to it for its submission with respect to the proposed Marine Park in this area. Among individual birdwatchers, Martin Schultz made four or five counts on the east side in 1982 (for the most complete see Table I, 12/12/82), and has previously made a number of winter counts at Sandy Point. He has also made about one hundred counts along Darby Beach (i.e. across the Inlet mouth and along the shore towards Wilson's Promontory) since the early 1970's. The burden of his findings is incorporated in this paper.

The first of the substantial published sources is Roy Cooper, Wilson's Promontory National Park and Its Avifauna (1975), although the Inlet is actually just outside the Park. Cooper organised two to five teams of observers who, in conjunction with a survey of the Park, visited the Inlet once a month over the ten years 1964-73. He tabulated the results in his book. The waders were one group of birds for which the author admitted that the survey records were incomplete, although the non-wader records from Shallow Inlet are certainly scanty too. It has been suggested that Cooper's teams made no real attempt to count Shallow Inlet proper, and the results certainly suggest that; but the book equally certainly implies an effort at coverage, mentioning for instance the islands which are major wader roosts and referring to high-tide observations. Nineteen wader species are tabulated (from the text Greenshank should be added to the table, but Knot deleted), with very few sightings and very low numbers of some of the species. As an example, Cooper cites only a lone undated record of Greenshank (two birds) whereas we have had repeated sightings of up to 179 individuals. He gives no complete wader count.

An article by Norris et al (1979) covering the whole of South Gippsland gives a distribution map for each species drawn from a survey of minor published sources. Shallow Inlet is marked for only eleven wader species and one of these, Lesser Golden Plover, is called "rare", which it is not. At least nine large non-wader species which we regularly see were also not recorded.

Summarized wader counts appear in Corrick (1981:196), relating to the maximum numbers of migratory waders recorded during a Fisheries and Wildlife survey of the wetlands of South Gippsland. Counts for the periods 5-10/3/77 and 24-29/11/77 are lumped together, yet the accumulated totals are very low (1110 of only six species). Details are transcribed on the working sheets of Martindale's survey (see below). The visits to Shallow Inlet were on 4,5, and 8/3/77 and 25/10/77 (sic) and do not appear to have been complete counts of roosts at high tide.

Published reports on full wader counts start with summaries of national wader counts in this Bulletin; and as put out by the RAOU. The original record sheets have been made available from RAOU files. Some are patently incomplete. In the summaries the results have usually been combined with Corner Inlet figures. As one report has it (Dann, 1980:5), "some localities have been combined, e.g. ... Shallow Inlet with Corner Inlet, as it is believed, at present, that these areas operate in close conjunction depending upon local conditions". All available separate Shallow Inlet wader count totals prior to 1983 are given below (table 1), from RAOU files (including an excellent count for December 1982 by Martin Schultz), and one for June 1982 from John Martindale's field notebook at the Arthur Rylah Institute.

Table 1

Wader totals for Shallow Inlet, 1981-82.

21/2/81	4393
5/7/81	402
6 and 7/2/82	417
3/6/82	509
6/7/82	550
12/12/82	6776

A professional report by John Martindale, A Study of Wading Birds of Corner Inlet, appeared about November 1983. It is dated December 1982 and covers Corner and Shallow Inlets, making planning recommendations about both. The report is complex and the present paper may be seen as an expansion and re-orientation of its coverage for Shallow Inlet. One of Martindale's maps (Map 2 [West]) shows four roosts at Shallow Inlet, three in the basin and one, marked as "location unknown", on the point. A table (X) combines the first three as "Shallow Inlet North" with a rank 2 (of four ranks) and also assigns the fourth, "Shallow Inlet South", to the second rank. This is incomplete as to the number and size of roosts and the ranking may be misleading in that consistent roosts are

not a feature of the locality. The birds are not "site-faithful", in Martindale's phrase. He claims that all the best British authorities - Prater, Minton - demonstrate this to be a wader characteristic. It is not here as far as roosting is concerned. Further, the criteria used to rank roosts are highly arbitrary; depend on proportionate relationships to Corner Inlet and Victorian populations; and depend very heavily on consistency of use. This is cumbersome and for practical reasons no attempt is made to recalculate the rankings with our new data. The major theoretical objection is that his procedures may obscure a salient fact of the wader regime at Shallow Inlet - that roosts are used irregularly. A resort like Shallow Inlet would tend to be undervalued relative to areas where smaller roost sites are occupied on all, or all but the highest, tides.

