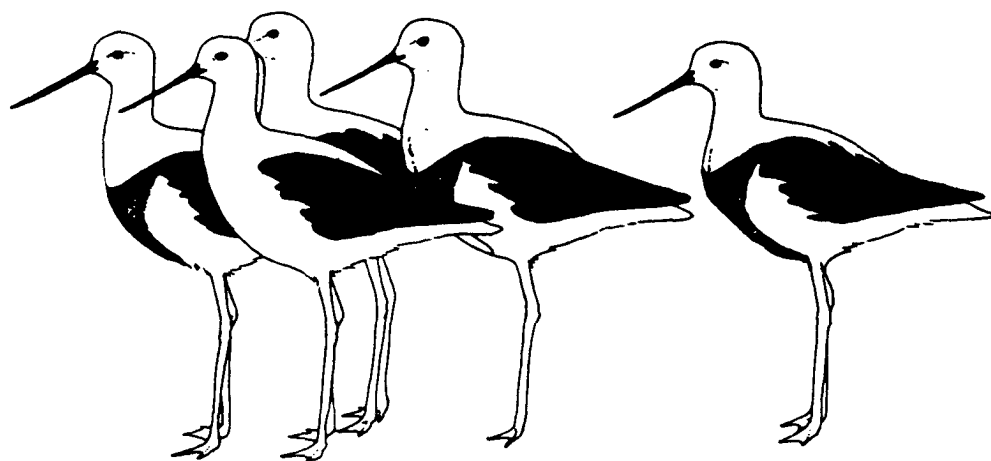


# The Stilt



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

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

1. To develop or assist with plans for wader research in Australasia in conjunction with other interested bodies;
2. To co-ordinate and encourage counting, banding, feeding studies and other scientific programmes involving amateur and professional skills;
3. To encourage and assist with the publication of results;
4. To maintain effective communication between wader enthusiasts within Australasia and with similar groups overseas;
5. To formulate and promote policies for the conservation and management of waders and their habitat.

EDITORIAL

It is very pleasing to see the increase in material contributed to *THE STILT*. The previous issue initiated two new regular sections on Asian wader studies and Australian wader banding and recovery data. This issue sees another regular section commencing with two articles from New Zealand. The status of New Zealand's waders is largely unknown outside that country and it is hoped that this new channel of communication between New Zealand's wader enthusiasts and the AWSG will encourage the New Zealanders to further their studies.

This issue includes the report for the 1986 Summer Wader Count, a paper describing seasonal changes of wader numbers at an inland site and 2 feeding studies. Also in this issue is further news from Interwader, an analysis of Great Knot data and some very interesting recoveries of waders overseas.

Thanks are extended to those who wrote in concerning the banding totals (see "An Apology and A Plea") and to Mark Barter for collecting most of the material for this issue prior to my return from overseas.

The previous editor, Peter Dunn, is to be congratulated for his efforts in raising *THE STILT* up to its present high standard, both in contents and presentation. It is now up to all future contributors and editors to maintain this standard.

Eric Woehler.

### DONATIONS TO THE AWSG RESEARCH FUND

In 1986 the AWSG received almost \$600 in tax-deductible donations to its Research Fund. This money has been used to meet the expenses associated with running the Group's research activities which consist primarily of the Population Monitoring and Regular Count Programmes. The majority of the expenditure involves the use of computers which not only is the most efficient method of storing data but also enables prompt reports to be produced. Marilyn Hewish's article on the 1986 Summer Count in this Stilt is such an example. The first Regular Count report will appear in the April 1987 Stilt.

Our ability to keep Membership Fees at \$10 depends on a healthy flow of donations to support the Scientific Programme. An average donation of \$5 per member (\$3 for most with tax deductibility) will enable us to cover both the costs of the current programme and to expand our efforts into new areas. Tax-free donations must be used for scientific purposes and are your way of directly supporting this essential work.

Please use the opportunity, when sending in your 1987 Subscription, to make a donation to the AWSG Research Fund (which is part of the RAOU Research Fund).

### AN APOLOGY AND A PLEA

The banding totals given in the table on Page 32 of The Stilt No. 8 were not, as stated, complete totals for Tasmania, Western Australia and Victoria but only comprised the work of the Shorebird and Wader Study Groups in those States. Also the banding period given at the top of the table is correct, whilst that given in the Editorial is not.

Our apologies for the confusion and our thanks to those who wrote to the Editor pointing out the errors.

As the Banding Scheme will only be able to supply Group banding totals for the foreseeable future, we request that all wader banders advise the Editor of the numbers of each species banded and the relevant sites so that a comprehensive table can be published annually in The Stilt.

Please send details by 1st February 1987 in order that the 1986 results can be published in the April 1987 edition of The Stilt.

### AWSG ACTIVITIES AT THE RAOU CONGRESS

The AWSG will have its own segment at the RAOU Congress to be held at the University of Adelaide on 13th and 14th December.

Four papers will be presented covering various aspects of wader studies including analysis of morphometric data, population dynamics and habitat degradation.

Further information can be obtained from:

Dr. D.C. Paton,  
47 Gilbert Street,  
GILBERTON,  
South Australia, 5001.

PLEASE WATCH OUT FOR COLOUR-DYED WADERS

All Red-necked Stints, Curlew Sandpipers, Sharp-tailed Sandpipers, Red Knots and Bar-tailed Godwits caught by the north Western Australia Expedition in August - September will be dyed yellow.

Additionally, Interwader is planning to catch and dye waders in S.E. Asia either pink or blue.

Dyed birds are often best identified in flight when the coloured underwing can be easily seen in wheeling flocks.

Please report any sightings to Brett Lane or Jon Starks at the R.A.O.U., 21 Gladstone Street, Moonee Ponds, Victoria, 3039. (Telephone: (03) 370 1272).

COORONG SURVEY, FEBRUARY 1987

A count of waders at The Coorong in south east South Australia will take place on the 6-8th February 1987. The ground counts on the 7th and 8th will be preceded by an aerial survey on the 6th to determine the main wader locations. Those interested in taking part should let Roger Jaensch, the count organiser know as soon as possible. His address is -

466 Canning Highway,  
ATTADALE, W.A. 6155.

Some assistance with petrol costs may be available to interstate participants and, if demand is sufficient, a mini-bus may run from Melbourne to transport counters from Victoria.

MORE PARTICIPANTS NEEDED FOR REGULAR COUNT PROJECT

The Regular Count Project of the AWSG aims to determine the timing of arrival, departure and migration of migratory species and flocking in resident species, and to monitor the effects of rainfall patterns on the movements of inland resident species.

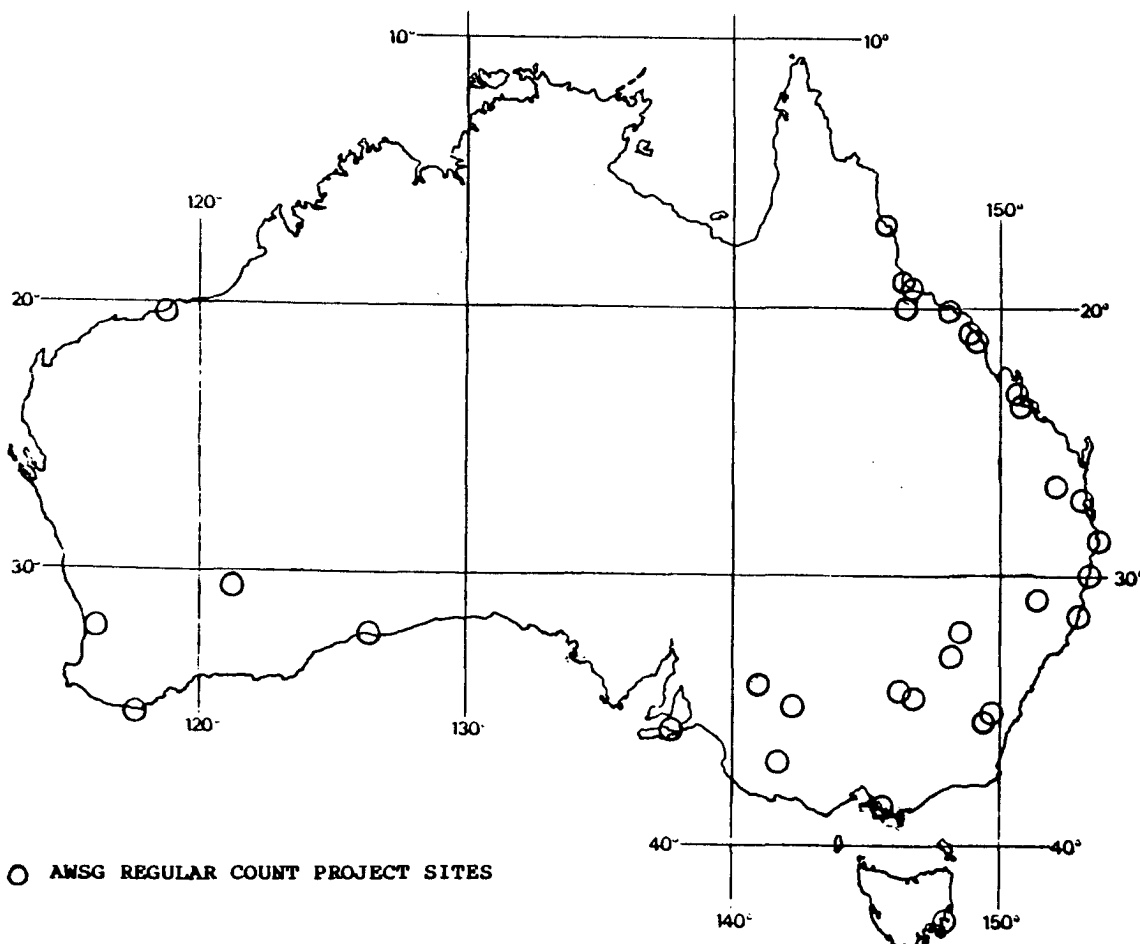
Participants are encouraged to conduct monthly or more frequent wader counts at discrete wetlands. The project will continue until the end of December, 1990. During this period participants are encouraged to continue regular counts for a minimum of two years.

The extent to which we can fulfill our aims depends largely on the coverage that we can get across the continent.

As can be seen from the accompanying map which shows sites presently being monitored, the eastern coast of the continent south to about Sydney is fairly well covered, as are the inland areas of south-eastern Australia. Better coverage is desperately needed in all other areas.

If you would like to participate in this project, please write to me at the address below.

Richard Alcorn,  
AWSG Regular Wader Count Coordinator,  
17 Lawrence Street,  
HORSHAM, Vic. 3400  
(053) 821 686



GREAT KNOTS PARTLY UNDONE

Mark Barter, 21 Chivalry Avenue, Glen Waverley, Victoria, 3150.

1. SUMMARY

An analysis has been carried out of morphometric data obtained from Great Knot (*Calidris tenuirostris*) caught in north Western Australia between 1981 and 1985. Results are given for different age-groups for wing, bill and total head lengths, weight, primary feather moult, degree of breeding plumage and age composition at different times during the non-breeding season. Significant differences exist in weight and moult between the Great Knot populations at Broome and Anna Plains. Preliminary percentage cumulative frequency analysis indicates that wing-total head and bill-lengths increase between August - September and October - November. More data is required to confirm these results.

2. INTRODUCTION

Until the late 1970's the world population of Great Knot (*Calidris tenuirostris*) was generally thought to be of the order of 10-20000 individuals. Since 1981, various expeditions to northern Australia, and more complete counts elsewhere in the country, have resulted in the current estimate of some 270 000 Great Knot spending the non-breeding season in Australia (Lane, pers. comm). The Great Knot in fact, is second only to the Red-necked Stint in abundance within Australia. The species is mainly concentrated in northern Australia in the Port Hedland - Broome region and the south-eastern corner of the Gulf of Carpentaria.

The Australasian Wader Studies Group has made five expeditions to north Western Australia from 1981 to 1985 and during this period has caught a total of 2163 Great Knot. The sample sizes by period are:

|                    |   |           |
|--------------------|---|-----------|
| August - September | - | 752 birds |
| October - November | - | 588 birds |
| March - April      | - | 823 birds |

Only a relatively small fraction of these birds were processed to any extent, generally because of the need to release birds expeditiously due to the very hot conditions particularly in the October - November and March - April periods. However, sufficient data is available to enable at least some preliminary analyses to be made.

Little biometric information on Great Knot has been published. Data from Prater et al (1977) and Cramp and Simmons (1983) is tabulated below and shows that male birds are smaller than females.

| Measurement | Age | Male                                |           |      |         | Female |           |      |         | Source |        |
|-------------|-----|-------------------------------------|-----------|------|---------|--------|-----------|------|---------|--------|--------|
|             |     | n                                   | $\bar{x}$ | sd   | R       | n      | $\bar{x}$ | sd   | R       |        |        |
| Wing-length | 2+  | 7                                   | 185       | 2.48 | 181-189 | 8      | 192       | 5.80 | 186-203 | Cramp  |        |
|             | 2   | 8                                   | 182       | 2.03 | 179-186 | 7      | 187       | 2.97 | 182-189 | Cramp  |        |
|             | 1   | 14                                  | 175       | 3.00 | 170-179 | 14     | 185       | 3.38 | 177-190 | Cramp  |        |
|             | 2+  | 14                                  | 185.7     | -    | 179-193 | 21     | 190.7     | -    | 181-198 | Prater |        |
|             | 1   | 16                                  | 176.3     | -    | 170-184 | 11     | 180.4     | -    | 171-189 | Prater |        |
| Bill        | -   | 31                                  | 42.1      | 1.78 | 39-45   | 36     | 43.8      | 0.96 | 41-47   | Cramp  |        |
|             | 2+  | 13                                  | 42.4      | -    | 39-45   | 18     | 43.9      | -    | 41-47   | Prater |        |
|             | 1   | 12                                  | 42.3      | -    | 40-45   | 11     | 41.5      | -    | 39-43   | Prater |        |
| Tarsus      | 3+  | n = 47, $\bar{x}$ = 34.7, R = 32-38 |           |      |         |        |           |      |         |        | Prater |
|             | 1   | n = 39, $\bar{x}$ = 34.4, R = 32-36 |           |      |         |        |           |      |         |        | Prater |

Table 1. Published biometric data on wing-length, bill and tarsus in mm. (n = number of birds,  $\bar{x}$  = means, sd = standard deviation, R = range. 2+ = two years and older, 2 = second-year birds, 1 = first-year birds).



Information on identification, plumage, distribution and movements can be found in Prater *et al* (*ibid*), Cramp and Simmons (*ibid*), Myers *et al* (1982) and Marchant (1986).

### 3. METHODS

Great Knot were caught by cannon-netting (Broome and Anna Plains) and mist-netting (Port Hedland) techniques.

Morphometric data, i.e. wing-length, bill and total head-length, weight and primary feather moult, was obtained using standard methods. The amount of breeding plumage was assessed subjectively.

Birds were aged by plumage and primary feather wear and the following code is used:

- 3+ - in third-year or older
- 2+ - in second-year or older
- 2 - in second-year
- 1 - in first-year

Second-year Great Knot become indistinguishable from 3+ birds when the primary moult has been completed and all 2 and 3+ birds then become 2+. Ages change on 1st August.

Percentage cumulative frequency (PCF) analysis was used to estimate sex-related differences in some measurements and the method used is described in Griffiths (1968).

### 4. RESULTS

#### 4.1 WING LENGTH

The frequency distributions of wing length, and the means and standard deviations of wing length, for the different age groups are shown in Figs. 1 and 2.

The average wing length of adult birds declines marginally from August - September (189.4mm) to October - November (188.6mm) and increases significantly ( $P < 0.025$ ) between October - November and March - April (190.6mm). The wing lengths of both first (179.3mm) and second-year birds (178.9mm) are significantly shorter than those of adult birds ( $P < 0.001$ ).

The average wing length of first year birds increases significantly by about 7mm when P10 is replaced during primary moult in the March - April period i.e. from 179.3 to 186.0mm.

The results of percentage cumulative frequency (PCF) analyses for the August - September and October - November adult samples are given in Table 2.

| Period           | Male  |      | Female |      | Inflexion Point | Sample Size |
|------------------|-------|------|--------|------|-----------------|-------------|
|                  | Mean  | sd   | Mean   | sd   |                 |             |
| August-September | 183.3 | 2.75 | 192.7  | 3.03 | 41%             | 123         |
| October-November | 185.9 | 3.53 | 193.4  | 2.45 | 63%             | 178         |

Table 2. Wing length data in mm for adult Great Knot in August - September and October - November as derived by PCF analysis.

The most satisfactory inflexion points were selected by using the  $\chi^2$  test to determine the value which gave the best fit of the calculated and actual wing length distributions. Sample sizes for adults in March - April and for other age groups at any time were too small for a satisfactory PCF analysis to be performed.

#### 4.2 BILL LENGTH

The frequency distributions, and means and standard deviations, of bill-lengths for the different age groups are shown in Fig. 3. Whilst reasonable sized adult samples were available for the August - September, October - November and March - April periods, suitable samples for second-year birds were only available for August - September and for first-year birds in March - April. The distributions for adult and second-year birds show varying degrees of bimodality but detailed PCF analysis was unsatisfactory either due to small sample size or to unsuitable curves. However, a preliminary analysis indicated that the bill length of both adult males and females appeared to increase from the August - September to October - November periods.

The difference between adult bill-lengths in August - September (43.7mm) and October - November (44.2mm) is not significant ( $p > 0.05$ ) and neither are the differences between adult and first-year birds in March - April (44.2 and 43.4mm, respectively) or adult and second-year birds in August - September (43.7 and 43.8 mm, respectively) (both  $P > 0.05$ ). The weighted average non-breeding season bill-lengths for the three age groups is given in Table 3, below. The differences in length are not significant.

| Age   | Number of birds | Mean | sd  |
|-------|-----------------|------|-----|
| 3+/2+ | 263             | 44.1 | 1.9 |
| 2     | 46              | 43.9 | 1.8 |
| 1     | 53              | 43.9 | 1.9 |

Table 3. Weighted average bill-lengths in mm for adult (3+/2+), second-year and first-year Great Knot.

#### 4.3 TOTAL HEAD LENGTH

The frequency distribution, and means and standard deviations, of total head lengths for all adult and second-year Great Knot and for adults at Anna Plains in August - September and Broome in October - November is given in Fig. 4.

The difference between the mean adult total head lengths at Anna Plains in August - September (74.9mm) and Broome in October - November (75.2mm) is not significant ( $P > 0.25$ ).

The mean total head length for all adult (75.2mm) is significantly greater than for second-year birds (74.5mm) ( $P < 0.55$ ).

No total head length measurements were made on first-year birds.

Whilst the frequency distribution is approximately normal for all 3+, there is evidence of bi-modal distributions when the Broome and Anna Plains data is analysed separately. PCF analysis gave the results shown in Table 4.

| Site                   | Sample Size | Male |      | Female |      | Inflexion Point |
|------------------------|-------------|------|------|--------|------|-----------------|
|                        |             | Mean | sd   | Mean   | sd   |                 |
| Anna Plains (Aug/Sept) | 52          | 73.0 | 0.98 | 75.7   | 1.15 | 38%             |
| Broome (Oct/Nov)       | 55          | 74.3 | 1.70 | 76.9   | 1.63 | 66%             |

Table 4. Adult male and female total head length data in mm obtained by PCF analysis.

The most satisfactory inflexion points were determined using the  $\chi^2$  test.

The PCF curve for second-year birds was unsuitable for detailed analysis but did indicate that the total head length distribution for this age-group is also bimodal.

#### 4.4 WEIGHT

Weight data for the different age groups during the August - September, October - November and March - April periods is shown in Table 5. The adult weights in the March - April period are shown in frequency histogram form in Fig. 5.

| Period       | Site        | Age | Sample size | Average Weight (g) | s d (g) |
|--------------|-------------|-----|-------------|--------------------|---------|
| Aug/Sep      | Broome      | 3+  | 80          | 147.8              | 14.3    |
| "            | Anna Plains | 3+  | 53          | 151.8              | 17.1    |
| "            | Broome      | 2   | 59          | 152.3              | 13.1    |
| "            | Anna Plains | 2   | 29          | 139.8              | 8.9     |
| Oct/Nov      | Broome      | 3+  | 175         | 147.7              | 12.2    |
| "            | Anna Plains | 3+  | 342         | 137.1              | 10.3    |
| "            | Pt. Hedland | 3+  | 13          | 140.4              | 12.6    |
| "            | All         | 2   | 25          | 140.7              | 12.1    |
| "            | All         | 1   | 23          | 128.5              | 12.6    |
| March/ April | Broome      | 1   | 76          | 143.4              | 15.4    |
| "            | Anna Plains | 1   | 60          | 130.2              | 10.0    |

Table 5. Weight data by period, site and age. (NB. weights in March/April are shown in Fig. 5).

With all three age groups, the average weight of Broome Great Knot is significantly higher than that of Anna Plains birds, except for adults during the August - September arrival period. The small sample of Port Hedland adults in October - November is not significantly different in weight from Anna Plains adults during the same period.

The decline in average weight at Broome between adult samples obtained on the 24th and 25th March 1985 (see Fig. 5) indicates that the heavier birds departed between the catches and this is confirmed by the frequency histograms for the two days. Anna Plains birds almost three weeks later were significantly lighter than the Broome adults caught in late March.

Use of the Summers and Waltner (1979) equation for maximum flight range gives a flying distance of 4500 Km for birds of average weight in the 24th March catch (i.e. 204.2g), whilst Great Knot at the approximate peak weight of 255g can fly about 7300 Km without re-fuelling. In the calculation it has been assumed that the fat-free weight of adults in Broome is 138.8g (i.e. 94% of 147.7g, assuming a 6% fat content in October - November birds) and the average flight speed is 75 Km per hour.

4.5 PRIMARY MOULT

The median primary moult scores (MPMS) by date, place and age are given in Table 6.

| Date        | Place        | 3+                      | 2                     |
|-------------|--------------|-------------------------|-----------------------|
| 24/8/82     | Anna Plains  | 0 <sup>29</sup> (26)    | 20 <sup>30</sup> [0]  |
| 30/8-2/9/81 | Broome       | 2 <sup>81</sup> (58)    | 38 <sup>44</sup> [7]  |
| 2-4/9/82    | Broome       | -                       | 32 <sup>14</sup> [14] |
| 7-8/9/82    | Anna Plains  | 0 <sup>14</sup> (36)    | -                     |
| 22/10/83    | Broome       | 29 <sup>32</sup> (100)  | -                     |
| 25/10/83    | Broome       | 28 <sup>26</sup> (100)  | -                     |
| 27/10/83    | Broome       | 30 <sup>26</sup> (100)  | -                     |
| 28/10/83    | Broome       | 30 <sup>94</sup> (100)  | -                     |
| 31/10/83    | Anna Plains  | 22 <sup>278</sup> (100) | 31 <sup>15</sup> [7]  |
| 7-10/11/83  | Port Hedland | 34 <sup>14</sup> (93)   | -                     |

Table 6. Median Primary Moult Scores of adults and second-year birds for different dates.

Key:  $x^n$  (Y) or [Y]  $x$  = MPMS

$n$  = number of birds in sample

(Y) = % commenced moulting

[Y] = % completed moulting

Adults (3+) appear to commence primary moult shortly after (or possibly before) arrival in north-west Australia as 58% are moulting by end of August/early September at Broome. Anna Plains adults appear to start moulting later than birds at Broome.

By late October, Broome adults have reached a MPMS of around 30, with all birds moulting, whilst those at Anna Plains have a significantly lower score of 22 ( $P < 0.005$ ). The considerable difference between the moult regimes at the two sites can be seen in the percentage frequency histograms shown in Fig. 6.

Port Hedland adults have a MPMS which is similar to that of Broome birds, allowing for the later catch dates, although one bird had not commenced primary moult.

Primary moult in second-year Great Knot is well in advance of adults in August - September with a small percentage of Broome birds having completed moult. As with adults, Anna Plains second-years have lower scores than Broome birds. By the end of October, Anna Plains birds had still not reached the MPMS value of Broome second-years some 8-9 weeks earlier.

Frequency histograms showing the number of primary feathers moulted, or in moult, for first-year birds in three catches during the March - April period are given in Fig. 7. Whilst the percentage of birds in active moult is similar for the three catches, Anna Plains first-years are well in advance of Broome birds with 45% having completed a full wing moult by mid-April, whilst none had done so at Broome by the end of March and only 8% (i.e. one bird in a small sample) by mid-April. Similarly, a far smaller percentage of Anna Plains second-years (17%) had failed to commence moult than Broome birds (57% on 24-26th March and 46% on 17-19th April).

The starting point for primary moult in first-year birds is detailed in Table 7. The "indeterminate" category consists of those birds for which it is impossible to establish the starting point because they are in the final stages of moult and the number in this category will obviously be greater for Anna Plains birds. The Broome results only cover the 43% of birds which had commenced moult. It can be seen that there is a different moult regime at Anna Plains, where moult almost invariably commences at the centre (i.e. P=7-8), than Broome where moult generally starts at P1.

| Place/Dates                | Primary Moult Commencement Point |               |              | Indeterminate |
|----------------------------|----------------------------------|---------------|--------------|---------------|
|                            | P1                               | Centre (P7-8) | P1+ "Centre" |               |
| Broome<br>(24-26/3/85)     | 11                               | 1             | 2            | 3             |
| Anna Plains<br>(5-13/4/85) | 1                                | 12            | 1            | 34            |

Table 7. Numbers of first-year birds commencing primary moult at different positions in the primary feather tract.

4.6 BREEDING PLUMAGE

A limited amount of information was obtained on breeding plumage and this is summarised in Table 8. The degree of breeding plumage was subjectively scored for each bird on a fractional basis and the results given are catch averages.

| Date       | Place       | Sample size | Average breeding plumage fraction |
|------------|-------------|-------------|-----------------------------------|
| 24-26/3/85 | Broome      | 124         | 0.52 (sd 0.25)                    |
| 13/4/85    | Anna Plains | 12          | 0.29 (sd 0.10)                    |

Table 8. Average breeding plumage fraction data for adults.

The difference between Broome and Anna Plains adults is significant ( $P < 0.005$ ), with the Anna Plains birds having a lower fraction even though the catch date is some three weeks later than at Broome.

4.7 AGE COMPOSITION

The age composition of catches during different periods of the non-breeding season are given in Table 9.

| Date (s)      | Place       | 3+/2+     | 2        | 1         |
|---------------|-------------|-----------|----------|-----------|
| 22-24/8/82    | Anna Plains | 59% (41)  | 41% (28) | -         |
| 30/8-2/9/81   | Broome      | 64% (80)  | 36% (45) | -         |
| 22-27/10/83   | Broome      | 96% (171) | 3% (6)   | 1% (2)    |
| 31/10-5/11/83 | Anna Plains | 95% (345) | 4% (16)  | 1% (4)    |
| 24-26/3/85    | Broome      | 74% (125) | -        | 26% (44)  |
| 30/3/82       | Broome      | 63% (15)  | -        | 37% (25)  |
| 13/4/85       | Anna Plains | 19% (9)   | -        | 81% (38)  |
| 17-19/4/85    | Broome      | 16% (51)  | -        | 84% (275) |

Table 9. Age composition at different times. ( ) = number of birds in sample.

The changes in percentages of birds of different ages in August - September and March - April are consistent with the arrival and departure of adult birds, respectively, and the age-composition of the large samples at Broome and Anna Plains in October - November are very similar.

## 5. DISCUSSION

In considering differences in the means of sex-related measurements of different samples it should be borne in mind that the means will be affected by variations in the sex ratio of the samples due to the significant sexual dimorphism in Great Knot. Preliminary PCF analyses of wing and total head length indicate that there is a higher percentage of adult males in the October - November sample than in the August - September period.

The average wing length of adults, and first-year birds with old outer primaries fall between the averages for male and female specimens given in Table 1. However, second-year birds have an average wing length which is less than that given for males. This discrepancy is difficult to explain, especially as wing-lengths of specimens tend to be less than those of live birds.

The significantly shorter wing length of both first- and second-year birds compared to adults agrees with the data for museum specimens. The changes in mean wing-lengths of adults are consistent with primary feather wear and replacement, notwithstanding the apparent changes in sex-ratio.

The decline in wing-length between first-year birds with new outer primaries in March - April and second-year birds in August - September is probably exaggerated, as a substantial portion of first-years may not replace the outer primary during the partial or total primary moult undertaken in the first-half of the year.

Speculation on possible reasons for the apparent significant increases in wing length, as determined by PCF analysis, between August - September and October - November must be reserved until additional data is obtained. However, it is interesting to note that similar increases occur in total head-length (statistically significant) and, in a preliminary analysis on small samples, for bill length.

The weighted average bill-lengths determined in this study are longer than those given for either sex in Table 1. The cause of this difference is possibly bill shrinkage in museum material.

The probable explanation of the significant difference in means of total head-lengths for adult and second-year birds is different sex ratios in the two age groups.



The considerable differences in weight of all age groups between Broome and Anna Plains is difficult to explain. A possible explanation is that Broome is favoured by heavier females and Anna Plains by the lighter male birds.

Birds of average weight in late March can fly as far as south-western China (4500Km), whilst Great Knot at the maximum weight of around 250-260g could comfortably reach Shanghai (5500Km), where two Great Knot banded in north Western Australia in recent years have been retrapped.

The differences, previously noted for weight, and possibly total head-length, between Great Knot at Broome and Anna Plains also extend to primary moult, where both adults and second-year birds at Broome have higher MPMS values than Anna Plains birds. In the case of first-year birds, those at Anna Plains are well in advance of Broome in March - April and also appear to commence moult at different primary feather positions. It seems likely that not all Broome first-years undergo a complete primary moult, whilst most Anna Plains birds do.

The earlier primary moult of second-year birds at Broome could be due to the need to replace feathers that had not been renewed earlier in the year. Anna Plains birds, which appear to undergo a more complete primary moult as first-years, may be able to delay second-year moult without unduly affecting flight efficiency. It seems unlikely that a similar explanation could be extended to explain the site differences for adult birds as it is generally observed that adult waders in the southern hemisphere commence primary moult soon after arrival at their non-breeding destinations.

The significant difference between average breeding plumage fractions at Broome and Anna Plains could be due to the Anna Plains birds' pre-breeding hormonal condition being less well-developed than that of Broome birds. Thus, the resulting reduced urge to migrate would also be associated with delayed moult into breeding plumage.

The very low percentages of first-year birds in the October - November samples indicates either very poor breeding success or that the major influx of first-years occurs at a later date.

## 6. CONCLUSIONS

1. The average wing-lengths of adult and first-year Great Knot determined from live birds are consistent with those for museum material, whilst second-year birds have an average wing-length which is shorter than the mean for male museum species.

2. The average bill-lengths determined in this study are longer than for museum material. This could be due to bill-shrinkage in specimens.

3. Substantial and significant differences exist between the Great Knot populations at Broome and Anna Plains for weight and moult at all ages and, possibly total head-length.

4. Preliminary percentage cumulative frequency analysis indicates that the wing-length, total head-length and bill-lengths of both sexes increase between the August - September and October - November periods. However, further confirmation of these trends is required.

5. Great Knot are capable of flying non-stop from north Western Australia to the Chinese coast. Birds close to maximum weight can comfortably reach the Shanghai region.

7. ACKNOWLEDGEMENTS

I am grateful to the Australasian Wader Studies Group for making their data available for analysis and to those sun-burnt helpers who perspired copiously whilst collecting the data. My thanks also to Karen Barter for typing the various drafts of this paper.

8. REFERENCES

- Cramp, S., and Simmons, K.E.L. (eds) 1983. The Birds of the Western Palearctic. Vol. 3. Oxford.
- Griffiths, J. 1968. Multimodal frequency distributions in bird populations. Bird Study, 15:29-32.
- Marchant, J.H. 1986. Identification, habits and status of Great Knot. Brit. Birds, 79:123-135.
- Myers, J.P., Hilden, O. and Tomkovich, P. 1982. Exotic Calidris species of the Siberian Tundra. Ornis Fennica, 59:175-182.
- Prater, A.J., Marchant, J.H. and Vuorinen, J. 1977. Identification and Ageing of Holarctic Waders. BTO Guide 17. Tring, U.K.
- Summers, R.W. and Waltner, M. 1979. Seasonal variations in the mass of waders in Southern Africa, with special reference to migration. Ostrich 50:21-37.

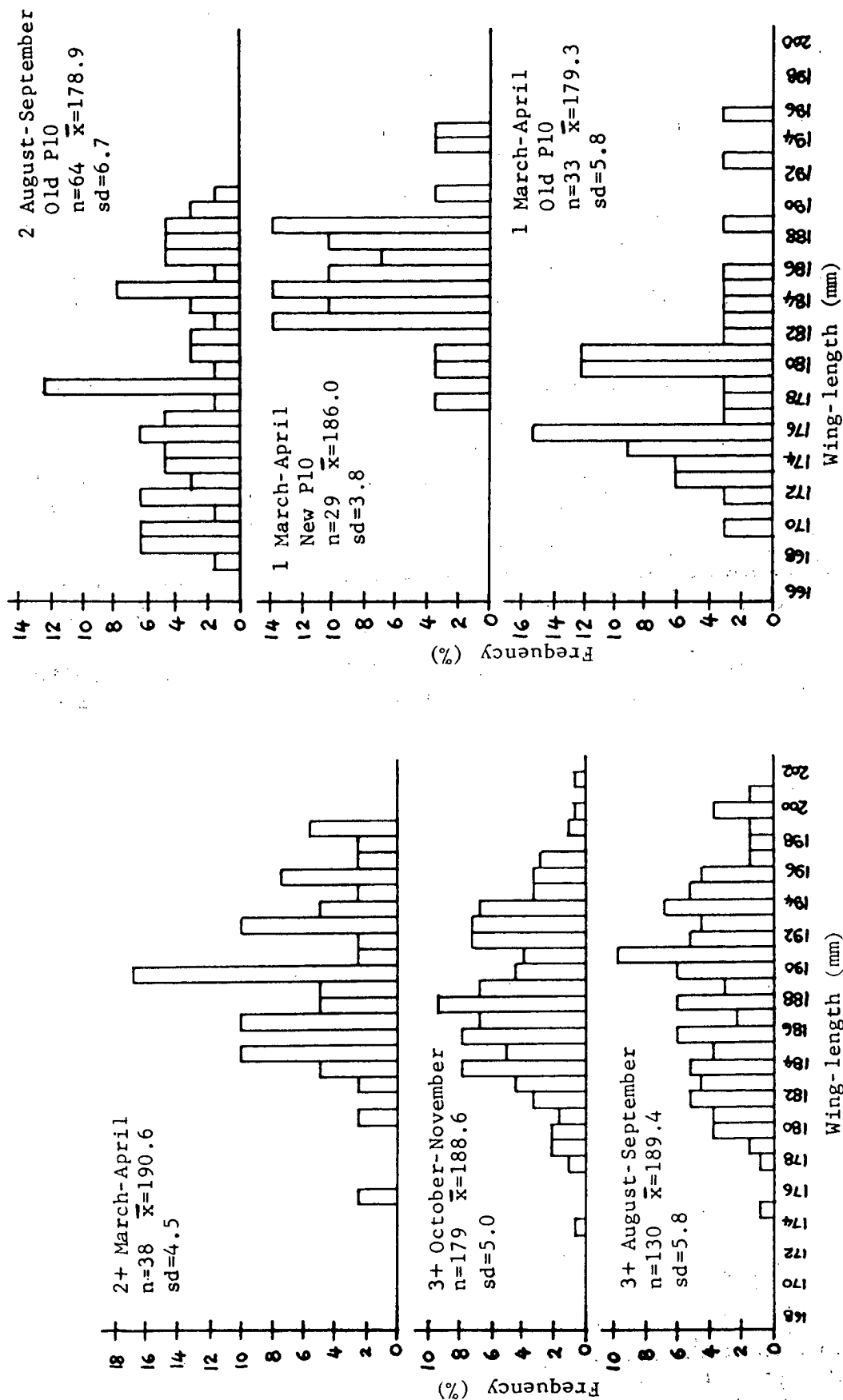
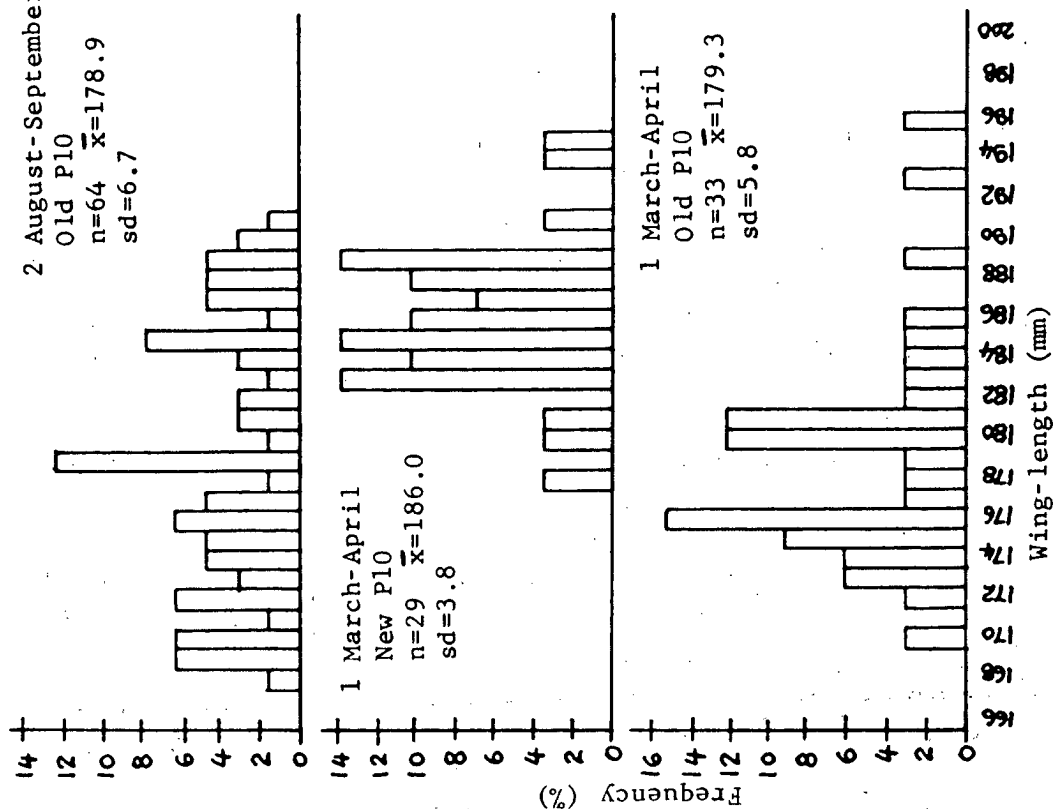