Indeed, Shallow Inlet was not closely examined in the course of the Martindale survey. The data cited are for only five counts of "Shallow Inlet South" and only three of the usually much larger "Shallow Inlet North" roosts. References to the sources of individual counts are not given but a scrutiny of the manuscript working papers at the Arthur Rylah Institute confirms that few were used other than National Wader Counts from RAOU files and observations by Andrew Corrick in the course of the 1977 Gippsland survey. A single additional count by Martindale himself on 3/6/82 was made; it is incorporated in Table 1 above. The result is that the numbers and variety of Shallow Inlet waders are much underestimated in his report and their roosting behaviour has not been fully determined. In fairness it should be added that John Martindale undertook a massive and even hazardous task in counting all the Corner Inlet barrier island roosts and was probably allowed too short a time for it. The point at issue is that Shallow Inlet is relatively undervalued:

Current Count Sequence.

Apart from a vague acquaintance with Cooper's book none of the above sources was known when the present observations were begun. In January 1983 Michael and Pauline Tarrant, who had bought a cottage nearby at the Sandy Point settlement, and my wife and I jointly explored the Inlet and found sufficient variety and numbers, including 150 Lesser Golden Plover, to decide on making regular counts. The counts have been quite arduous because of surprisingly difficult conditions of distance, topography and weather. They have also been fruitful, and fun, involving a number of observers. I wish to thank Pauline Tarrant for her remarkably unflappable hospitality to so many teams of muddy wader counters; Jim Wilson, the fifth regular

team member, whose boat we have used and misused; Rod Gowans of the Arthur Rylah Institute for access to the manuscript material of the Martindale report; Brett Lane for all sorts of information from the RAOU files (and help in counting); Mark Barter for information about Tasmanian waders (and he and his family for help in counting); Martin Schultz for discussing his counts with me (and for help in counting); all the other occasional observers; and the farmers on the west side of the Inlet for permission to cross their land. To obtain reasonable coverage there is always someone assigned to a shore which proves to hold next-to-no birds that day, and everyone has been understanding about this. The result has been a set of quite complete counts revealing a number of features about the locality as a resort for waders, which may be summarised under the following heads:

1. Number and species present.

Shallow Inlet is a very significant summer wader resort. The peak (January) count reached 16,000 birds and other counts have reached almost 11,000. Up to seventeen species have been seen on a single day. A total of twenty-one species was seen in 1983-84. Eighteen of these were recorded by the Cooper Survey. To his list we add Hooded Plover, Turnstone and Knot. His list includes Little Whimbrel (one on 5/3/1967) which we have not seen, giving a total of twenty-two species.

The locality appeared to attain international status (i.e. to hold over one per cent. of the population of an avifaunal region, Australasia) in 1983 for six species: Lesser Golden Plover (second most important Australian site), Double-banded Plover, Eastern Curlew (one of the top ten Australian resorts), Red-necked Stint, Sanderling, and Curlew Sandpiper. It is a site of importance for a seventh species, Sooty Oystercatcher, with over ten per cent. of the state population. This is however a rough guide as new data for Australia are constantly being acquired, and annual species totals fluctuate.

Table 2

Wader totals for Shallow Inlet, February 1983 - February 1984

13/2/83	8891
27/2/83	7283
13/3/83	5900
19/3/83	5273
3/4/83	7000
30/4/83	1999
9/7/83	735
14/8/83	650
26/8/83	699
24/9/83	1582
15/10/83	4133
6/11/83	2785
26/11/83	3814
17/12/83	4233
2/1/84	16,092
21/1/84	6,701
4/2/84	10,934

2. Roosts and the tidal system.

The birds' choice of roost sites is inconstant. The main roosts are on two or three islets on the eastern side of the basin, on a western island, and on several stretches of the western shoreline. If the tide is not very high, flocks may accumulate on sandbars and not move at all to firmer sites. There may be one such roost or several, just as there may be several roosts on terra firma. The number of roosts and the movements between them on any one high tide make the population hard to count, even with a boat. The fact that flocks may remain on bars or uncovered flats, normally intermediate or pre-roosts, when the high tide is a low one, as it was on the National Wader Count in summer 1984, is a real problem. Inaccessibility, distance, heat haze, rain, all these factors have been responsible for very large proportions of unidentified small waders on some counts.

An obvious influence on roosting behaviour is wind direction and strength: strong easterlies cause birds to choose the shelter of the eastern side, and vice versa. Height of tide also affects choice of roost and very high tides eventually cause birds to leave the eastern islets, or later even the western shore, to fly down the channel to the point. There is often some such movement without actual tidal necessity, and in any case flocks of small waders habitually roost on the point, in the mouths of two dry valleys in the dunes (former channel entrances) and scattered about on the sand plain. This is especially important relative to roosts around the basin in winter, but it goes on all year. The concentration of birds at one spot characteristic of wader roosts is absent here. The interactions of wind direction and strength and height of tide, and no doubt other factors,

produce shifting patterns and we cannot yet accurately predict the locations, numbers and species of roosts on a given day.

3. Shallow Inlet and Corner Inlet populations.

The summering population at Shallow Inlet prominently features Red-necked Stints and Curlew Sandpipers. Together they made up 72 per cent. of the February 1983 National Wader Count and usually constitute over 80 per cent. of all waders present except in winter. To the west, at Anderson's Inlet, over three February counts (1980-82) their average was 73 per cent. and further west still in Westernport in 1973-74 they made up an average of 67 per cent. of all maximum high-tide counts (Loyn 1975: 7-8). Immediately to the east in Corner Inlet, on the other hand, it is possible to calculate from Lane and Jessop (1983a) that these two species accounted for only 50 per cent. of the total of the February '83 count. Furthermore several of the larger waders such as Grey Plover, Bar-tailed Godwit, Knot and Great Knot are present in numbers in Corner Inlet but are very scarce or absent in Shallow Inlet.

Brett Lane has suggested to me that the pattern of its wader species and their relative abundance may assimilate Shallow Inlet to the great flow of migrants which arrives in north-west Australia and moves on to South Australia, Port Phillip, Westernport, and Anderson's Inlet, rather than to the easterly stream of Queensland, New South Wales and even New Zealand which the Corner Inlet population more resembles. Yet the nearest roosts are only about twelve kilometres apart as the godwit fails to fly.

Obviously an hypothesis of total separation of the two populations because of different migratory streams would be exaggerated. There is overland passage to south-eastern Australia too. Nevertheless, that east and west migrant streams end up abutting one another hereabouts without much overlap is consistent with the observed differences between the Corner and Shallow Inlet populations. What is implied is that there is a sort of Wallace Line along the ancient continental divide which once connected the mainland and Tasmania. This line, running north-south through Yanakie down the isthmus to Wilson's Promontory, might be called the 'Lane Line'.

The distinct populations of the two inlets might be accounted for by arguing alternatively that the sandy muds of Shallow Inlet do not contain food organisms in any quantity at depths suitable for the longer-billed species. This is not *prima facie* convincing because it does not account for the scarcity of Grey Plover or Knot - hardly long-billed species - nor the presence in numbers (max. 622) of the patently long-billed Eastern Curlew. An attempt to test these two hypotheses is needed. In principle a mass of ringing/retrap data might help, but both Inlets are difficult for cannon-netting and it would be hard to organise the requisite effort. Otherwise a mass of data on the invertebrate fauna of the two inlets might be sought, together with correlations with the feeding behaviour of individual wader species. Again, results on a statistically-significant scale would require a formidable amount of professional work.

On all our counts and days in the field we have seen no wader interchange between the two inlets; neither has Martin Schultz on all his visits. This is contrary to remarks by Martindale (1982: 46), who states that "the feeding grounds there [Shallow Inlet] are frequented by waders that roost in the western half of Corner Inlet, that is there is a passage across the Yanakie Isthmus". His rationale is that the tide in Shallow Inlet is earlier by approximately one hour and that birds can extend their feeding time by commuting between the inlets. He further states (p. 61) that, "movements of Red-necked Stints, Double-banded Plovers, Bar-tailed Godwits and Eastern Curlews have been observed *regularly* across the Yanakie Isthmus between Shallow Inlet and the *roosts* in the west half of Corner Inlet." (Italics added). It is not clear that flights to *roosts* can extend feeding times at all. An examination of Martindale's field notebook in any case produced only a single note of a flight between the inlets. On Wednesday 26th [May 1982] at Duck Point on Corner Inlet, near Yanakie, he saw "Movement. 13.45 150 small waders to Shallow Inlet (½ DBP; ½ RNS)." There must have been other observations, perhaps however only a few made by Peter Dann (pers. comm.). Our own findings include none to support the commuting hypotheses. Possibly there is flighting at night, but it would be effectively unobserved and would not permit a regular exploitation of tidal differences. Instead our findings suggest that the regular movements and relationships are those

within the Shallow Inlet system, between the basin and the point, as well as a further connection along the shore between the point and Darby Beach.