Fig 1. Frequency histograms of wing-length for adult (3+/2+) Great Knot in August-September, October-November and March-April

Fig 2. Frequency histograms of wing-length for first- and second-year Great Knot



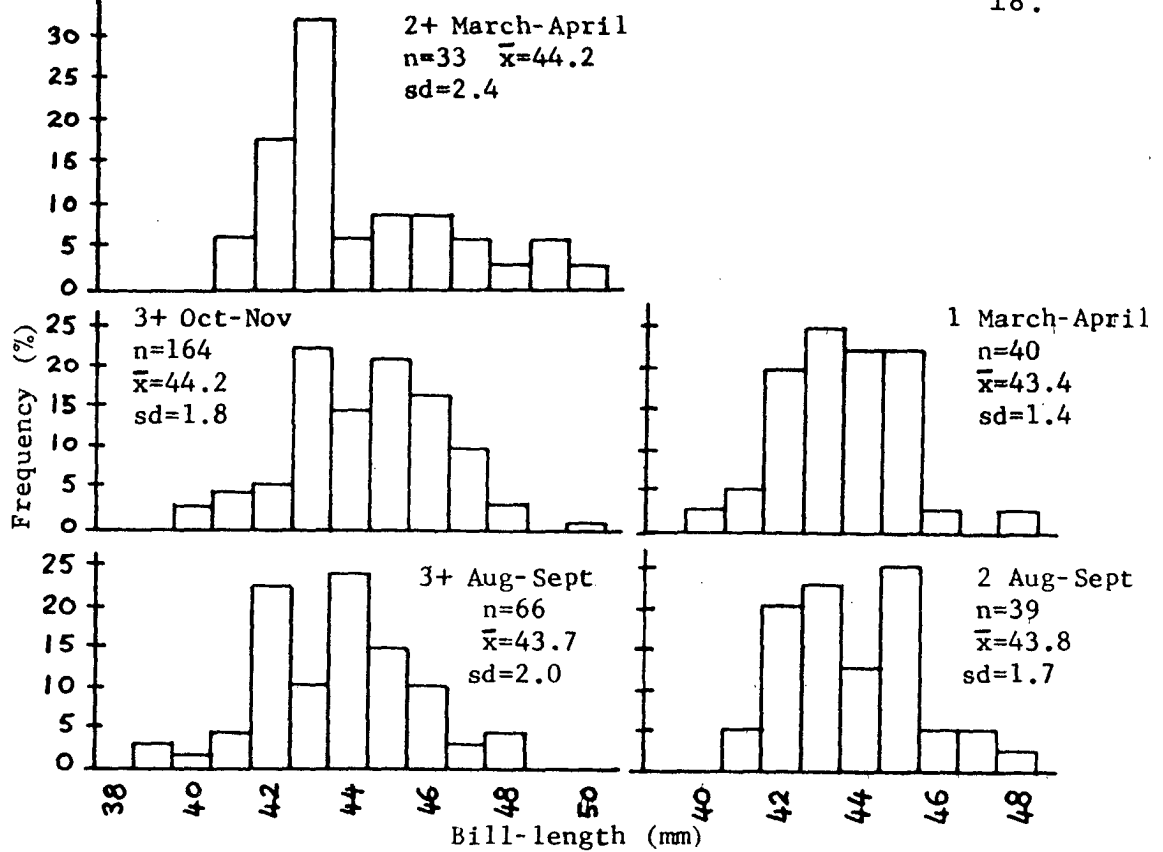


Fig 3. Frequency histograms of bill-length for adult (3+/2+), first- and second-year Great Knot at different times

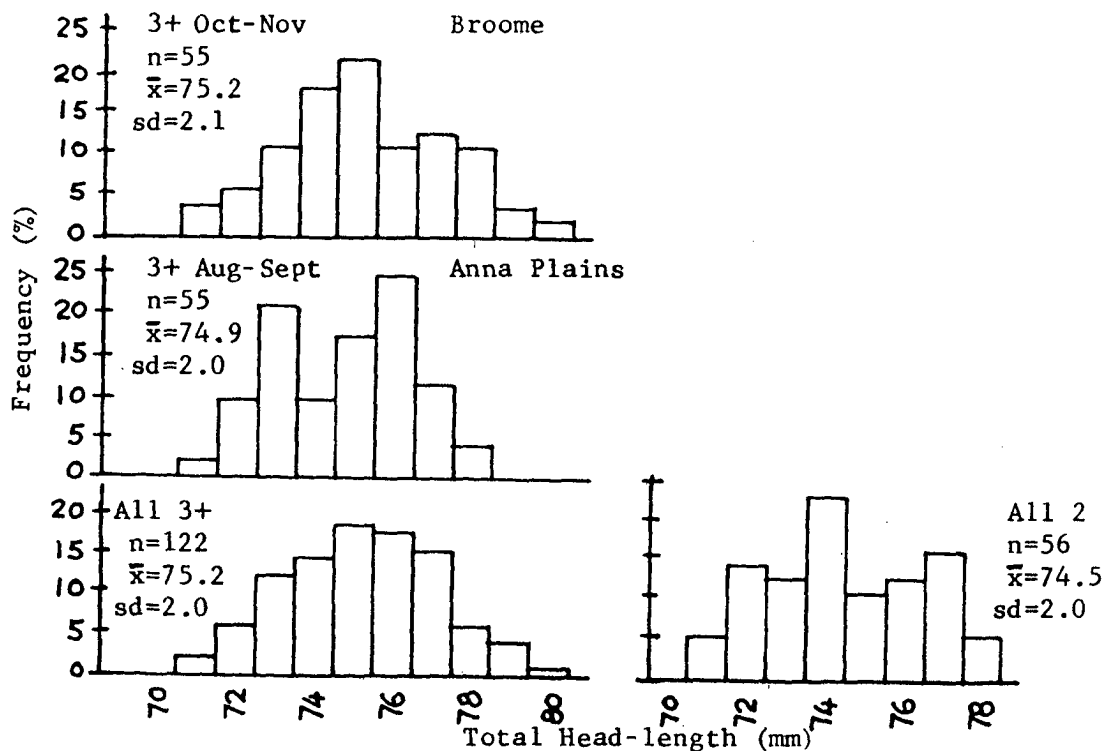


Fig 4. Frequency histograms of total head-length for adult (3+) and second-year Great Knot

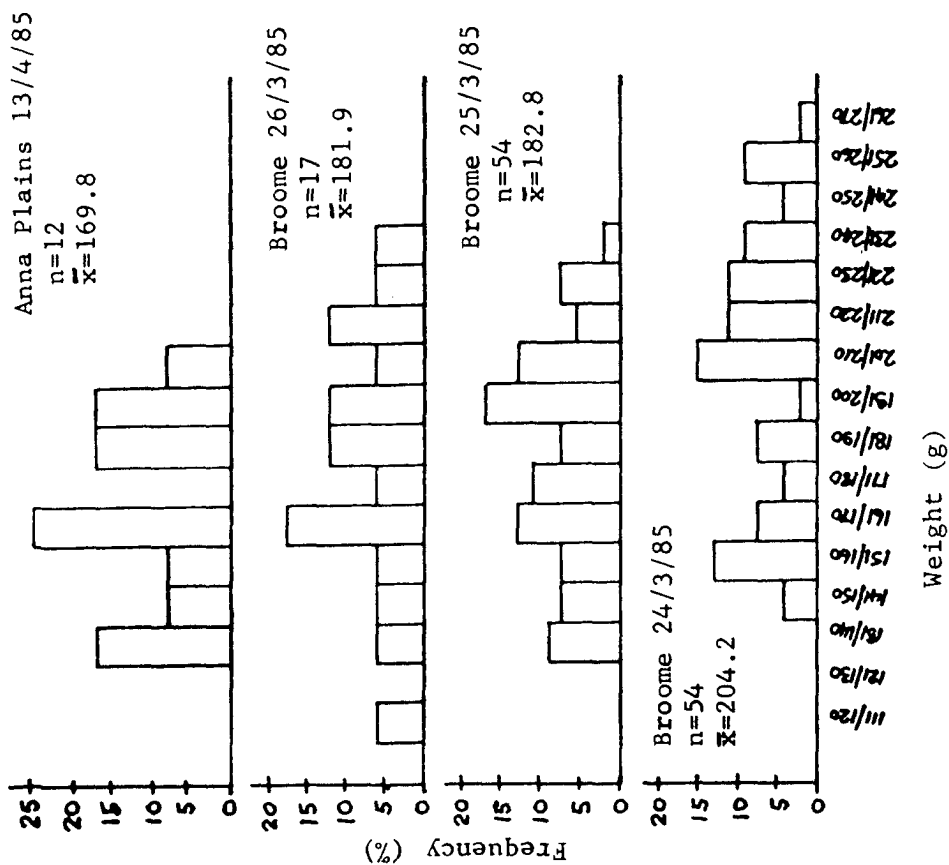


Fig 5. Frequency histograms of weights of adult Great Knot on three successive days at Broome and three weeks later at Anna Plains during the March-April period

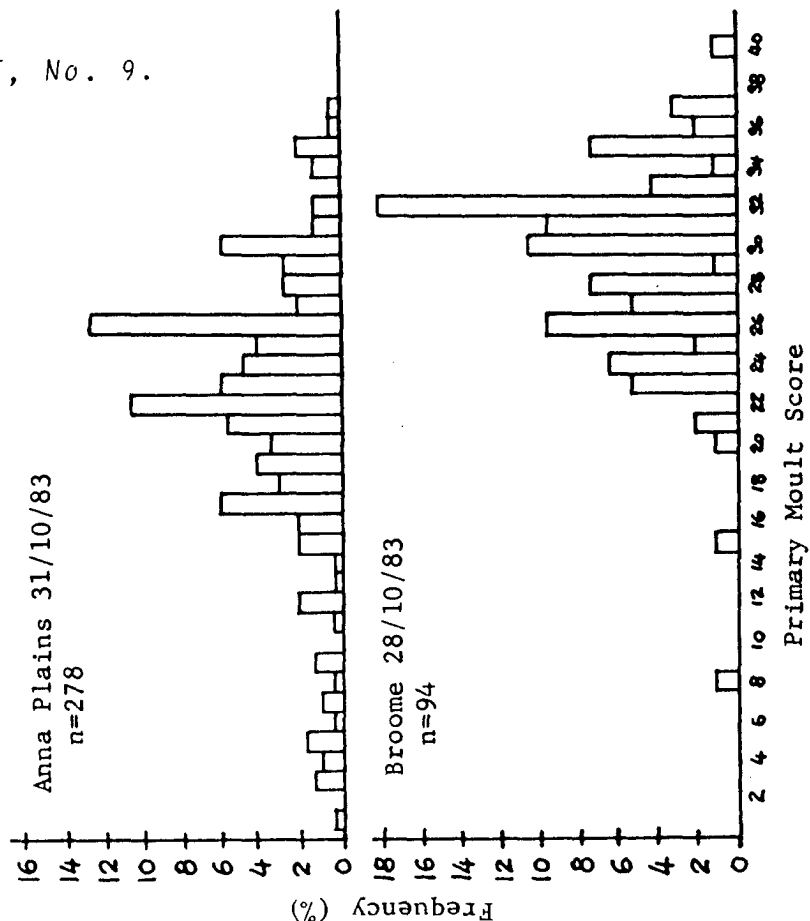


Fig 6. Frequency histograms of primary moult score of adult Great Knot at Anna Plains and Broome on comparable dates

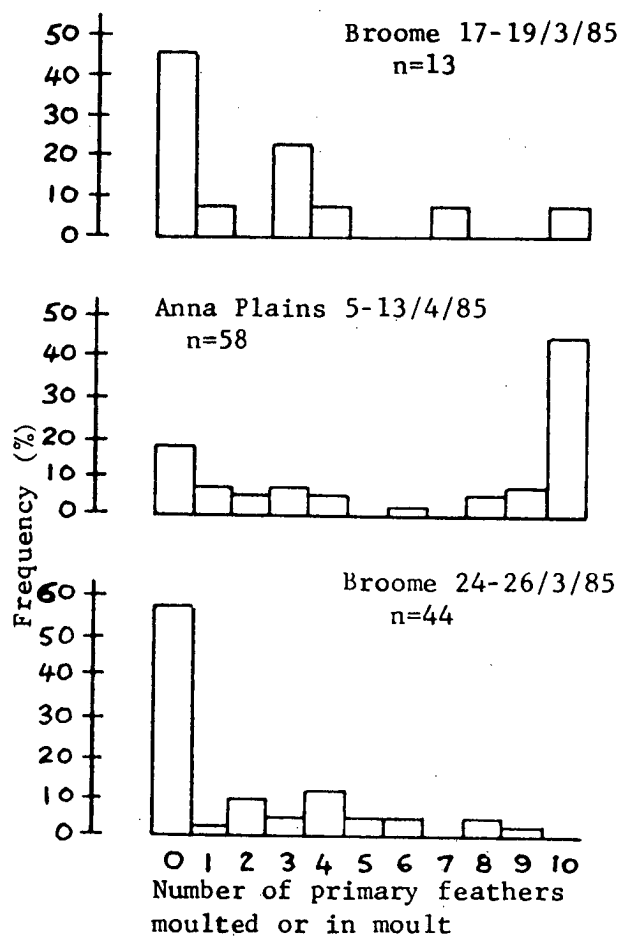


Fig 7. Frequency histograms showing number of primary feathers moulted or in moult for first-year birds in the March-April period

THE A.W.S.G. POPULATION MONITORING PROJECT: REPORT ON THE  
SUMMER 1986 WADER COUNT

Marilyn Hewish, 74 Wellington Street, Bacchus Marsh, Victoria, 3340.

The Population Monitoring Project of the A.W.S.G. has been designed to provide information on year-to-year changes in populations of Australia's waders at selected sites. Wader distribution information obtained from the R.A.O.U. Wader Studies Programme, 1981-85, has enabled the selection of 23 sites of national significance for waders in 7 states. These sites will be counted twice-yearly in February and June for 5 years, 1986-1990, in a complete and consistent fashion, so that population levels can be followed as a whole, for particular sites, and for particular species.

The summer, 1986, count took place on February 1st/2nd and 8th/9th, at the 23 areas listed in Table 1. A total of 260,489 waders of 42 species were counted. Details of wader species and numbers counted in each area are given in Table 2. It has been estimated that the total summer population of waders in Australia is 1.8 million. Thus the monitoring count has detected approximately 14% of the estimated population. Five-year monitoring of an initial population of approximately a quarter of a million birds should give an indication of fluctuations in the Australian population as a whole, for comparison with trends in individual areas.

118 count sheets were returned, each corresponding to a separate roost or wetland. In the 1984 summer count, 685 sheets were returned, the maximum number for any year during the R.A.O.U. National Wader Counts. Thus, the monitoring project effort and site coverage represent a significant proportion (17%) of those in this closest approach to national coverage in 1984. It is hoped that the monitoring programme represents a balance between adequate site and population coverage, and a sustainable level of regular effort among the participants.

Although the summer 1986 count was only the first of the monitoring project, some inferences can be drawn from a comparison with the results of summer National Wader Counts organised for the R.A.O.U. from 1981 to 1985. Ten areas, in which site coverage has been consistent in each summer from 1981 to 1986, have been selected for further analysis. These areas are Botany Bay (NSW), Corner Inlet, Westernport four Port Phillip Bay sites (VIC), south-eastern coast (SA), Swan coastal plain (WA), and Cape Portland (TAS). These ten areas were chosen for preliminary analysis, as the 1986 count area corresponded exactly to a complete zone counted in 1981-85. Figure 1 shows the sum of all wader species counted in these ten areas in each summer count from 1981 to 1986. Similarly, the figure shows the total counts for

each of eight wader species, for the ten areas for each year. In this way, population trends in ten consistently-covered areas become apparent. Caution must be exercised in extrapolating these trends to the Australian population, however, as Victorian sites are heavily represented in this sample.

The total number of all waders at these ten sites has fluctuated over the six years, but shows no consistent decline or increase. Similarly, Lesser Golden Plovers, Eastern Curlews, Greenshanks, Sharp-tailed Sandpipers, Red-necked Stints, and Curlew Sandpipers have fluctuated in numbers, with no consistent trend emerging, although years of notable increase or decrease in numbers are readily apparent. It is a little surprising that Eastern Curlew counts have shown such consistency over the six years. A reduction in numbers at the extremities of their range (Tasmania and South Australia) has led to suggestions that the population is declining (Close and Newman, 1984), but this is not apparent in these counts over a wider area. Red Knots had a successful breeding season in 1985 (Victorian Wader Study Group, pers. comm.), and this is reflected in their high count in summer 1986. In fact, Bar-tailed Godwits and Red Knots seem to show a consistent increase in numbers over the six year period, and it will be interesting to see if this trend is continued in the next four years. The large fluctuations in the numbers of Sharp-tailed Sandpipers may, in part, reflect years of good or poor breeding success, or the availability of inland wetlands. However, Sharp-tailed Sandpipers begin northward migration in mid-February, so that the count result is strongly influenced by the date chosen for the February count; the later the count, the greater the likelihood that numbers will be lower due to departure of some of the population. 1986 was a good year for Lesser Golden Plovers, Bar-tailed Godwits, Red Knots, and Sharp-tailed Sandpipers, and an average year for Eastern Curlews, Greenshanks, Red-necked Stints and Curlew Sandpipers.

More detailed information on year-to-year changes in wader populations will be available, when data from individual count sheets from 1981-5 are extracted from National Wader Count records. Direct comparison will then be possible for the 23 monitoring sites from 1981-86, and, by the end of the monitoring project, we will have information from ten consecutive years for many of them.

As this programme is designed to monitor population trends, it is helpful if wader counts and regional co-ordinators note on their count sheets any notable change in wader numbers in particular counts or areas, and any trends which they have noticed. As National Co-ordinator, it is difficult for me to remember the patterns of wader distribution and numbers in 23 sites, and I



must rely heavily on the experience of counters who are familiar with their areas. I would also encourage counters and co-ordinators to note any disturbance to waders and destruction of wader habitat in their areas, as, when the project has been completed, it may be possible to correlate changes in population levels in particular areas with these factors.

Several counters have provided such information with the summer 1986 count results, and I quote from some of their comments on disturbance to waders and wader sites.

Marie Johnson, describing the Cobaki Road west site at Tweed Heads, N.S.W. wrote "There have been large numbers of Black-winged Stilts and Black-fronted Plovers until recently, but there is housing development going on, and already a very large area has been filled - the reason for the numbers of birds diminishing."

Alan Morris, Botany Bay, N.S.W.: "The count for Eastern Curlews at 55 is too low as the birds were subject to harrassment on the day of the count (2 joggers, 1 jet ski, and 2 motor boats). The usual expected number should have been 180-215."