This is not necessarily incompatible with an irregular or occasional shift between the inlets by the small (but not the large) wader species. Given the proximity of the two inlets some moving around by birds would astonish no-one, and need neither invalidate the hypothesis that the two populations have significantly different migratory origins, nor support the hypothesis that there is regular tidal commuting. There are only two National Wader Counts which are reasonably complete for both Corner and Shallow Inlets and Brett Lane has drawn my attention to the possibility that they may indeed indicate a shifting of small waders between the inlets. These counts are summarised in Table 3:

Table 3.

Small wader summer totals, 1983 and 1984, Shallow and Corner Inlets

	February 1983	February 1984
Shallow Inlet	7547	10037
Western Corner Inlet	9200	5203
Subtotals	16747	15240
Eastern Corner Inlet	13317	12520
Totals	30064	27760

Note: The birds included are Red-necked Stints, Curlew Sandpipers and unidentified small waders.

The comparable subtotals for Shallow Inlet and Western Corner Inlet may of course be the result of quite other factors. Under field conditions the counts are not as precise as they may appear, and it is perhaps an heroic assumption that all unidentified birds were either Red-necked Stints or Curlew Sandpipers. But on that not wholly unreasonable supposition, the entire subtotal population may have been in Shallow Inlet on 2/1/84, at a count of 15,574 individuals, but not on 21/1/84 at 5,697 individuals. No such large swings in numbers present were however recorded in 1983. The overall decreases between the National

Wader Counts of 1983 and 1984 of nine per cent. in the subtotals and six per cent. in Eastern Corner Inlet may be accounted for by a decline in Red-necked Stints in the area, corresponding to a general decline in summer 1984 throughout eastern Australia.

Irregular but large shifts between the inlets may of course make hazardous any attempt to pick out through passages by looking for peaks in numbers above the seasonal trends, although the cases reported in the following section are probably not affected.

4. Through Passages.

Cooper (1975) claimed that the bulk of waders arrive here and pass through to Tasmania within four to six weeks, although he does not state which weeks in the year these might be. He was generally concerned to urge that Wilson's Promontory is the departure point for a narrow-front bird migration to the Bass Strait islands and Tasmania. As far as the waders are concerned his published data lend little support to this hypothesis.

An attempt to employ our data to identify waves of waders by species is vitiated by irregular counts of sometimes large numbers of unidentified small waders. Red-necked Stints and Curlew Sandpipers otherwise dominate the records, but a chi-square test suggests that we would be unwise to distribute the unidentified "littlies" between these two species in the identified ratios of the same dates. There is no clear sign that any scarcer species are passage migrants rather than summer visitors, although a trivial exception may be the Red Knot with three autumn records only.

Nevertheless we can derive two conclusions from the figures. We may look for overall peaks which stand above the normal spring build-up and autumn decline. First, there seems to have been an October passage, with the total count for 15/10/83 thirty-three per cent. above that for 6/11/83; and early April '83 produced a peak thirty-three per cent. higher than mid-March. Second, the figures for Curlew Sandpipers show March-early April and October peaks indicative of passages even when "unidentifieds" on dates either side of the peaks are distributed on "worst case" assumptions, as in table 4 (below). There is of course no direct evidence on the origin or destination of these waves.

Table 4.

Curlew Sandpiper Movements

(a)	Autumn:	February	March	Early April	Late April
		2126	4000	4200	1816
		(includes all unidentifieds)	(No unidentifieds present)	(Even if none of 550 unidentifieds was this species)	(Even if all unidentifieds were this species)

(b)	Spring:	September	October	Early November
		64	1329	268
		(No unidentifieds present)	(Even if none of 1000 unidentifieds was this species)	(No unidentifieds present)

5. Relative numbers of palaearctic migrants summering and wintering.

Shallow Inlet has exhibited a collapse in wader numbers from summer to winter. Earlier figures are probably too incomplete to tell, but in 1983 the total number of northern hemisphere species present in July was only four per cent. of that in February. This is approximately consistent with the findings of National Wader Counts, that the overwintering proportion of the summer population of Red-necked Stints, Curlew Sandpipers, Bar-tailed Godwits and Eastern Curlews is lower the further south-east one looks. If we examine the February and July data for these species for various locations (Lane and Jessop 1983a and 1983b; RAOU files; Jones 1983) and compare them with Shallow Inlet we find the overwintering percentages to have been as follows:-

Table 5.