Ruby Henderson, Toorbul, QLD.: ".....the waders had, in the main, deserted the first site, where they have congregated for all the years I have counted there. The main body was at a site south of this. We feel that the pressure of closer settlement on this piece of coastline, with more children and dogs etc., must be forcing the birds further south. Also, lots of small shrubs growing naturally along the shoreline have been cut down, thus robbing the birds of a screen from houses and people."

Some counters have noted unusual numbers or species of waders in an area:

Tim Murphy, north mouth of Brisbane River, QLD.: "The numbers of birds on the mudflats, feeding at very low tide, were as large as I have ever seen. The numbers of Stints were very large."

Jamie Matthew, Price Saltfields, S.A.: (on the count of 70 Whimbrels) ".....an exceptionally high number - found on coast at high tide among mangroves. Very low numbers of Godwits and Knots - probably due to high water levels compared to other years." These Whimbrels, together with one at Clinton Conservation Park, and 10 along the S.E. coast, made a total of 81 counted in S.A. This is the highest S.A. Whimbrel count since summer 1981, when 90 were counted in the Gulf St. Vincent area. Since then summer counts have recorded 9 in 1982, 7 in 1983, 2 in 1984, and 1 in 1985.

Bob Swindley reported that a Baird's Sandpiper was present at Lake Connearre, near Geelong, Vic. on the 1st, 6th, 8th and 9th of February (first found by F.T.H. Smith and F. Anderson). It was not, however, seen during the official count.

In summer 1986, Alan Morris gained admission for the first time to the Naval Armaments Depot near Homebush Bay in the Paramatta River area of N.S.W. He wrote, ".....we found about twice the numbers of waders counted elsewhere in the Paramatta - no doubt the place would act as a good high tide roost when disturbance on the Paramatta River on weekends reaches an intolerable level." This demonstrates that, even after five years of National Wader Counts, there is still much to be learned about wader sites and movements, at the local as well as the national level. I hope that the Population Monitoring Project will be as successful as the R.A.O.U. Wader Studies Programme which preceded it, in increasing our knowledge of Australia's waders and contributing to their conservation.

#### ACKNOWLEDGEMENTS

It is a privilege to work with a team made up of the individuals and organisations listed below.

Any large-scale project, such as this one, owes its existence to the hundreds of people who do the work. I am most grateful to the wader counters, who brave heat, mud, howling gales, and rough seas (Lindsay Bone, at Bakers Creek, Mackay, counted 500 Bar-tailed Godwits while "dodging 1 metre waves in a 3 metre dinghy."). The participants' efforts in this count, and over the last six years, are much appreciated.

I would like to thank the regional organisers. I rely completely on their knowledge of their areas, and they are hard-working and unfailingly helpful. They are Alan Morris (Shoalhaven Estuary, Botany Bay, Paramatta River, N.S.W.), Jim Perry (Hunter Estuary, N.S.W.), John Martindale (Clarence/Richmond estuaries, N.S.W.), Clive Minton and Peter Dann (Corner Inlet, Vic.), Val Curtis (Westernport, Vic.), Mike Carter (Eastern Port Phillip Bay, Vic.), Claire Appleby (Altona, Vic.), Brett Lane (Werribee/Altona, Vic.), Margaret Cameron (Bellarine Peninsula, Vic.), Denis Watson (Moreton Bay, QLD.), Lindsay Bone (Mackay area, QLD.), Dawn Magarry, (Cairns area, QLD.), Niven McCrie (Darwin area, N.T.), Mike Bamford (Swan coastal plain, Albany area, W.A.), Jamie Matthew (Gulf St. Vincent, western Eyre Peninsula, south-eastern coast, S.A.), and Bob Patterson (Derwent Estuary, Marion Bay, Cape Portland, TAS.).

The Department of Conservation, Forests, and Lands provided a boat and personnel for the Corner Inlet and Mud Island counts. When rough seas prevented a count of the specified count day, they were most helpful in arranging an alternative date.

I would like to thank the committee of the A.W.S.G. for their help and encouragement. Brett Lane and Mark Barter, in particular, have worked towards making my task an easier one. Terry Barter was very helpful in arranging printing of count sheets.

The A.W.S.G. is grateful for the assistance of the R.A.O.U. in setting up the R.A.O.U. Research Fund to support the expenses of this project, and in providing computer facilities for analysing the data.

#### REFERENCES

Close, D.H. and Newman, O.M.G. (1984). The decline of the Eastern Curlew in south-eastern Australia. *Emu*. 84: 38-40.

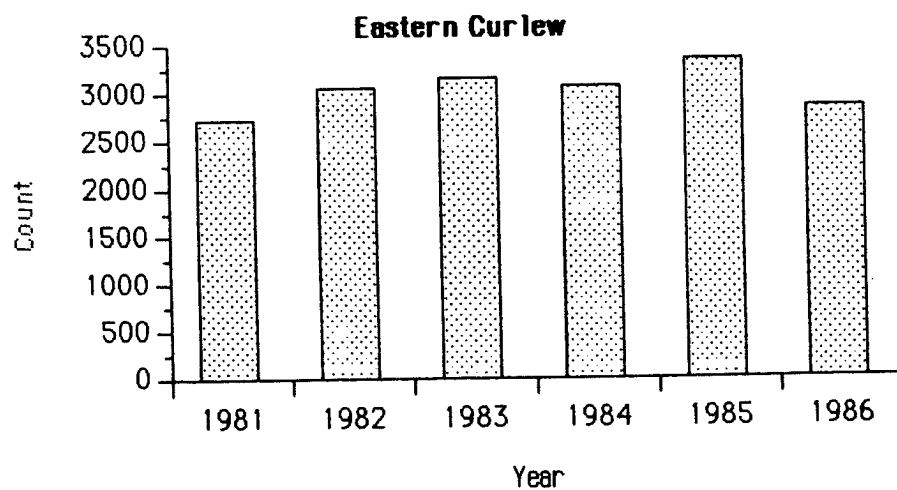
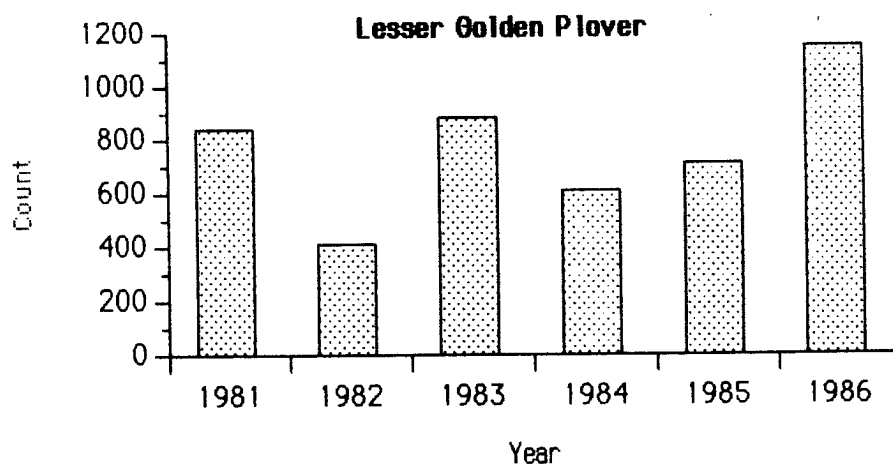
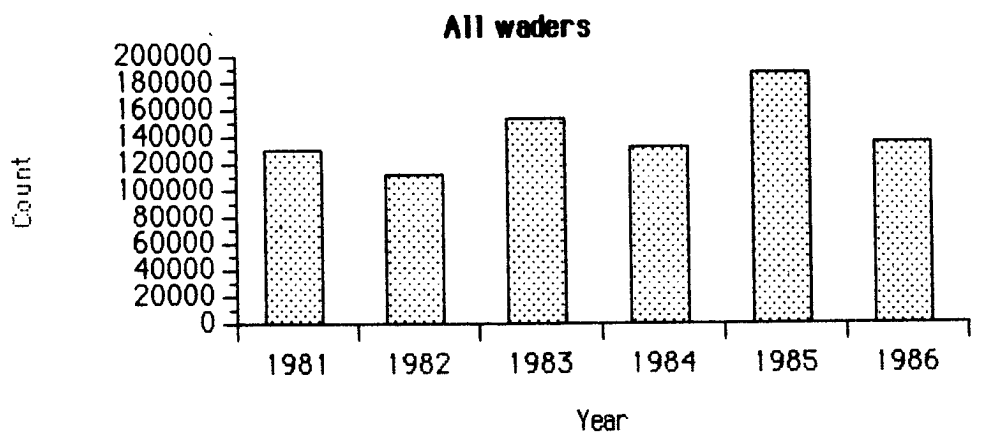
Table 1. Areas counted for the Population Monitoring Project, summer 1986.

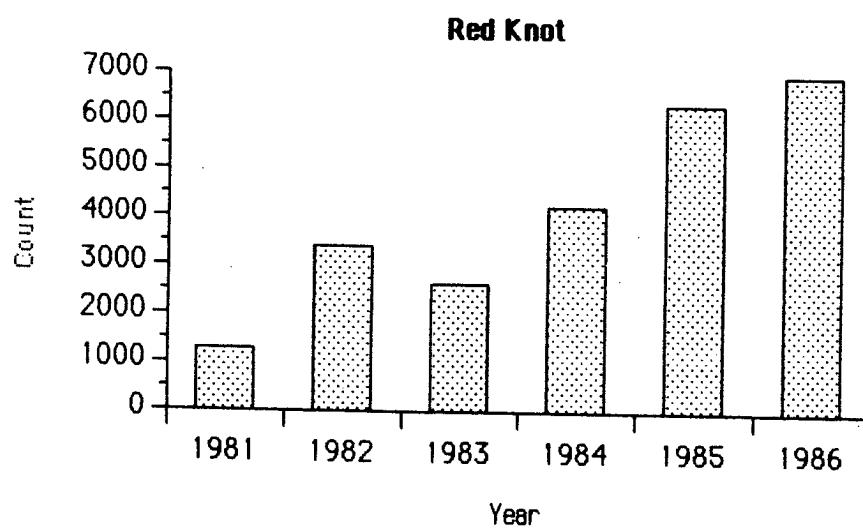
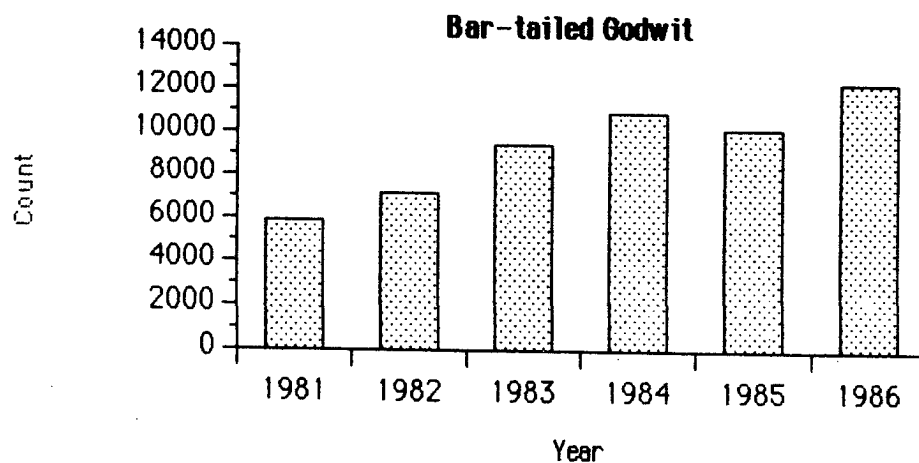
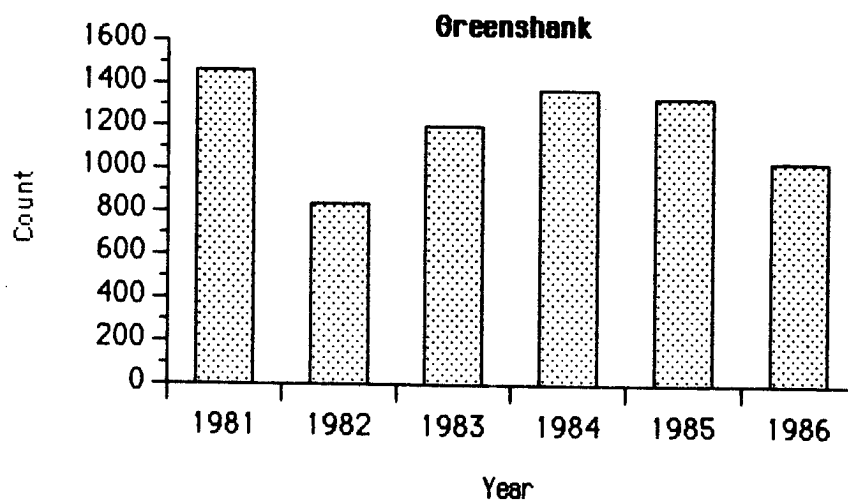
| <u>STATE</u> | <u>AREAS</u>   |
|--------------|--|
| N.S.W.       | Shoalhaven Estuary<br>Botany Bay<br>Paramatta River<br>Hunter Estuary<br>Clarence/Richmond estuaries             |
| VIC.         | Corner Inlet<br>Westernport<br>Eastern Port Phillip Bay<br>Altona area<br>Werribee/Avalon<br>Bellarine Peninsula |
| QLD.         | Moreton Bay<br>Mackay area<br>Cairns area  |
| S.A.         | Western Eyre Peninsula<br>South-eastern coast<br>Gulf St. Vincent  |
| W.A.         | Albany area<br>Swan coastal plain  |
| TAS.         | Derwent Estuary<br>Marion Bay<br>Cape Portland   |
| N.T.         | Darwin area  |

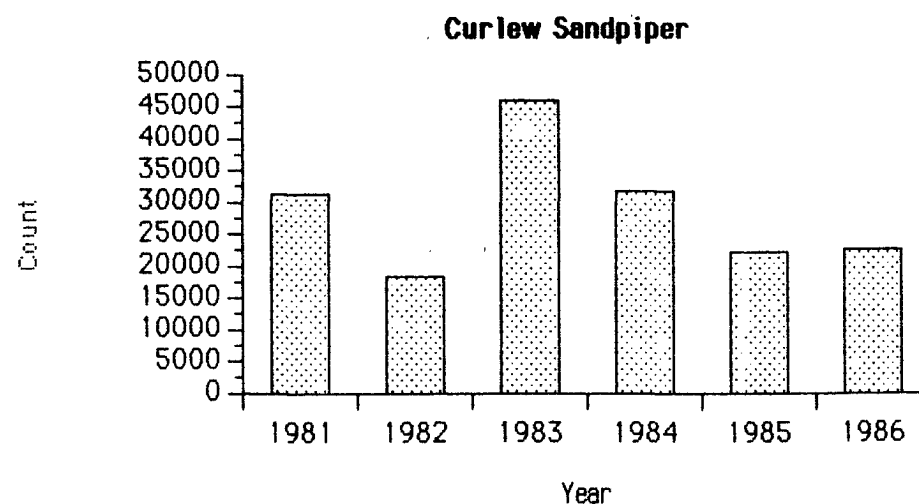
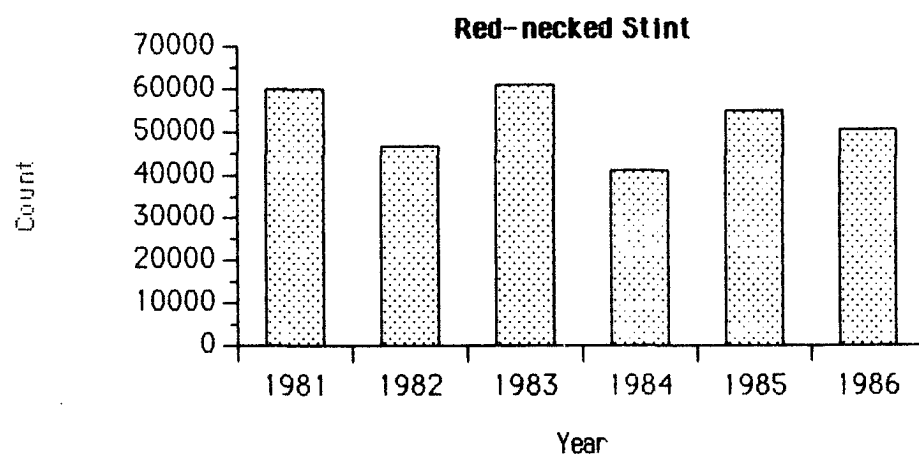
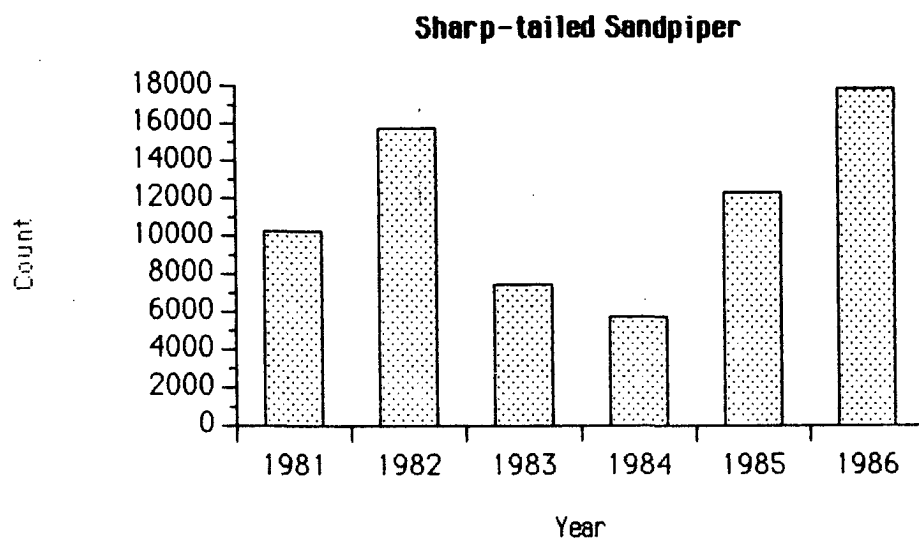
TABLE 2. RESULTS OF THE SUMMER 1986 WADER COUNT  
AT 23 SELECTED SITES