Overwintering percentages of northern hemisphere waders

Rest of Victoria	12%
Stockyard Point, Westernport, Vic.	9%
Tasmania	7%
Anderson's Inlet, Vic.	3%
Shallow Inlet, Vic.	4%

At four per cent., even lower than Tasmania, Shallow Inlet has an exceptionally poor winter/summer ratio. So does nearby Anderson's Inlet, while the equivalent ratio for Curlews in neighbouring Corner Inlet is only one per cent. Is this merely a locational matter, slightly anomalous in view of the Tasmanian ratio, or is it related to a low winter feeding potential? The mudflats may have a restricted winter exposure, though this seems unlikely given the shallow waters. Alternatively the winter feeding capacity of the mud, sandier than Westernport, may be particularly low.

6. Occupation of the sand spit.

The Inlet proper was especially empty during July and August '83. The few hundred waders present mostly roosted in barely-sheltered spots on the sand at the Waratah Bay side of the point. There was still some interchange, with Double-banded Plovers entering the basin on the dropping tide. Yet many of the birds present - some of the Double-banded Plovers and also Hooded Plovers, Red-capped Plovers, Red-necked Stints and Curlew Sandpipers - picked for food on the sand plain, or fed together with Sanderlings along the tideline of Waratah Bay. We counted 264 Sanderlings on 9/7/83. By September Red-capped Plovers, Red-necked Stints and Curlew Sandpipers which had roosted on the point were re-entering the main Inlet on the falling tide, but some birds still kept to the sand during summer 1983-84. As many as 361 Sanderlings were present on 21/1/84.

The sand point is ordinarily used for roosting by a number of birds of several species from the basin; it is also used by spill-over flocks on very high tides; but it is also the feeding as well as roosting area for birds of its own, and in winter these may exceed those using the basin. (Once again this may suggest that the mudflats are an unsatisfactory winter feeding habitat). Additionally, Martin Schultz has observed an interchange between the Sanderling flocks on Sandy Point and Darby Beach, which may account for the irregular numbers at each locality considered separately. He also tells us that the maximum of one thousand small waders from Darby Beach will roost on the east side of the Shallow Inlet entrance during south-westerly gales. There is therefore a series of connected wader populations on the Shallow Inlet side of the Yanakie Isthmus.

Martindale (p. 46) states that the location of the point's roost is "uncertain" and "variable" and that this may be because the entrance has shifted in past years. However the area of the point has increased with its southward migration, not decreased, while the scatter of small roosting parties across much of the sand plain seems a matter of unconstrained choice within that zone which no recent geomorphological change need have affected.

7. The Future of Shallow Inlet and vicinity.

The nature, interconnections and inconstancy of the roost sites, together with the variety of feeding areas, means that the tidal basin, the sand spit, and their margins need to be studied and protected as a whole. The locality is vulnerable to the disturbance which is building up with recreational use, especially power-boating, wind-surfing, and the horse-riding and dog-walking which noticeably disturb birds on the point beaches. Further reclamation would be unfortunate. The area supports sizeable autumn wader populations when they are putting on fat for migration to northern breeding grounds, and migratory strategies might not be malleable enough to accommodate losses of this type of habitat. (cf. Tubbs 1983: 62).

At present the coast of this part of Victoria is under consideration as a Marine Park. While this is far-sighted given that one never meets another naturalist here by chance, it is not without dangers, notably the preference which may be given to Corner Inlet. The factual basis for planning has so far been inadequate. To repeat, Shallow Inlet and the dunes are interrelated; exposure to south-westerlies and high tides oblige the basin flocks to occupy marginal roosting sites and even join those of the sand spit. Martindale's entirely proper recommendation that the mudflats be made a reserve needs to be extended to incorporate the entire sand spit. This requires protection from recreational and development pressures - the confusion of conservation and recreation which has occurred in parks overseas, such as in New York state (Vidal 1977: 242), ought to be avoided from the outset. Shallow Inlet is far more significant for wader numbers and variety, absolutely and relatively, than was thought. Further, the disjunction and the nature of the possible relationship between its wader population and that of Corner Inlet are so interesting that special measures are warranted to study and protect both.