|                      | CLARENCE/<br>RICHMOND | HUNTER<br>ESTUARY | PARAMATTA<br>RIVER | BOTANY BAY | SHOALHAVEN<br>ESTUARY | CORNER/SHALLOW<br>INLETS | WESTERNPORT | PHILLIP BAY | ALTONA | WERRIBEE/<br>AVAILON | BELLARINE<br>PENINSULA | CAIRNS<br>AREA | MACKAY<br>AREA | QLD | VIC  | NSW  | S.A.  | W.A.  | TAS  | CAPE PORTLAND | DARWIN AREA | TOTAL |        |
|----------------------|-----------------------|-------------------|--------------------|------------|-----------------------|--------------------------|-------------|-------------|--------|----------------------|------------------------|----------------|----------------|-----|------|------|-------|-------|------|---------------|-------------|-------|--------|
| Bush Thick-knee      | 1                     |                   |                    |            |                       | 970                      | 211         |             | 2      | 52                   | 10                     |                | 2              | 1   |      |      |       |       | 99   | 143           |             | 2     |        |
| Brown Thicket-knee   |                       |                   |                    | 12         | 18                    | 223                      | 4           |             |        |                      |                        |                | 121            | 13  |      |      |       |       |      |               |             | 2295  |        |
| Pied Oystercatcher   | 11                    |                   |                    | 8          | 12                    | 16                       | 362         |             |        |                      |                        |                | 13             |     |      |      |       |       |      | 42            |             | 385   |        |
| Sooty Oystercatcher  |                       |                   |                    |            |                       | 29                       | 29          | 219         | 39     | 173                  | 578                    | 14             | 8              |     |      |      |       |       | 5    | 22            | 17          | 2377  |        |
| Masked Lapwing       | 25                    | 6                 | 16                 | 2          | 14                    |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      | 11            |             | 2170  |        |
| Masked Lapwing       |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 35    |        |
| Grey Plover          | 191                   | 630               | 54                 | 73         | 177                   | 780                      | 44          |             | 1      | 64                   | 243                    | 5              | 14             |     |      |      |       |       | 1    | 151           | 21          | 2127  |        |
| Lesser Golden Plover | 61                    |                   |                    |            |                       | 250                      | 2           | 12          | 9      | 18                   | 17                     |                | 4              |     |      |      |       |       |      | 44            |             | 2745  |        |
| Lesser Golden Plover |                       |                   |                    |            |                       | 1                        |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 112   |        |
| Lesser Golden Plover | 125                   | 83                |                    | 19         | 25                    | 55                       | 2           |             |        |                      | 28                     | 5              | 1073           |     |      |      |       |       | 5    | 1             | 134         | 1384  |        |
| Lesser Golden Plover |                       |                   |                    |            | 6                     | 67                       | 1           |             |        |                      | 6                      |                |                |     |      |      |       |       |      | 3             |             | 92    |        |
| Lesser Golden Plover | 2                     |                   |                    |            |                       | 5                        | 3           |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 425   |        |
| Lesser Golden Plover | 13                    |                   |                    | 13         | 90                    | 18                       | 49          |             | 16     | 61                   | 269                    |                | 2              |     |      |      |       |       | 51   | 45            | 7           | 4555  |        |
| Lesser Golden Plover | 21                    |                   | 13                 | 2          | 4                     | 19                       |             | 10          | 2      | 19                   | 5                      |                | 32             |     |      |      |       |       |      | 1             |             | 59    |        |
| Lesser Golden Plover | 26                    | 171               | 492                |            |                       | 171                      | 132         | 220         | 2166   | 2388                 | 3360                   |                | 26             |     |      |      |       |       |      | 25            |             | 2404  |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 4537  |        |
| Lesser Golden Plover | 26                    | 11                |                    |            |                       |                          | 1           | 17          | 124    | 436                  | 220                    |                | 82             |     |      |      |       |       |      |               |             | 2789  |        |
| Lesser Golden Plover | 60                    | 520               |                    | 55         | 186                   | 132                      | 105         |             |        |                      | 101                    |                | 259            |     |      |      |       |       |      | 57            | 102         | 2137  |        |
| Lesser Golden Plover | 138                   | 40                |                    |            |                       | 1168                     | 728         |             | 1      | 21                   | 815                    | 8              | 178            |     |      |      |       |       |      | 58            | 23          | 4381  |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             | 5           |        |                      | 12                     | 6              | 183            |     |      |      |       |       |      | 1             | 18          | 801   |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 13    |        |
| Lesser Golden Plover | 175                   | 55                | 2                  | 105        | 1                     |                          | 22          |             |        |                      | 37                     | 4              | 8              |     |      |      |       |       |      | 2             |             | 498   |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 1     |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 345   |        |
| Lesser Golden Plover | 1                     |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 31    |        |
| Lesser Golden Plover | 30                    | 150               | 2                  | 1          | 17                    | 215                      | 25          | 4           | 16     | 80                   | 651                    | 5              | 27             |     |      |      |       |       |      |               |             | 18    |        |
| Lesser Golden Plover | 170                   | 12                |                    |            |                       |                          |             | 6           | 68     | 6                    | 64                     |                |                |     |      |      |       |       |      |               |             | 31    |        |
| Lesser Golden Plover | 2                     | 5                 | 7                  | 7          | 2                     |                          | 2           |             |        |                      |                        | 24             | 153            |     |      |      |       |       |      |               |             | 2126  |        |
| Lesser Golden Plover | 28                    | 550               |                    |            |                       |                          |             |             | 10     |                      | 86                     |                |                |     |      |      |       |       |      |               |             | 286   |        |
| Lesser Golden Plover | 765                   | 1440              | 273                | 851        | 400                   | 10642                    | 308         |             | 1      |                      | 14                     |                | 53             |     |      |      |       |       |      |               |             | 163   |        |
| Lesser Golden Plover | 29                    | 14                | 1                  |            |                       | 6410                     | 62          |             |        |                      | 338                    | 55             | 1395           |     |      |      |       |       |      |               |             | 195   |        |
| Lesser Golden Plover | 6                     |                   |                    |            |                       | 660                      |             |             |        |                      | 265                    |                |                |     |      |      |       |       |      |               |             | 985   |        |
| Lesser Golden Plover | 18                    | 940               | 123                | 33         | 70                    | 50                       | 186         |             |        |                      | 6400                   | 3              | 200            |     |      |      |       |       |      |               |             | 20670 |        |
| Lesser Golden Plover | 60                    | 145               | 58                 | 395        | 252                   | 19900                    | 2444        |             | 1437   | 4336                 | 7738                   | 60             | 878            |     |      |      |       |       |      |               |             | 40    |        |
| Lesser Golden Plover | 161                   | 2200              | 860                | 290        | 3                     | 4690                     | 3200        |             | 2686   | 7744                 |                        |                |                |     |      |      |       |       |      |               |             | 310   |        |
| Lesser Golden Plover | 21                    |                   |                    |            |                       | 1                        |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 983   |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 27612 |        |
| Lesser Golden Plover | 5                     | 2                 |                    | 10         | 200                   | 5                        |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 16    |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 82882 |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 1     |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 35929 |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 92    |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 2     |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 215   |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 32    |        |
| Lesser Golden Plover |                       |                   |                    |            |                       |                          |             |             |        |                      |                        |                |                |     |      |      |       |       |      |               |             | 540   |        |
| TOTAL:               | 2170                  | 7057              | 1901               | 1943       | 1277                  | 46258                    | 7790        | 3739        | 7358   | 22610                | 28053                  | 193            | 8908           |     | 8383 | 2798 | 14317 | 78628 | 3711 | 1143          | 6175        | 2543  | 260489 |

Figure 1. Sums of counts in ten areas, consistently covered in summer counts from 1981 to 1986.







GUT CONTENTS OF FOUR SMALL WADERS

D.G. Thomas, 7 Dominion Court, Blackmans Bay, Tasmania, 7152.

During a study of the food of the Curlew Sandpiper *Calidris ferruginea* and Red-necked Stint *C. ruficollis* in south-eastern Tasmania from September 1967 to April 1968 (Thomas and Dartnall 1971) a few specimens of four other species were collected.

Gut contents were determined for one Large Sand Plover *Charadrius leschenaultii* (collected at Clear Lagoon), four Red-capped Plover *C. ruficapillis* (one a road-kill at South Arm Neck, site not recorded for the other three), six Double-banded Plover (2 from Clear Lagoon and 4 at Barilla Bay) and eight Sharp-tailed Sandpiper *Calidris acuminata* (all from Barilla Bay). Gut contents, expressed as number of guts in which each item was found, are given in Table 1.

According to Blakers et al (1984) there are no published records of the food of the Double-banded Plover for Australia, so probably these are the first observations. Four guts contained grapsid crab remains. These crabs have a carapace of about 2cm diameter and it is unlikely that they were swallowed whole. The Double-banded Plover locates prey visually and catches it by pouncing. I have watched them catching crabs in this way. The crab is then dismembered and swallowed piecemeal.

Blakers et al (1984) give the food of the Sharp-tailed Sandpiper as mainly polychaeta worms. No worms were found in the guts of the eight Barilla Bay birds although substrate sampling showed that annelids were present, in places at densities as high as 2000 per m<sup>2</sup>. I believe this reinforces the point made by Thomas and Dartnell (1971) that waders in general take all suitable items which they encounter. In other words, waders with few exceptions, e.g. the Spoon-billed Sandpiper *Calidris pygmaeus*, are opportunistic generalist fine-grained feeders. Food differences within a species will be determined by what is available when and where particular birds happen to be. Availability of prey, regardless of density, depends on whether a species is capable of catching and is physically able to swallow items within a given size range which depends on both the hardness of the item and the ratio of its length and breadth. Availability also depends on the foraging technique (pecking, jabbing or probing) which determines the depth below the substrate surface from which a species can obtain its food.

Further observations on the diet of waders are required. These should be obtained from visual observations where the prey can be identified and from analysis of the gut contents of birds found dead or which die during banding operations. There is no justification for collecting birds for this purpose. I have seen



Pied Oystercatchers *Haematopus ostralegus* taking grapsid crabs, the bivalve mollusc *Anapella cycladea* (mean size 28 mm x 20 mm n = 10) which were also found in the guts of two birds collected at Barilla Bay, and annelids which have a mean size of 80 mm x 3 mm; Eastern Curlew *Numenius madagascariensis* taking grapsid crabs and Red Knot *Calidris canutus* taking whelks *Paracanassa* sp. off rocks well above the water's edge. The crabs carapaces are broken up in the bill, taken to the water, washed and swallowed whole.

#### REFERENCES

Blakers, M. S.J.J.F. Davies and P.N. Reilly 1984. The Atlas of Australian Birds. Melbourne: Melbourne University Press.

Thomas, D.G. and A.J. Dartnall 1971. Ecological aspects of the feeding of two calidridine sandpipers in south-eastern Tasmania. Emu. 71: 20-26.

Table 1. Gut contents, expressed as the number of guts in which each food item was found, of four small waders collected in south-eastern Tasmania 1967/68.

| ITEM (1)            | NUMBER OF GUTS                   |                                   |                                      |  |
|---------------------|----------------------------------|-----------------------------------|--------------------------------------|--|
|                     | LARGE SAND<br>PLOVER<br>(1 bird) | RED-CAPPED<br>PLOVER<br>(4 birds) | DOUBLE-BANDED<br>PLOVER<br>(6 birds) | SHARP-TAILED<br>SANDPIPER<br>(8 birds) |
| Insects             |                                  |                                   |                                      |  |
| Adults              | 1                                | 2                                 | 4                                    | -                                      |
| Larvae              | 1                                | 3                                 | 3                                    | 5                                      |
| Crustaceans         |                                  |                                   |                                      |  |
| Ostracods           | -                                | 1                                 | -                                    | 2                                      |
| Crabs               | -                                | -                                 | 4                                    | -                                      |
| Isopods             | -                                | -                                 | 1                                    | -                                      |
| Molluscs            |                                  |                                   |                                      |  |
| Bivalves            | -                                | -                                 | -                                    | 2                                      |
| Gastropods          | -                                | 3                                 | 2                                    | 7                                      |
| Seeds               | -                                | 1                                 | 1                                    | 1                                      |
| Unidentified debris | 1                                | 4                                 | 4                                    | 2                                      |

(1) It was not considered that identification at specific level was warranted.

WADER COUNTS IN NEW ZEALAND

Paul Sagar, South Island Co-ordinator for Miranda Naturalists Trust, 38A Yardley Street, Christchurch 4, New Zealand.

In New Zealand waders have been a major interest of birdwatchers for many years. Almost every wader haunt has been surveyed at least once during the past 50 years and in some areas e.g. Manukau Harbour and Firth of Thames regular counts have been conducted since the 1940s. However, despite these extensive surveys it still was not possible to answer two basic questions - (1) how many arctic migrants and NZ-breeding species occur in the country in any year, and (2) where are they to be found? Consequently in 1982 the Council of the Ornithological Society of New Zealand (OSNZ) discussed plans for a series of national wader counts.

These counts were planned for November/December (summer) and June (winter). Summer counts provided information mainly about the numbers and distribution of arctic migrants. NZ-breeding species are too dispersed to count effectively during summer but the large majority flock to coastal areas during winter. Therefore winter counts provided information about the numbers and distribution of NZ-breeding species and overwintering arctic migrants.

A pilot operation was completed in January 1983 to determine the feasibility of undertaking national counts. Our major concern was whether we had sufficient interested observers to effectively cover NZ's long coastline, particularly as some of our highest wader populations were known to occur where we had few observers. However, the project proved very popular and so full national wader counts were initiated in November 1983.

Since November 1983 three each summer and winter wader counts have been completed. During each count about 85% of the NZ coastline is surveyed and we know that fortunately relatively few waders occur in the areas not covered by the present project. Some 200-250 observers have been involved in each count, which represents a good proportion of the total OSNZ membership.

SUMMER COUNTS

Each summer Bar-tailed Godwits and Lesser Knots comprised the majority of the birds counted and the order of abundance of the top five arctic migrants remained the same - Bar-tailed Godwit, Lesser Knot, Turnstone, Golden Plover and Red-necked Stint. The totals of Bar-tailed Godwit and Lesser Knot are remarkably similar between years with about 82,000 and 50,000 respectively. The number of Turnstones has varied from 4,423 (1985) to 5,920 (1984), Golden Plovers from 300 (1984) to 548 (1985), and Red-necked Stints from 96 (1983) to 186 (1984). There is a long list of rarer species.

The general pattern of distribution of arctic migrants has been the same for each of the summer counts, with most birds being concentrated in the north, Bay of Plenty, Nelson and Southland. Areas where more than 10,000 waders have been counted consistently are Manukau Harbor, Firth of Thames, Kaipara Harbour and Farewell Spit (see the map for the location of these areas). There has been some marked annual variations in the totals for some major wader areas. However, there is less annual variation for the NZ total - 162,453 (1985), 166,088 (1984) and 142,467 (1983) - therefore the annual variation between sites may just reflect changes in the distribution of arctic migrants within NZ, rather than changes in the total number of waders spending the summer here.

#### WINTER COUNTS

Preliminary results are available for the 1984 and 1985 winter wader counts (the 1986 totals are still being compiled). The order of species abundance was the same in both years - South Island Pied Oystercatchers, Pied Stilts, overwintering Bar-tailed Godwits, Double-banded Plovers, Wrybilled Plovers and overwintering Lesser Knots. The totals for the NZ-breeding species are similar in both years with 78,703 (1985) and 79,983 (1984) South Island Pied Oystercatchers, 18,525 and 17,308 Pied Stilts, 6,849 and 7,527 Double-banded Plovers, and 3,720 and 3,883 Wrybilled Plovers.

These counts gave us our first reliable estimates for the total population of Pied Stilts. Research completed in the early 1970's had shown that the Oystercatcher population was increasing and then stood at about 50,000 - obviously the Oystercatcher population has continued to increase. However, the Wrybilled Plover totals indicate a decline in the population since the high of about 5,000 birds in the late 1970's. Obviously the totals for Double-banded Plovers are of particular interest to both NZ and Australian observers. When the winter totals for both countries are combined they give minimum population totals of about 12,500 birds.

There were some interesting changes in the numbers of overwintering arctic migrants. The numbers of Bar-tailed Godwits and Turnstones were lower in 1985 than in 1984 (7,192 versus 9,701 and 292 versus 719 respectively), while there was a significant increase in the number of Lesser Knots (3,503 versus 2,367).

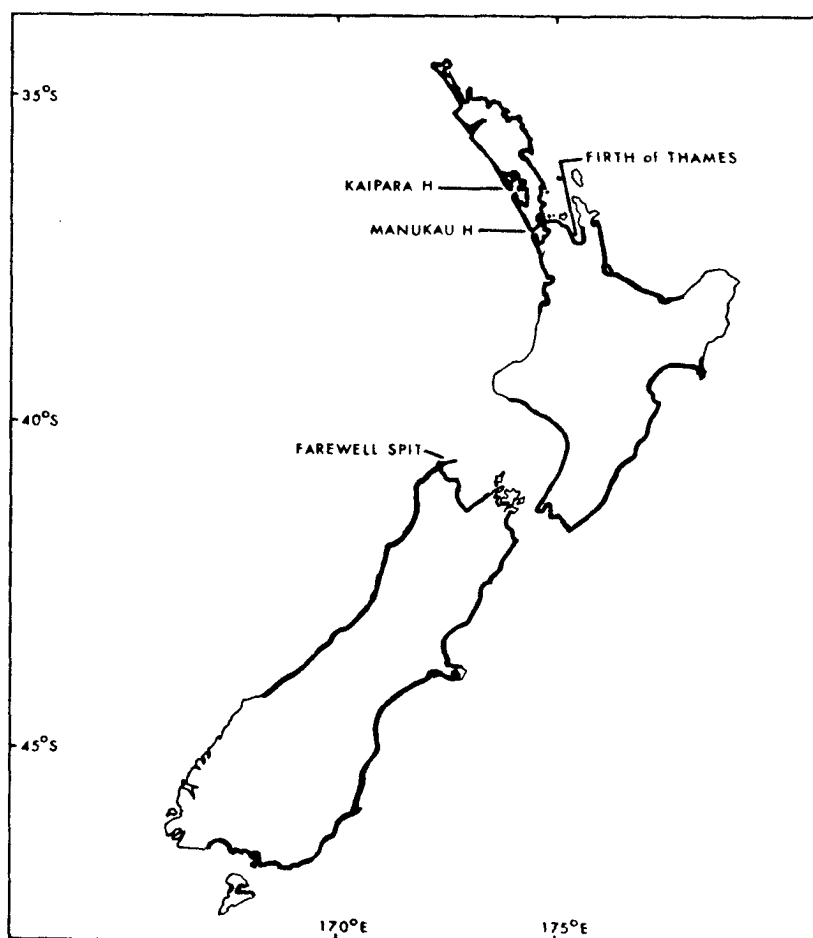
The total number of waders counted during both winter counts was about 122,000 and once again Manukau Harbour, Kaipara Harbour, Firth of Thames and Farewell Spit each supported over 10,000 birds.

### FUTURE PROGRAMMES

Once counts for winter 1986 are compiled then a detailed analysis of all information will be undertaken and the results published in Notornis (the journal of OSNZ). Such an analysis should show many gaps in our knowledge of waders in NZ and provide suggestions for future projects. Already suggestions include refining our knowledge of the arrival and departure of migratory species, examining the movement of waders between estuaries/harbours etc, and recording the specific areas within wader habitats which are used for roosting, feeding and breeding.

The future of the national wader counts was discussed at the May 1986 Council meeting of OSNZ and there was unanimous support for the continuation of the counts until the detailed analysis is prepared.

Future issues of THE STILT will contain a NZ section which will include a round-up of news from the region and information about wader studies. Anyone interested in submitting material for this section should contact either myself or the Editor of THE STILT.



Wader counts in New Zealand. Bold line indicates area covered during each national wader count.