Appendix I: Species Observed, 1983.

Pied Oystercatcher; Sooty Oystercatcher; Masked Lapwing; Grey Plover; Lesser Golden Plover; Hooded Plover; Mongolian Plover; Double-banded Plover; Large Sand Plover; Red-capped Plover; Ruddy Turnstone; Eastern Curlew; Whimbrel; Grey-tailed Tattler; Greenshank; Bar-tailed Godwit; Red Knot; Sharp-tailed Sandpiper; Red-necked Stint; Curlew Sandpiper; Sanderling.

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IMPRESSIONS OF THE NORTH-WEST AUSTRALIA WADER STUDIES EXPEDITION 1983

Annie Rogers

When I cannot sleep these days, I count waders, but not at Werribee, Queenscliff, or Yallock Creek. I go back to the North-West and drift along the Eighty Mile beach where the air is unpolluted, the sea is clear and the beautiful white sand is scattered with the most magnificent shells. As we drive along the beach, we disturb thousands of roosting birds and the cloudless sky is suddenly full of these lovely creatures displaying their amazing aeronautical abilities. This is my most impressive memory of the North-West Australian expedition and it is why I shall probably go again.

Mind you, the air might be unpolluted but in October-November it is rather hot, in fact very hot and also humid. The beautiful clean sea is unfortunately so full of sharks that one does not dare to step more than ankle deep into it. At that depth we could have speared enough of them (with star pickets) in a few hours to keep a fish and chip shop in flake for two years. The beach really is a shell collector's paradise. At night when the tide is high some of the shells eerily move around, helped by the hermit crabs that live in them. There is something disconcertingly spiderish about crabs at night when they are walking over your sleeping bag.

With no showers and no swimming, life would be rather unpleasant were it not for the arterial bore-bath hot water gushing out of a huge faucet that we could sit under. It was great once we had removed the three dead cows. The smell lingered a little but we got used to it.

The Anna Plain's station is the only link with civilization for hundreds of kilometres. The station manager kindly allows the ornithologists access to the beach through Station property. It was comforting to know that after our departure the beach would be left undisturbed until the next expedition.

We based our first camp at Roebuck Bay, this too is a very beautiful area, if slightly more frequented. Counting waders there was however

hardly a soporific experience involving much walking and scrambling in debilitating heat. It was lovely to see the albino godwit again, the third year it had been counted. Although I do not swim or enjoy sun baking most of the other members of the expedition had a ball on the nearby safe Cable Beach 'skinny dipping' and relaxing after the cannon netting catches.

The town of Broome is charmingly different with its strong Japanese influence and its pearling industry. The local R.A.O.U. members were marvellous. They lent us equipment and organized a terrific barbecue. Several of us shared their homes for a time. I am especially grateful for the help and hospitality given to me by Bobby Telford when I was ill with influenza. The kind, friendly, helpful people of Broome really impressed me.

The evenings in our bush camp site were very pleasant sitting around the fire when the temperature had dropped and the work was finished, chatting about birds and listening to guitar music. It was a pity that the creepy crawlies liked that part of the day too. Brett and Pricilla both sat on scorpions, who naturally objected, and Belinda was cornered in her tent by a large centipede who evicted her at midnight when it bit her finger.

Port Hedland Salt Works was our last base, a completely man made environment, I thought it sounded awful. I was pleasantly surprised that from our camp site we could watch hundreds of waders feeding or roosting. In fact I spent quite a lot of time drowsily watching waders.

I kept a daily journal whilst on the expedition. The entries all read the same for the time spent at Port Hedland Salt Works, 'too tired to write'. We mist netted at night and cannon netted during the day. We organized a shift system for the nightly mist netting but the birds and the weather did not appreciate our timing. Somehow it always seemed to be that shortly after 2 a.m. when my shift was finished something would prevent me from sleeping, - cries of, "Everyone up. The nets are full of birds", or the night it rained requiring a quick dash to get

under the canopy that we had erected for shade, a sudden squall and down it came on top of us, out to rescue the birds in the nets and close them, then suddenly it is dawn, and so it went on. We did not have to work all day, we had time to sleep but the heat and the millions of flies made it impossible. So I drowsily watched waders and quietly thanked God for Aerogard and the showers at the Port Hedland Airport.