WADER-WATCHING IN THE AUCKLAND AREA

Stephen Davies, C/- Miranda Naturalists' Trust, P.O. Box 39-180,  
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It is a treat to watch waders around Auckland. There is a good number of high-tide roosts, high numbers of birds and an impressive range of species to be seen. But more than that, anyone familiar with the smog, fog and bitter cold of wader-watching in Europe, or with the flies and blistering heat of wader-watching in much of Australia, would be delighted with the clear air and year-round mildness of the climate in Auckland. Anyone used to sloggng across miles of mud to peer at distant dots would be delighted with the ease of access at many Auckland sites, where it is often possible to park within a few metres of large flocks of roosting waders. And anyone used to watching waders in sewage farms and swamps would be delighted by the outstanding natural beauty of several sites in the Auckland region, especially Miranda on the Firth of Thames, where the majestic mountains of the Coromandel Peninsula create an unforgettable backdrop to swirling flocks of thousands of birds.

Auckland lies on a narrow neck of land, hedged on the east by Waitemata Harbour and on the west by Manukau Harbour. The Waitemata has no major high-tide roosts, but the Manukau boasts three main sites, one of which (at Mangere) is well within the city. Each of these sites holds flocks of 5-15,000 waders during the tides of each month. Census figures suggest that not less than 30,000 waders use the Manukau in both summer and winter. Access to Mangere at Ambury Farm Park is unrestricted and here it is possible to see Wrybill (*Anarhynchus frontalis*) within 5Km of One Tree Hill. Up to 1,000 Wrybill are present at this site in the winter. But perhaps the most impressive sight at Mangere is the winter roost of 12,000 + South Island Pied Oystercatcher (SIPO) on the grass verge of Kiwi Esplanade. Usually a few Variable Oystercatcher can be found within such large flocks. The other two Manukau sites are on the south side of the harbour and have been excellent for waders over the years. These sites are on or adjacent to private farmland and access may not always be obtained readily.

About 80Km by road north-west of Auckland lies Kaipara Harbour which boasts two main sites for waders. 5-15,000 birds use each site throughout the year. The more southerly site, near Jordan's farm, is distinctive in that, in recent years, the birds have roosted on a reclaimed area on which a car can be driven. It is strange to watch waders from short distances, driving from flock to flock, without once getting out of the car. This site attracts numbers of Lesser Golden Plover which are unusually high for the area - the annual maximum here is about 70. The very rare Black Stilt (*Himantopus novaezealandiae*) sometimes straggles as far

north as Auckland in the winter and this site has been favoured by several visits from fully black birds (rather than "smudgies") in recent years. Jordan's is also a good site for Whimbrel and the American subspecies is regularly recorded.

The Firth of Thames lies about 80Km by road south-east of Auckland. Not less than 20,000 waders are present in the Firth throughout the year. The roosts on a short stretch of coast just north of Miranda provide the cream of New Zealand's wader watching. 10-20,000 birds use these roosts during periods of high tide and it is very common to find 14 or more species of wader on any visit. Many national rarities have been recorded at or near Miranda - Ringed Plover (twice), Dunlin (in summer plumage), Baird's Sandpiper, Western Sandpiper and Least Sandpiper. To add interest, 600 + pairs of White-fronted Tern and 80 + pairs of Black-billed Gull (*Larus bulleri*) nest at the main roost at Access Bay in the summer. Access Bay and the Lime Works (which are only a few kilometres apart) are the main sites and access is very easy at both sites.

Most of the main sites for waders near Miranda are reserved or protected by covenant. The Miranda Naturalists' Trust (Box 39-180, West Auckland P.O.) has actively promoted the study and protection of the area, primarily (but not exclusively) because of its national and international importance for waders.

All of the sites described above are visited by migrants from the northern hemisphere in summer and from the South Island in winter, so counts remain uniformly high throughout the year. Some summer migrants remain through the winter; some winter migrants remain through the summer. Only comparatively small numbers of waders breed at the sites - Pied Stilt, New Zealand Dotterel (*Ch. obscurus*) and a very few Double-banded Plover (*Ch. bicinctus*) (known as Banded Dotterel in New Zealand). The ease with which the handsome and rather tame New Zealand Dotterel is seen around Auckland is misleading, for this endemic species has a population of perhaps fewer than 500 pairs and an odd distribution, being found only in the northern half of the North Island and the southern tip of the South Island plus Stewart Island. Colour-banding has shown some individuals in this species to be very long-lived.

The main winter migrants are SIPO (about 45,000 visit the Firth, Manukau and Kaipara), Pied Stilt (about 10,000) and Wrybill (about 4,000). Almost the entire population of the latter winters in these three harbours, the biggest concentration occurring in the Firth. The Wrybill must be amongst the most charming and confiding of waders - even "hardened" birders are likely to be thrilled to sit in the open within 3 metres of the edge of a flock of 2,000 Wrybill. In addition, Double-banded Plover gather at

the Auckland harbours in the autumn prior to departing for Australia, and several hundreds remain in the region throughout the winter.

The main summer migrants are Bar-tailed Godwit (30,000 + visit the Firth, Manukau and Kaipara), Lesser Knot (20,000 +) and Turnstone (1,000 +). Some migrants which are numerous in Australia occur in New Zealand in much smaller numbers - flocks of more than thirty Red-necked Stint, Curlew Sandpiper, Sharp-tailed Sandpiper, Whimbrel and Lesser Golden Plover are unusual; annual maxima of Curlew, Pectoral Sandpiper, Spur-winged Plover and Terek Sandpiper rarely exceed five at any one site; Large Sand Plover, Mongolian Plover and Grey-tailed Tattler occur annually, but usually as singles. Less regular in the region are Greenshank, Grey Plover, Oriental Plover, Asiatic Black-tailed Godwit, Hudsonian Godwit (*L. haemastica*), Sanderling and Great Knot. Apart from the rarities mentioned already, there are records in the region of a number of species which are very rare in the New Zealand context - Marsh Sandpiper, Red-capped Plover, Broad-billed Sandpiper, Ruff, Japanese Snipe, White-rumped Sandpiper, Common Sandpiper, Wandering Tattler, Upland (Bartram's) Sandpiper, Little Whimbrel and Red-necked Phalarope.

Australians will be surprised perhaps to see that some species common and resident in Australia are recorded in New Zealand only as very rare vagrants - for example, Red-necked Avocet is very rare in New Zealand and has not been recorded in the Auckland region. And surprised also, perhaps, by the rarity of some relatively common migrants to south-east Australia - for example, Common Sandpiper, Greenshank, Sanderling and Japanese Snipe. In New Zealand a twitcher would expect a yellow-legged stint to be Least rather than Long-Toed! Given that Ringed Plover has twice been recorded, that Asian Dowitcher recently admitted itself to the N.Z. list and that (real) Dunlin have been seen out here, the absence of a New Zealand record of Wood Sandpiper is amazing.

In closing I mention three further points. (1) Amongst the rarer sights at a major wader roost in the Auckland region, be it weekday or weekend, is another birder. (If more birders visited Jordan's, the present one-car procession might turn into dodgems!) (2) The Auckland region must be one of the very few places in the world where one can "do" the tide on the east side of the country and then "do" the tide (which peaks three hours later) on the west side of the country. (3) For the sake of parochial pride I should mention that there are no wader sites elsewhere in New Zealand to compare with those of the Auckland region. But reasonable sites for waders are found in the South Island at Farewell Spit and Lake Ellesmere, and in the North Island at Parengarenga Harbour, Raglan Harbour, Manawatu Estuary and on the Bay of Plenty.

### OVERVIEW OF INTERWADER ACTIVITIES IN 1986

INTERWADER activities in the first half of 1986 were dominated by the Northward Migration Project, involving fieldwork by local biologists and INTERWADER staff in at least 10 countries throughout the region between February and May. Following this period of intensive fieldwork, much of May, June and July was spent in the office writing up survey reports - 10 reports published in 1986, or in the final stages of preparation are listed in this section; another 7 are in progress.

The Asian Wetlands Inventory Project, under the joint organisation of ICBP, IUCN, IWRB and WWF, is a headline event in the region this year, focusing attention on wetlands (a major component of WWF's Wetland Campaign), and collating information on all major wetland areas. This obviously overlaps with INTERWADER's interests, and we are directly involved in drawing up national wetland inventories in Malaysia and Indonesia, while contributing more generally on other countries in the region.

The main emphasis of INTERWADER's activities has always been on survey work. However, with the considerable amount of experience gained in wader research and coastal wetland biology, we are now in a position to place more emphasis on production of educational materials and in the training of Asian biologists. In 1986, an educational poster and an audio/visual programme on mangroves have been produced by WWF-Malaysia in cooperation with INTERWADER, part-funded by WWF-Netherlands. Funds have also been obtained from WWF-US and UNEP to send four Asian biologists, two from Indonesia, one from the Philippines and one from China, to participate in AWSG wader studies training programmes in August/September 1986. We intend to expand these activities in the coming year.

### ASIAN WETLANDS INVENTORY

Some 60 species of Holarctic waders pass through East Asia on migration between their Siberian breeding grounds and mainly Australian winter quarters. These species are largely dependent on coastal wetlands as a series of stepping stones between the breeding and wintering areas for staging, refuelling and moulting. It is therefore important that an international network of coastal wetland reserves such as mudflats, saltpans and mangroves is established, in order to ensure the well-being of East Asian wader populations.

ICBP, IUCN, IWRB and WWF are jointly supporting a two-year project to develop a detailed inventory of wetlands in southern and eastern



Asia, taking in all countries from Pakistan and India to China, Japan, Indonesia and Papua New Guinea, (although not including Australia). This inventory will be developed as part of a wetland data base at IUCN's Conservation Monitoring Centre in Cambridge, England. The project will culminate in the publication of a Directory of Asian Wetlands - a summary of all the information available in the data base at that time. Thereafter, new information will be incorporated and will be available for use by national and international conservation agencies.

The principal objective of the inventory is to present as comprehensive a review as possible of the important wetlands of Asia, using information from all available sources.

INTERWADER is involved in this project, principally in Malaysia and Indonesia, where Duncan Parish is coordinating work on the Malaysian Wetland Inventory through the Department of Wildlife and National Parks under the guidance of a Malaysian Wetland Working Group, and Marcel Silvius will be working on the Indonesian Wetland Inventory in close cooperation with PHPA, the Indonesian Directorate for Forest Protection and Nature Conservation, and other Indonesian bodies concerned with wetlands.

Anyone able to contribute information on Malaysian and Indonesian wetlands should contact INTERWADER as soon as possible. If you have information on other Asian countries, contact the International Coordinator for wetland data sheets and instructions for their use. International Coordinator: Derek A. Scott, C/- IWRB, Slimbridge, Gloucester GL2 7BX, England. Tel: (045389) 624.

#### INTERWADER EAST ASIA/PACIFIC WATERBIRDS PUBLICATIONS DATABASE

INTERWADER has started compiling a West Pacific/East Asian/Australasian shorebird publications database, designed to enable the assembly of lists of references by author, publication or subject as a service to researchers.

Most of the references in the collection at present deal with the better-researched areas of study in the region - breeding waders in Siberia and wintering shorebirds in Australia. Further references on these areas are welcomed, but more urgently, we need references to local studies, counts or observations along the migration routes and breeding areas of China, S.E. Asia and northern Australasia. Examples might be wader feeding studies; site surveys recording breeding herons; notes on the moult of wintering plovers; reviews of wintering ducks at specific wetlands, etc.. Such references may be unpublished reports, short notes or papers in local or international journals.

If you know of any such papers, or have written any, please send us details of the reference, or better still, send a copy.

### INTERWADER NEWSLETTER

INTERWADER publishes a newsletter in June and December, giving details of surveys and other activities in East Asia as well as including features on a wide variety of topics.

Contributions are invited for inclusion in the newsletter. They should concern aspects of waterfowl or wetland biology relevant to East Asia, although articles on waders will usually be given preference. Contributions should be fairly concise (maximum 1,000 words, 500 words preferred), and follow the guidelines given for The Stilt. Contributions should be submitted at least one month before the date of issue (i.e. before May for the June issue, before November for the December issue). INTERWADER reserves the right to make editorial changes in material prior to circulation.

Details of subscription rates can be obtained from:

INTERWADER,  
C/- WWF Malaysia,  
P.O. Box 10769,  
Kuala Lumpur,  
MALAYSIA.

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SEASONAL CHANGES IN THE WADER POPULATION OF AN INLAND SITE

Jeff Campbell, 8/5 Wattle Avenue, Glenhuntley, Victoria, 3163.

During a period of 24 months, from August 1983 to July 1985, regular monthly counts of waders were conducted at Lake Ranfurley, Mildura, Victoria (34° 11' S , 142° 06' E ).

Lake Ranfurley is a shallow basin, split into two separate bodies by a levee bank and filled by drainage water from Mildura and nearby horticultural properties, with some minor inflow from sewage settling ponds adjacent to the lake. The substrate is muddy and although the lake edges are mainly devoid of vegetation some areas contain patches of salt tolerant juncus and saltbush/samphire.

Originally a natural overflow basin of the Murray River the lake level is now totally artificially controlled and rainfall therefore has a negligible effect on rises and falls of the lake and the consequent suitability or otherwise of the habitat for waders. Monthly water levels, in metres a.s.l., for the eastern section of the lake which was the most important sector for waders, are given in Figure 9. A slight variation in these figures occurred in the western unit of the lake although changes in levels generally followed the same trends.

During the counts a total of 12 species were observed at the site (Table 1) and bar-graphs for selected species and for palearctic and southern hemisphere breeding species are given (Figs. 1 to 8). Mean seasonal averages are also given (Table 2).

SPECIES ACCOUNTSMasked Lapwing *Vanellus miles*

A resident species, observed in all bar three counts, and with a stable though slightly fluctuating population except for large increases in numbers in March and April 1984 and March 1985. These increases were probably due to the arrival of a flock of non-breeding semi nomadic birds (Johnsgard 1981).

Two runners were seen during the November 1984 count.

Red-kneed Dotterel *Erythrogonyx cinctus*

The nomadic nature of this species in the Sunraysia area was well illustrated by the count results. It is possible that the numbers of this species were underestimated due to its preference for vegetated areas (Maclean 1977), generally juncus at this site.

Mean seasonal averages show that the highest numbers during the survey were present in spring and winter (cf. Blakers et al 1984). It is possible that increasing salinity of the lake in summer and autumn due to higher temperatures causing a rise in evaporation rates drove this species away as it lacks a nasal salt-secretion gland (Lane & Jessop, 1984).

Many immature birds were present from August to December 1984 and breeding at the site was suspected at that time but not confirmed.

Red-capped Plover *Charadrius ruficapillus*

A resident species with varying numbers following no apparent seasonal trend. However it was evident that the population fell when the water level rose dramatically, thus inundating favoured feeding areas.

A nest containing two eggs was recorded in November 1984; adult birds were observed performing "distraction displays" in March and April 1984 and juveniles were seen in September 1983 and March, April and August 1984.

Black-fronted Plover *Charadrius melanops*

Recorded in small numbers in ten of the 24 months with a significant mean increase in autumn and winter (cf. Blakers et al 1984). This species may have been present during other counts but overlooked because of its solitary habits (Maclean 1977) and cryptic nature (Phillips 1980) in its favoured habitat of small isolated bodies of water (Maclean 1977). When recorded at the lake it was found at two distinct sites only, both fitting the above habitat description.

A single juvenile was observed in February 1985.

Black-winged Stilt *Himantopus himantopus*

Recorded in most months in highly variable numbers with a significant mean increase in autumn and to a lesser extent in winter. It would appear that water level rather than season was responsible for the fluctuating population of this species, influxes of fresh water would presumably kill much of the brine shrimp thus removing its favoured food (Serventy 1938; C. Sonter pers. comm.).

Immature birds were recorded in December 1983; April, May, August and December 1984 and January and March 1985.

Banded Stilt *Cladorhynchus leucocephalus*

Present during 13 months of the survey in generally low numbers with the exception of October 1983 to January 1984 when a large influx occurred. Similarly to the Black-winged Stilt the inflow of fresh water appeared to have a major effect on the population level of this species.

Red-necked Avocet *Recurvirostra novaehollandiae*

Recorded in all months with no obvious seasonal trends. Unlike the stilts did not appear to be significantly effected by changes in water level as it apparently does not feed on the brine shrimp (Johnsgard 1918). Often observed swimming in deep water at the lake.

Immatures were recorded in April, May and November 1984 and March 1985.

Ruddy Turnstone *Arenia interpres*

A single turnstone was recorded in October 1984. This species was an occasional visitor to the Sunraysia area, generally as single birds only (Hobbs 1961).

Greenshank *Tringa nebularia*

A single bird observed at the site in February and March 1985. This species was much more common at other wetlands in the Sunraysia district and the general absence of this conspicuous bird seems impossible to explain.

Sharp-tailed Sandpiper *Calidris acuminata*

Recorded in rather low numbers in all seasons bar autumn when it was entirely absent. In August 1984 all birds present were in partial alternate plumage.

Red-necked Stint *Calidris ruficollis*

Present in all months except August 1983 with, as would be expected for a palearctic breeding species, significantly lower numbers in winter. In March 1985 an estimated 60% of those birds were present in partial alternate plumage and by April only eight of the remaining 68 stints were in basic plumage.

Curlew Sandpiper *Calidris ferruginea*

Similarly to the Sharp-tailed Sandpiper recorded in low numbers in all seasons other than autumn, although unlike that species was most numerous in spring. Lane and Jessop (1983) have commented on this species' narrow habitat preferences making it less common in the inland than the Sharp-tailed Sandpiper and Red-necked Stint.

## DISCUSSION

Because Lake Ranfurley is not a discrete site - several other wetlands regularly inhabited by waders exist in the vicinity, and the limited period of two years over which this survey was undertaken was probably insufficient to determine definite population trends (Alcorn 1986). The results are however considered to be of some interest as little has been published on inland wader sites (see Thomas 1970).

One interesting statistic to come to light is that the three most common palearctic breeding species at the site - Sharp-tailed Sandpiper, Red-necked Stint and Curlew Sandpiper were all more numerous during the southward migration period than during the northward (means: Sharp-tailed Sandpiper 65/0, Red-necked Stint 438/43.5, Curlew Sandpiper 6/0). This could either mean that these species passed through the area on their southward migration but not on the northward as suggested by Alcorn (1986) or that those birds arriving from their breeding grounds remain until departing for the north.

Unlike many other inland sites which become unsuitable for waders in times of drought (Lane and Jessop 1984) the artificial control of water flow into Lake Ranfurley means that it remains suitable for waders even at such times. This very asset however can also force both palearctic and southern hemisphere breeding species to temporarily abandon the areas when the inflow is increased, thus flooding feeding areas or altering the salinity level and destroying prey species.