The compensations were - one Red Necked Phalarope two Asiatic Dowitchers and nearly two hundred Broadbilled Sandpipers caught plus hundreds of other sundry waders. The sighting of a blue bird by Ira - a Curlew Sandpiper painted by Duncan in Malaysia earlier in the year delighted everyone.

Too soon the expedition was over and we were all ready to make our various ways to homes as far apart as Canberra, New South Wales, Tasmania, Victoria, Perth, Kunanurra, Hedland England and Canada. There were fond and sometimes tearful farewells. For me not only was it a great experience, it was spent with the nicest group of people I have met in years.

If you have an adventurous spirit, love birds and remote beautiful places, if you do not mind hard work and can cope with heat, flies and creepy crawlies that bite, and if your favourite food is flake, then go on a North West Australian birding expedition sometime - I can thoroughly recommend it.

NORTH WEST AUSTRALIA WADER EXPEDITION 1985

The next major Australasian Wader Study Group expedition to study waders in the Broome/80 Mile Beach/Port Hedland area of N.W. Australia, will take place between 23rd March and 20th April, 1985. This date has been chosen in order to obtain data on the northward departure of migrant waders, in particular:

(a) the dates of departure of the different species

(b) evidence for passage through the area of waders which 'summered' in southern Australia

(c) weight increases prior to departure.

VWSG members,who have formed the core of most previous expeditions, are again encouraged to participate in this expedition which will operate in a similar manner to previous ones. A light aircraft is again likely to be used for recce and transport purposes. The West Australian Fisheries and Wildlife Department are hoping to provide the usual vehicle and personnel support.

One attraction of an expedition at this time of year is that birds will be coming into their full breeding plumage. It will also be interesting to be in the northwest immediately after the 'wet season' in contrast to earlier expeditions held during the 'dry season'. Please lend your support - preferably for the full four week period. An early indication from potential participants - to Brett Lane or myself - would be welcomed.

CLIVE MINTON.

FAIRY TERNS - A REWARD

The efforts of VWSG members in annually clearing excess vegetation from the Fairy Tern breeding area on South Spit, Werribee Sewage Farm, have again been rewarded with a record number of pairs nesting and record breeding success in the 1983-84 summer (see previous note on p.34 of VWSG Bulletin No.5. in January 1982).

A visit to the colony on 31st December, 1983 revealed 54 nests with eggs or newly hatched young. Further visits in January, 1984 indicated a particularly successful breeding season with most pairs raising at least one young. Altogether, 48 chicks were banded, out of some 60 or more young which were reared to fledging.

The colony is situated in an ideal location. It is on a small island some 30 metres diameter, permanently surrounded by water, and therefore safe from most ground predators. The Fairy Terns were occasionally seen in December being harried by an Artic Skua, but this does not appear to have adversely affected their breeding success.

The tidal range in Port Phillip Bay is small and relatively little affected by weather conditions - the nests are thus safe from flooding, a scourge of many coastal tern colonies. Finally the 1 metre tall vegetation which has been deliberately left around the perimeter of the island, protects the nesting birds from strong winds. The birds nest in the 20 metre diameter centre of the island which is cleared annually apart from a few isolated bits of low vegetation left in order to provide cover for the chicks.

Next clearance scheduled for July 1984!

CLIVE MINTON

CATCH PHRASES

One good turn deserves another - Ken Rogers when helping to prepare suitable breeding habitat for Fairy Terns on South Spit

They sit there radiating indecision - cold member of base camp referring to firing party.

Nemo tenetur ad impossible - (no one is required to do what is impossible) - perhaps a suitable motto for VWSG.

Unrecorded remark - by senior member on firing the wrong net. (We understand he has now retired to concentrate on passerines.)

Whom God destroys he first makes mad - James Dupont 1606 - 1679 - before deciding not to form the first wader study group?

- Contributions (preferably reasonably non-defamatory) for this section are welcome - Ed.