## REFERENCES

- Blakers, M. S.J.J.F. Davies & P. Reilly. 1984. The Atlas of Australian Birds. Melbourne University Press. Melbourne.
- Hobbs, J.N. 1961. The birds of south-west New South Wales. Emu. 61:21-55.
- Johnsgard, P.A. 1981. The plovers, sandpipers, and snipes of the world. University of Nebraska Press, Lincoln.
- Lane, B. & A. Jessop. 1983. National Wader Count, summer 1983 - report to participants. Australasian Wader Studies Group. Melbourne.
- Lane, B. & A. Jessop. 1984. National Wader Count, winter 1984 - report to participants. Australian Wader Studies Group. Melbourne.
- Maclean, G.L. 1977. Comparative notes on Black-fronted and Red-kneed Dotterels. Emu. 77: 199-207.
- Phillips, R.W. 1980. Behaviour and systematics of New Zealand plovers. Emu. 80: 177-197.

|   | ML | RkD | RcP | BfP | BwS | BS   | RnA | RT | Gs | StS | RnS | CS |
|---|----|-----|-----|-----|-----|------|-----|----|----|-----|-----|----|
| A | 4  | -   | 76  | -   | -   | -    | 6   | -  | -  | -   | -   | 64 |
| S | 1  | -   | 159 | -   | -   | 3    | 18  | -  | -  | 7   | 105 | 73 |
| O | 4  | -   | 178 | -   | 8   | 1006 | 190 | -  | -  | 2   | 83  | -  |
| N | 6  | 6   | 146 | -   | 5   | 2111 | 166 | -  | -  | 1   | 284 | 5  |
| D | 8  | -   | 91  | -   | 44  | 429  | 281 | -  | -  | 1   | 53  | 1  |
| J | 3  | -   | 101 | -   | 22  | 194  | 160 | -  | -  | -   | 78  | 21 |
| F | 6  | -   | 42  | -   | -   | 1    | 34  | -  | -  | -   | 26  | -  |
| M | 23 | -   | 85  | -   | -   | -    | 29  | -  | -  | -   | 36  | -  |
| A | 25 | -   | 125 | 7   | 131 | 3    | 286 | -  | -  | -   | 317 | -  |
| M | 4  | 1   | 93  | 4   | 25  | -    | 299 | -  | -  | -   | 19  | -  |
| J | 2  | 8   | 237 | -   | 52  | -    | 13  | -  | -  | -   | 21  | -  |
| J | 3  | 12  | 66  | 5   | 10  | -    | 88  | -  | -  | -   | 1   | -  |
| A | -  | 23  | 106 | -   | 30  | 9    | 105 | -  | -  | 44  | 16  | -  |
| S | 2  | 27  | 162 | -   | 3   | -    | 115 | -  | -  | 7   | 75  | 32 |
| O | 6  | 28  | 177 | -   | 3   | -    | 157 | 1  | -  | 1   | 162 | -  |
| N | 6  | 24  | 102 | 2   | 12  | 19   | 133 | -  | -  | 59  | 151 | 4  |
| D | 7  | 25  | 126 | 4   | 343 | 8    | 177 | -  | -  | 66  | 143 | 2  |
| J | 9  | 13  | 130 | -   | 127 | 7    | 477 | -  | -  | 13  | 98  | 1  |
| F | 3  | 19  | 139 | 1   | 121 | 3    | 159 | -  | 1  | 84  | 30  | 1  |
| M | 43 | 7   | 16  | 4   | 108 | 4    | 107 | -  | 1  | -   | 441 | -  |
| A | 2  | 6   | 47  | 6   | 12  | -    | 12  | -  | -  | -   | 68  | -  |
| M | 3  | 23  | 82  | 9   | 71  | -    | 71  | -  | -  | -   | 38  | -  |
| J | -  | 15  | 62  | 19  | 35  | -    | 41  | -  | -  | -   | 3   | -  |
| J | -  | 14  | 74  | 19  | 63  | 11   | 478 | -  | -  | -   | 5   | -  |

Table 1. Species totals, August 1983 - July 1985.

|     |   |                        |     |   |                      |
|-----|---|------------------------|-----|---|----------------------|
| ML  | - | Masked Lapwing         | RkD | - | Red-kneed Dotterel   |
| RcP | - | Red-capped Plover      | BwS | - | Black-winged Stilt   |
| BS  | - | Banded Stilt           | RnA | - | Red-necked Avocet    |
| RT  | - | Ruddy Turnstone        | Gs  | - | Greenshank           |
| StS | - | Sharp-tailed Sandpiper | RnS | - | Red-necked Stint     |
| CS  | - | Curlew Sandpiper       | BfP | - | Black-fronted Plover |

|                      | DJF<br>SUM | MAM<br>AUT | JJA<br>WINT | SON<br>SPR |
|----------------------|------------|------------|-------------|------------|
| Masked Lapwing       | 18         | 50         | 4.5         | 12.5       |
| Red-kneed Dotterel   | 28.5       | 18.5       | 36          | 42.5       |
| Red-capped Plover    | 314.5      | 224        | 260.5       | 462        |
| Black-fronted Plover | 2.5        | 15         | 21.5        | 1          |
| Black-winged Stilt   | 35.5       | 173.5      | 95          | 15.5       |
| Banded Stilt         | 321        | 3.5        | 10          | 1569.5     |
| Red-necked Avocet    | 644        | 402        | 365.5       | 389.5      |
| Ruddy Turnstone      | -          | -          | -           | 0.5        |
| Greenshank           | 0.5        | 0.5        | -           | -          |
| Sharp-tailed S/piper | 82         | 459.5      | 22          | 38.5       |
| Red-necked Stint     | 214        | -          | 23          | 430        |
| Curlew Sandpiper     | 13         | -          | 32          | 57         |

Table 2. Mean seasonal averages.

Serventy, D.L. 1938. Waders and other aquatic birds of the Swan River Estuary, W.A. Emu. 38:18-29.

Thomas, D.J. 1970. Wader migration across Australia. Emu. 70: 145-154.

#### ACKNOWLEDGEMENTS

My sincere gratitude is due to Chris Sonter who assisted with most of the counts and who carried out the last three counts after I had left the area; to John Hobbs who completed a count when I was temporarily absent from the region and to several members of the then Sunraysia Bird Observers' Club who assisted at various times.

Thanks are also extended to the Sunraysia District Office of the Rural Water Commission of Victoria for the supply of water level records of the lake.