VICTORIAN WADER STUDY GROUP

Financial Statement from 1/7/83 to 15/3/84

INCOME	$	EXPENDITURE	$
Members' Subscriptions	465.00	Repairs & Equipment	114.40
Sale of Bulletin	2.00	Printing - Bulletins	378.56
Donations	1.65	Colour Bands	120.00
		Postage	87.35
		Bank fees	13.50
		Stationery	25.10
		Federal & State Taxes	1.34
	468.65		740.25
Cash in Bank - 1/7/83	471.48	Cash in Bank - 15/3/84	261.50
Cash/cheques in hand 1/7/83	80.18	Cash/cheques in hand 15/3/84	18.56
	1020.31		1020.31

BRENDA MURLIS,

Hon. Treasurer.

VICTORIAN WADER STUDY GROUP

DATES FOR FIELDWORK, FEBRUARY TO SEPTEMBER, 1984

DATE	PLACE & PRINCIPAL OBJECTIVES	TIDE TIME(HRS)	TIDE HEIGHT(m)
Feb 17 (Fri)	7.30 pm Monash Uni. Zoology Dept. Seminar Room. "Radar Studies of Wader Migration over the Oceans" Dr Timothy & Dr Janet Williams, Swarthmore College, Philidelphia		
Feb 18 (Sat)	Werribee Large catch of small waders for assessing proportion of juveniles and for obtaining retraps for annual survival estimates	1622	0.7
Feb 19 (Sun)	Point Henry Japanese Snipe - for departure weights		
Feb 25-26 (Sat/Sun)	Queenscliff A) Large catch of small waders for assessing proportion of juveniles and for obtaining retraps for annual survival estimates B) Crested & Fairy Terns (Sat. pm tide) C) Other species for which Feb samples are missing	1959(Sat) 0728 (Sun)	1.4 1.3
Mar 11-12 (Sun/Mon)	Yallock Creek Eastern Curlew, for departure weights	1849 (Sun) 0629 (Mon)	2.8 2.6
Mar 24-25 (Sat/Sun)	Queenscliff Departure weights for migrant waders	1740 (Sat) 0518 (Sun)	1.5 1.4
April 14 (Sat)	Werribee A) Late departing migrant waders B) Newly arrived Doublebanded Plovers C) Resident Pied Oystercatchers & Redcapped Plovers	1248	0.7
May 5 (Sat)	Yallock Creek Masked Lapwing. Doublebanded Plovers. Overwintering waders.	1616	3.1

DATE	PLACE & PRINCIPAL OBJECTIVES	TIDE TIME(HRS)	TIDE HEIGHT(m)
May 19 (Sat)	Altona Doublebanded Plover	1845	1.0
June 2-3 (Sat/Sun)	Queenscliff Hooded Plover (Lake Victoria) Winter wader flocks	1415 (Sat) 1457 (Sun)	1.6 1.6
June 23-24) June 30-) July 1)	National Winter Wader Counts (Contact Brett Lane at RAOU)		
June 30 (Sat)	Werribee Doublebanded Plover	1647	0.8
July 14 (Sat)	Altona Doublebanded Plover	1644	0.9
July 28-29 (Sat/Sun)	Werribee & Altona Doublebanded Plover	1529(Sat) 1616(Sun)	0.7 0.8
Aug 11-12 (Sat/Sun)	Werribee & Altona Doublebanded Plover	1531 (Sat) 1616 (Sun)	0.8 0.8
Sept 1 (Sat)	Yallock Creek Newly arrived migrants, especially Eastern Curlew	1701 (Sat)	3.0

The normal meeting time will be 5 hours before high tide. Please howevever phone CDTM. or one of the other contacts listed below, a few days before each planned date to advise of your availability and to obtain final details of the rendesvouz time and location. It is most desirable that people do phone in in this way rather than waiting for CDTM et al to make 30 or 40 phone calls before each field work weekend!

CONTACTS (* note new phone number/address)

Clive Minton - *589 4901 (home)
*661 2892 (office)
Address: 165 Dalgetty Rd., Beaumaris 3193

Brett Lane - 428 4694 (home) 370 1272 (RAOU office)
Ira Savage - 052-216253 (home)
Peter Dann - 059-56 8395 (home)
Brenda Murlis - 874 2860 (home)
John Dawson - 787 2082 (home)
Ken Rogers - 714 8433 (home) * 419 9511 (office)
Mark Barter - 233 3330 (home) 60 0591 (office)

C D T MINTON
1.2.84

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Mrs. Brenda Murlis,
Treasurer,
Victorian Wader Study Group,
34 Centre Road,
Vermont, Vic. 3133

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