FIG.1 RED-CAPPED PLOVER

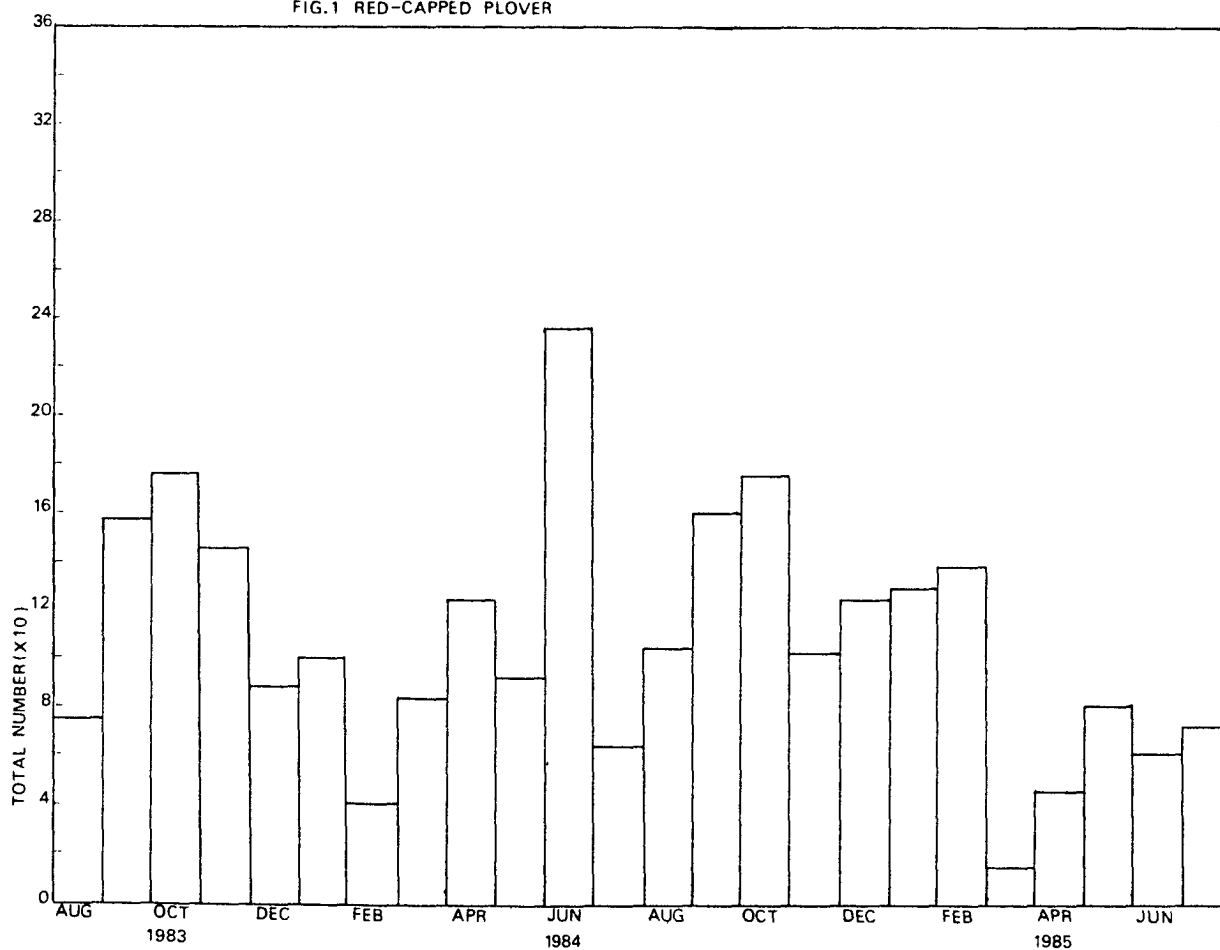




FIG.2 RED-NECKED AVOCET

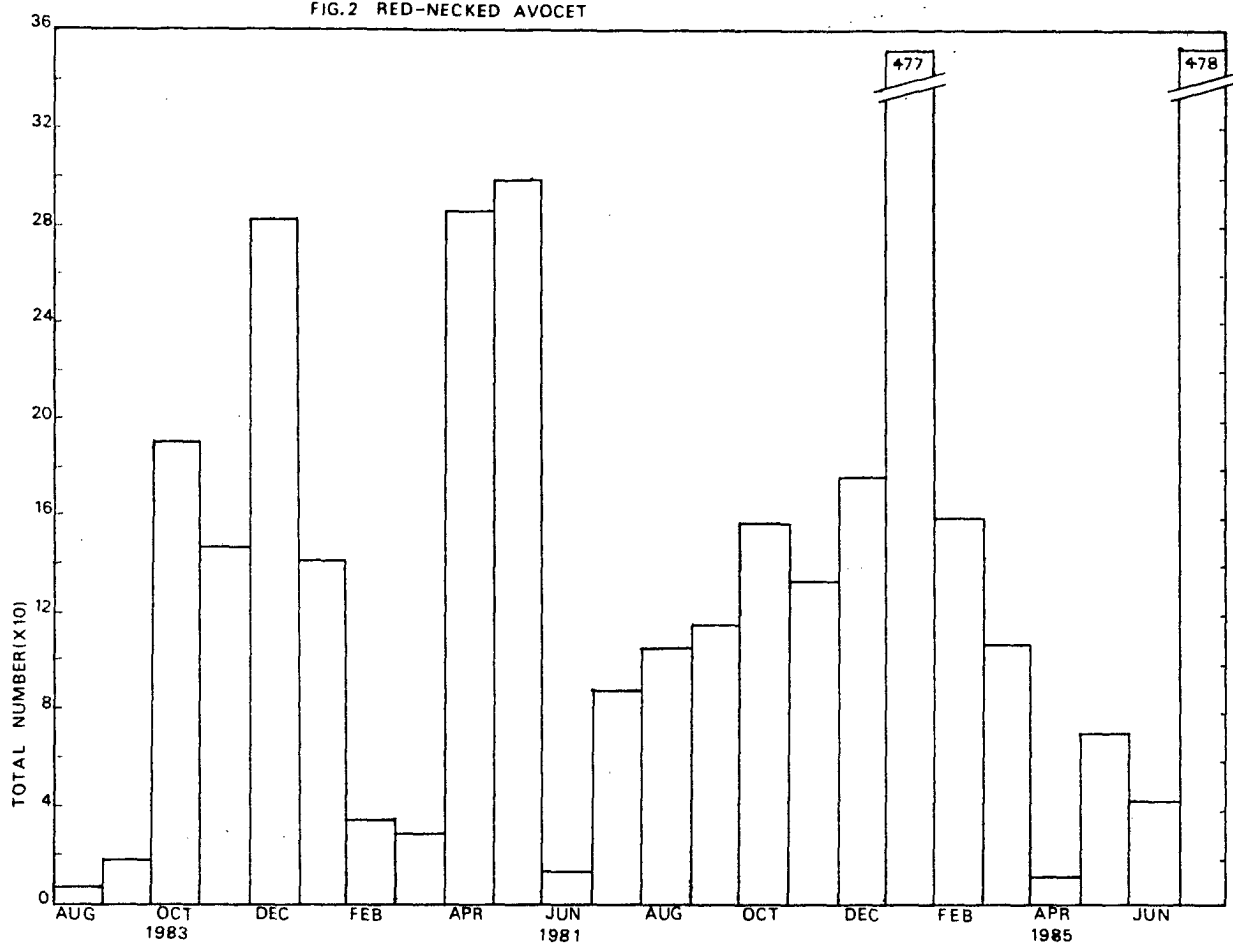


FIG.3 RED-NECKED STINT

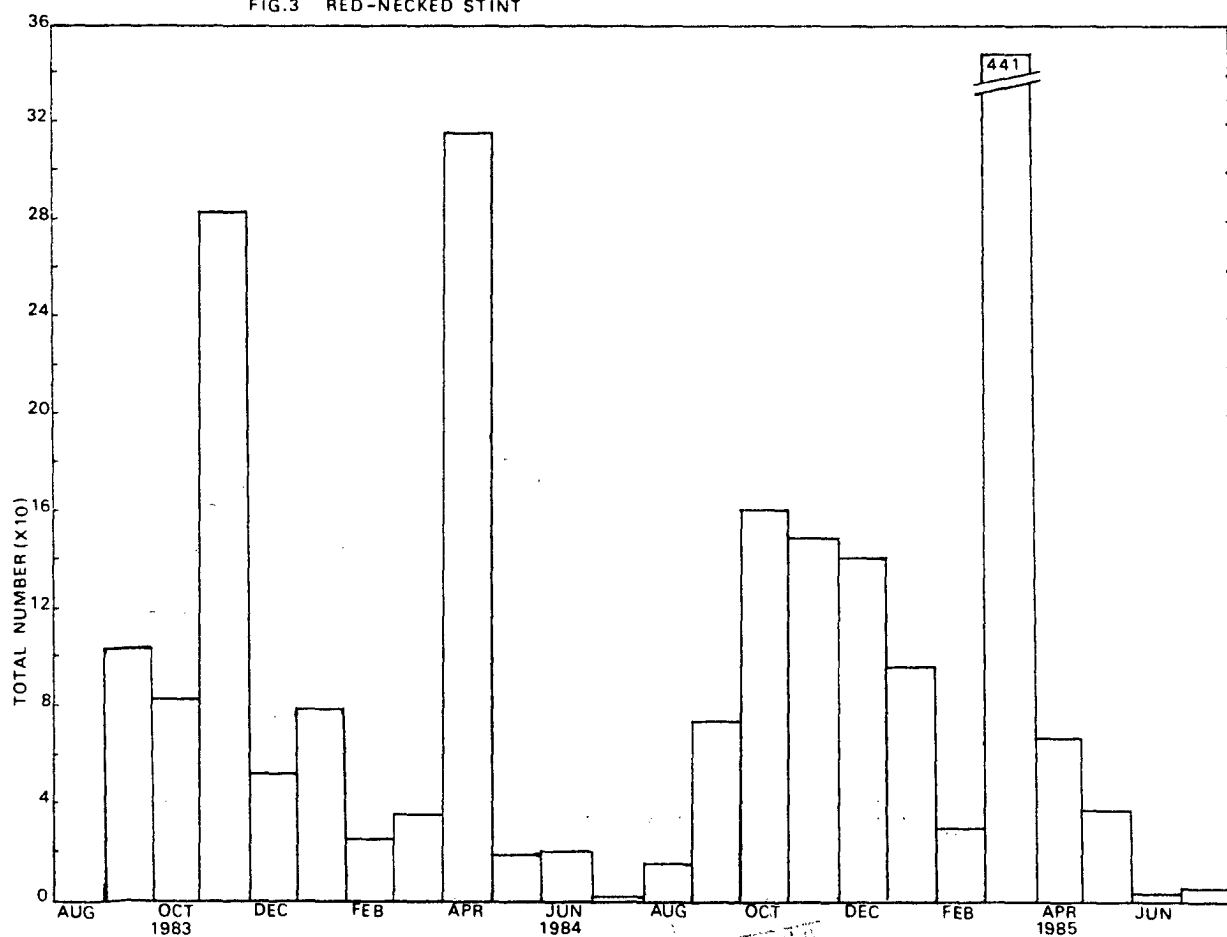


FIG.4 MASKED LAPWING

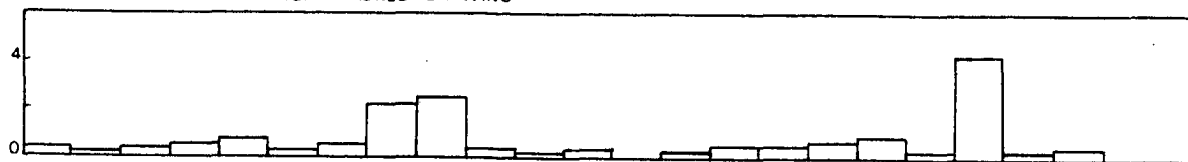


FIG.5 SHARP-TAILED SANDPIPER

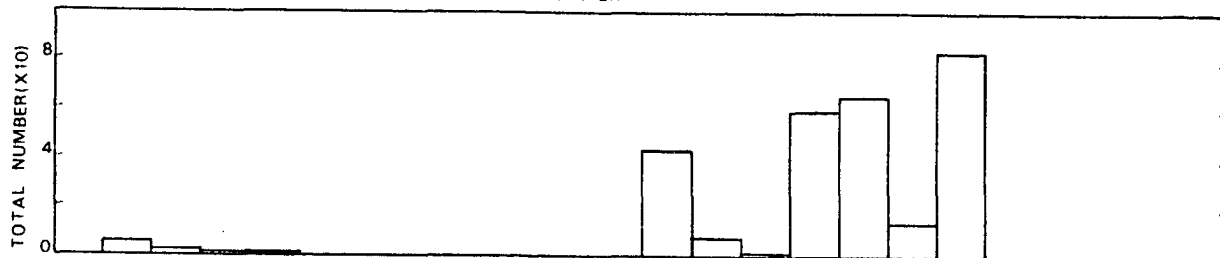


FIG.6 CURLEW SANDPIPER

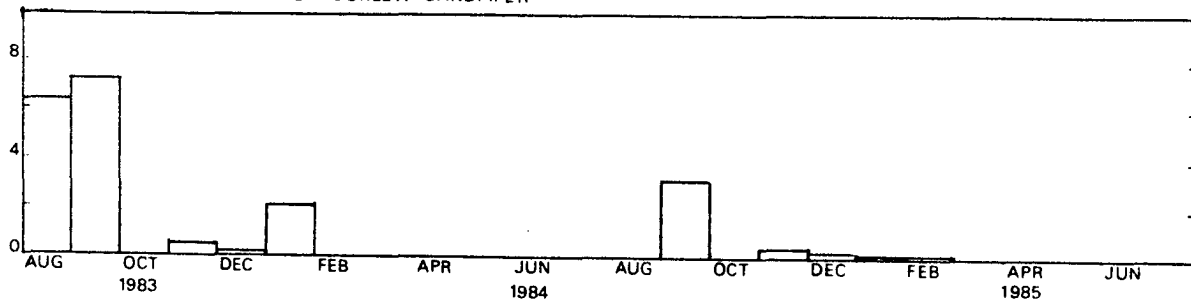


FIG.7 SOUTHERN HEMISPHERE BREEDERS

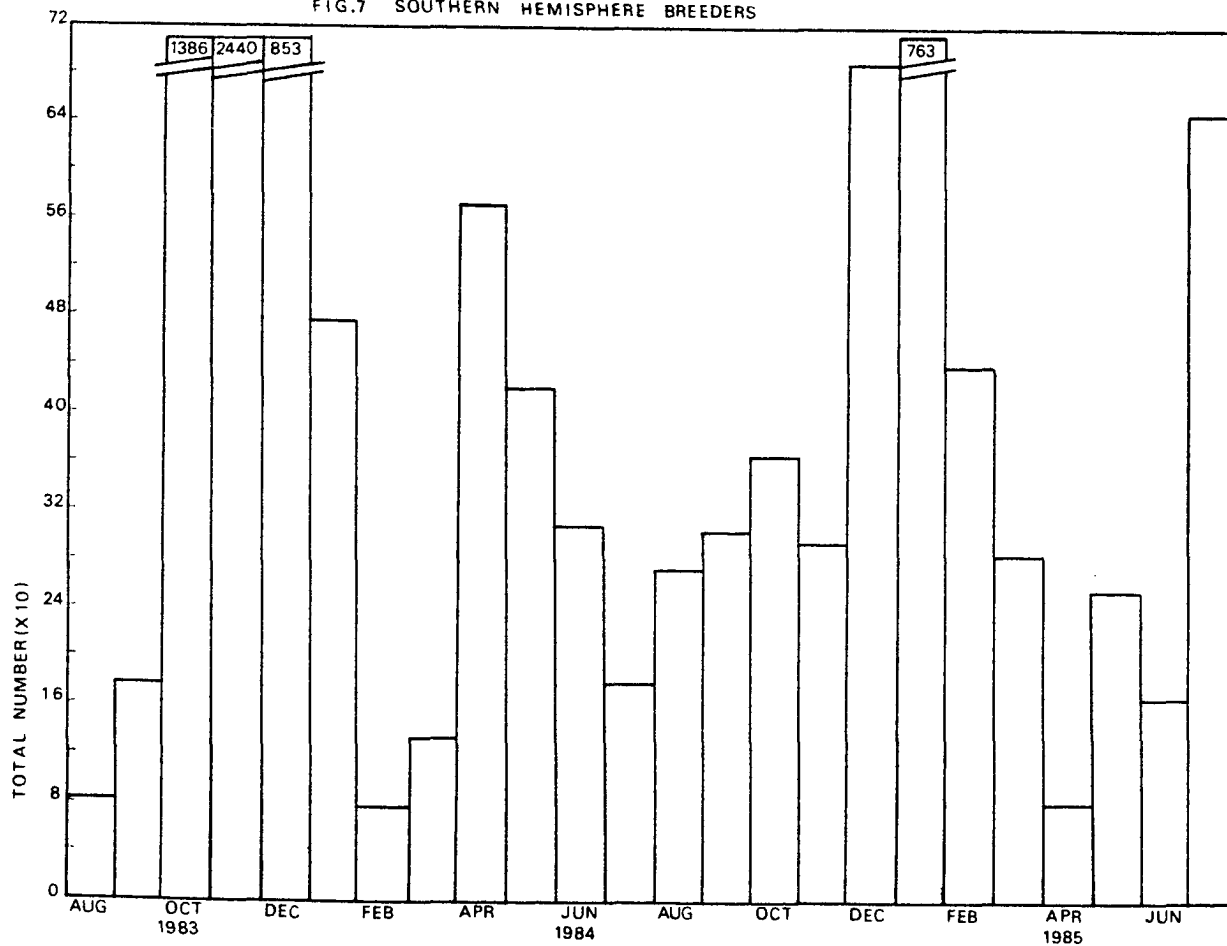


FIG.8 PALEARCTIC MIGRANTS

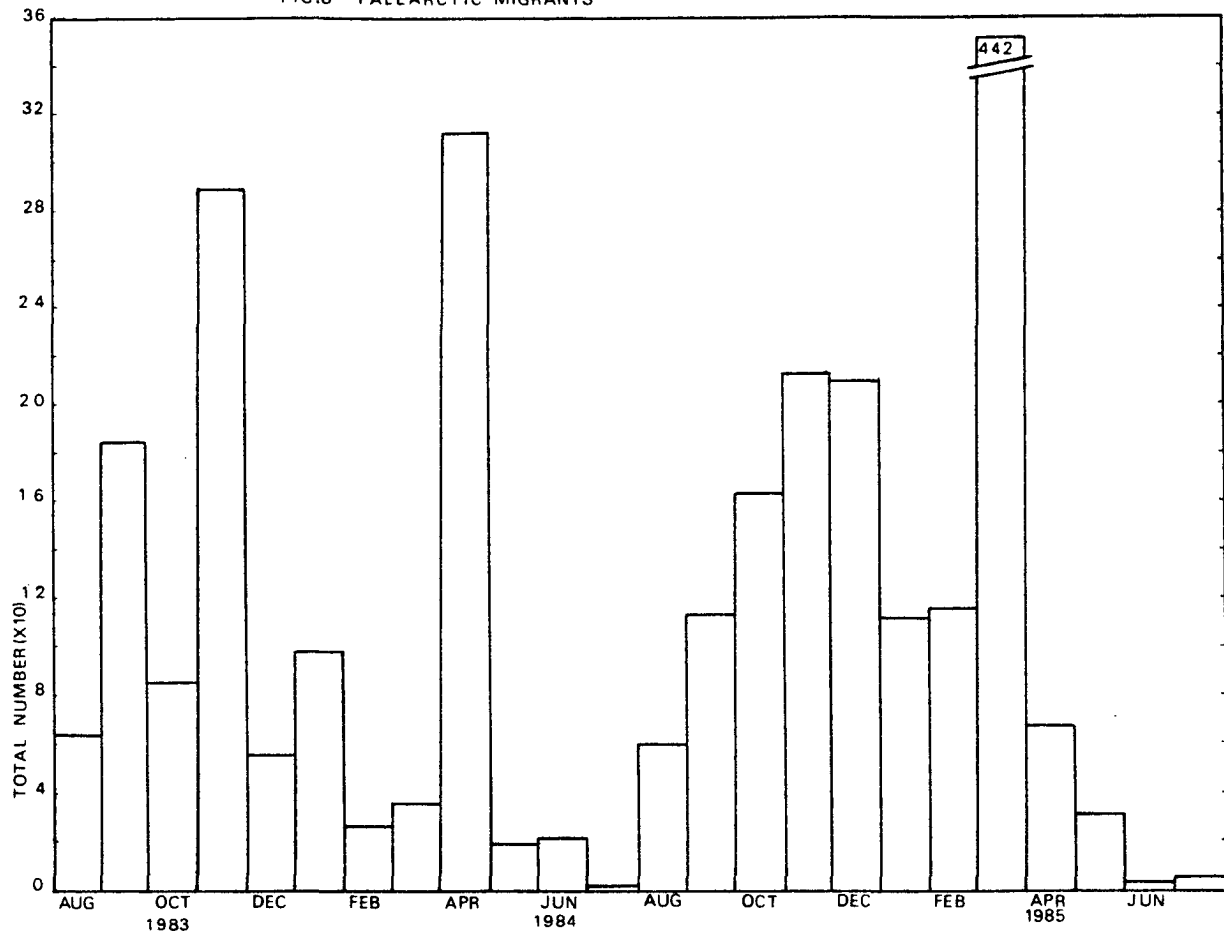
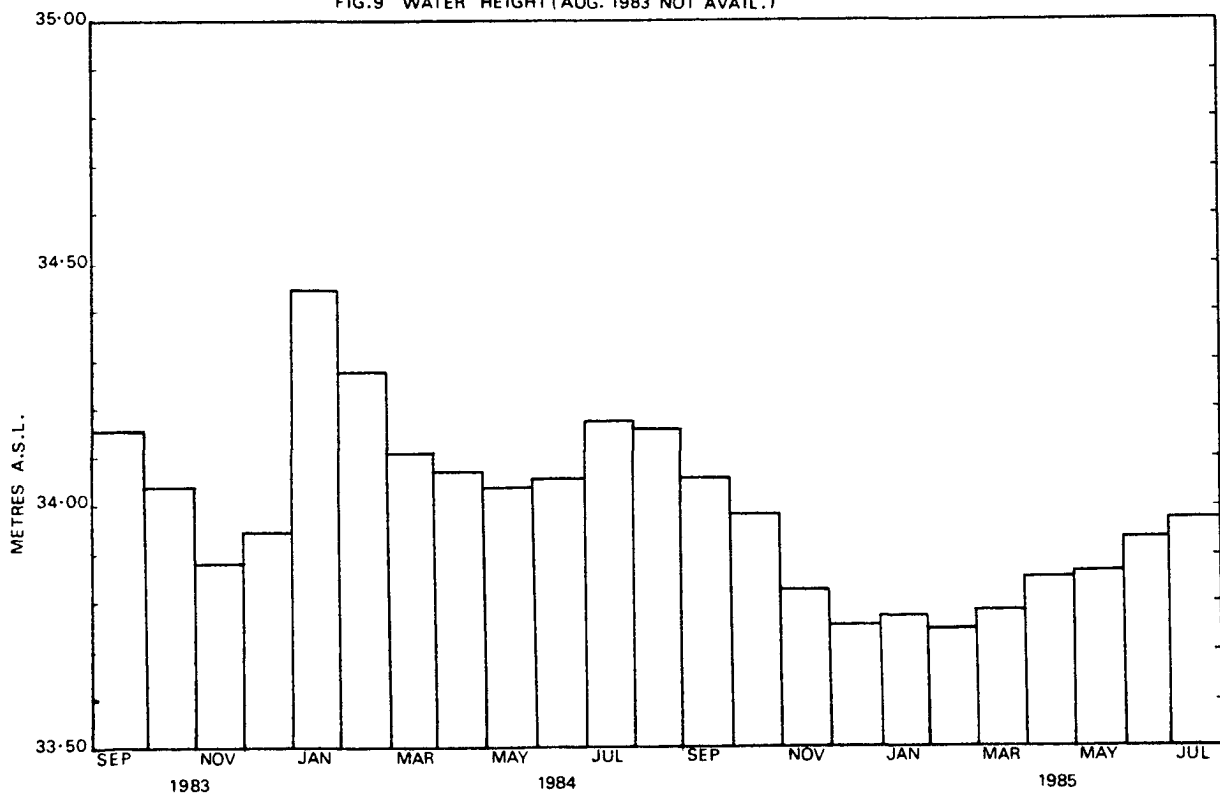


FIG.9 WATER HEIGHT (AUG. 1983 NOT AVAIL.)



THE HOODED PLOVER (*Charadrius rubricollis*) AS A REEF-FORAGER

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INTRODUCTION

The Hooded Plover, *Charadrius rubricollis* is primarily associated with sandy ocean beaches in south-eastern Australia (Blakers et al 1984, Lane and Davies in print). However, on some stretches of coastline in central Victoria, the Hooded Plover ranges on to and actively forages on reef platforms adjacent to these sandy beaches. This paper examines reef foraging of the Hooded Plover at Thorny Beach Reef, Phillip Island (Lat. 38°31'S, Long. 145°11'E ) and Breamlea (Lat. 38°17'S, Long. 144°28' E ).

METHODSa. FEEDING BEHAVIOUR

Birds were observed with 17 x 50 Hoya binoculars at Breamlea on 3 June 1984 and Thorny Beach Reef on 6 June 1984. Plovers were watched from a distance of up to 100m. When I was too close to the birds they halted their activities, stood still and bobbed their heads. When this happened I moved away and halted observations until the plovers resumed normal activity.

Feeding rates for individual birds were recorded for one minute intervals on an electronic counter.

b. DIET

Direct dietary determination proved difficult as many of the prey items were too small to be identified from a distance. In order to obtain some idea of the composition of the diet a limited number of faecal samples were collected. Collection was only undertaken when no other small wader species were present in order to eliminate possible faecal confusion. Faeces collected were wrapped in paper towelling and dried in an oven. Each of the dried faeces were crumbled with forceps into a petri-dish and examined under a binocular microscope. Comparison to a reference collection enabled prey remains to be identified. A quantitative analysis of prey composition was impossible due to the fragmentary nature of the remains. Instead only presence/absence of individual prey species was noted.

c. INVERTEBRATE PRESENCE

In order to obtain an indication of the abundance of prey species within regions of the reef where the plovers were observed foraging eleven 0.25m<sup>2</sup> areas at Thorny Beach Reef and three 0.23m<sup>2</sup> areas at Breamlea were examined in detail. Within these areas the numbers of invertebrates apparent to the naked eye were counted.

## RESULTS

### FORAGING BEHAVIOUR

At both sites the plovers only foraged on the reef platform during the low tide phase of the diurnal tide cycle. Foraging was confined to lower flat reef sections or on raised rocks in the spray zone of the lower littoral zone just above the sublittoral fringe. No foraging was observed on elevated rocky areas or boulder fields above the lower littoral zone or on reef flats in the lower littoral zone with a dense coverage of the algae, *Hormosira banksii*.

During the mid-tide and high tide phases when the lower littoral zone was covered with water the plovers moved on to adjacent beaches.

Foraging predominantly occurred in areas with little seaweed cover. Birds were rarely observed feeding in shallow rock pools. For example, at Breamlea 2.3% (n = 92) of feeding acts (pecks at substrate) were made on the water surface in tidal pools. Feeding mainly consisted of occasional or series of pecks employed as the birds slowly moved over the rock substrate. Foraging occurred on the tops, sides and in the numerous crevices of the rocks on the reef platform.

The average feeding rate (number of pecks per minute) over a thirty minute period at Breamlea was 36.0 pecks/minute (SD = 6.07) and at Thorny Beach Reef over a sixty minute period was 34.2 pecks/minute (SD = 7.64). Therefore the feeding rate was similar in the two areas (Student's t test, df = 88, t = 0.747, p > 0.05).

### DIET

Hooded plovers feed predominantly on small prey which are difficult to identify from a distance. On a number of occasions a bird was observed to peck in quick succession at one spot on the rock substrate. On several occasions when such feed "spots" were inspected freshly broken shells were evident. In all cases the fragments were of the mussel, *Modiolus pulex*.

Figure 1 outlines the prey types identified from the ten faeces collected at Thorny Beach Reef and ten at Breamlea. The most frequently encountered prey were the molluscs *M. pulex* (95%) and *Littorina unifasciata* (95%). Amphipods of the families Gammaridae and Talitridae were also well represented (50%).

### INTERTEBRATE PRESENCE

At both sites the molluscs *M. pulex* and *L. unifasciata* were present in large numbers in areas where Hooded Plovers were observed foraging

(Table 1). The nerite, *Nerita atramentosa*, was present in large numbers at Breamlea. The reef area examined at Thorny Beach Reef possessed a greater species diversity than at Breamlea, with a number of species not recorded at the latter site.

#### DISCUSSION

In the ocean beach environment the Hooded Plover feeds on a variety of prey, including insects, polychaete worms, crabs, bivalve molluscs, isopods and amphipods (Schulz et al 1983, Schulz 1984). Similarly in the present study faecal analysis showed that a range of prey species available on the reef platforms was consumed.

The larger range of prey recorded in the faeces at Thorny Beach Reef appears to reflect a greater diversity in potential prey present on the reef platform in this area. Despite this two molluscs, *L. unifasciata* and *M. pulex*, were the most frequently encountered prey items (from faeces) at the two sites. Both these species were abundant in the lower littoral zone where Hooded Plovers were observed foraging.

Several species of invertebrates were common in the lower littoral zone but did not appear to be preyed upon. These were the nerite, *N. atramentosa* at Breamlea and the barnacle, *Chamaesipho columna* at Thorny Beach Reef. *N. atramentosa* is a large snail (length to 25mm) with a robust shell and would appear to be too large a prey item for the Hooded Plover. Similarly, Schulz (1984) noted that on Darby Beach a large snail (length to 30mm), *Polinices incei*, although common was not taken. *C. columna* also appeared to be avoided as no fragments of barnacle exoskeleton were located in the faeces and from close observation aggregations of this barnacle were avoided.

Although faecal analysis provides an indication of prey taken it should be interpreted with care. It is not known how long it takes for prey to be digested in the Hooded Plover. The incidence of *amphipods* of the genus *Orchestia* at both sites and insects in the faeces at Thorny Beach Reef would suggest that some of the prey originated from the beach rather than the reef environment. Since the majority of prey recorded\* (for example, the molluscs) it is felt that faecal analysis was an adequate method of providing an indication of the reef-dwelling prey species the Hooded Plovers were feeding on.

This study has shown that the Hooded Plover is able to exploit a variety of prey species in the reef environment. In this environment foraging was only observed in the lower littoral zone during the low tide phase. Invertebrates diversity is greater in the lower littoral zone than other sections of the intertidal reef platforms (Dakin 1980).

| PREY SPECIES            | NUMBERS PRESENT   |    |    |    |    |    |    |    |    |    |    |          |    |    |  |
|-------------------------|-------------------|----|----|----|----|----|----|----|----|----|----|----------|----|----|--|
|                         | THORNY BEACH REEF |    |    |    |    |    |    |    |    |    |    | BREAMLEA |    |    |  |
|                         | 1                 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 1        | 2  | 3  |  |
| Annelida                |                   |    |    |    |    |    |    |    |    |    |    |          |    |    |  |
| Polychaeta - Spirulidea | 0                 | 4  | 0  | 0  | 1  | 3  | 0  | 0  | 0  | 0  | 0  | 0        | 0  | 0  |  |
| Nemertean               | 0                 | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0        | 0  | 0  |  |
| Crustacea               |                   |    |    |    |    |    |    |    |    |    |    |          |    |    |  |
| Amphipoda - Gammaridae  | 0                 | 2  | 0  | 1  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 2        | 0  | 0  |  |
| Cirripedia              |                   |    |    |    |    |    |    |    |    |    |    |          |    |    |  |
| Catomerus polumerus     | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 2  | 4  | 0  | 12       | 4  | 6  |  |
| Chamaesipho columna     | *                 | 20 | *  | 60 | 40 | 60 | 43 | *  | *  | *  | 45 | 0        | 0  | 0  |  |
| Cthalamus antennatus    | 0                 | 0  | 0  | 0  | 0  | 50 | 35 | 33 | 4  | 4  | 0  | 0        | 0  | 0  |  |
| Mollusca                |                   |    |    |    |    |    |    |    |    |    |    |          |    |    |  |
| Bivalvia                |                   |    |    |    |    |    |    |    |    |    |    |          |    |    |  |
| Modiolus pulex          | *                 | *  | *  | *  | *  | *  | *  | *  | *  | *  | *  | *        | *  | *  |  |
| Brachiodontes restratus | 3                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0        | 0  | 0  |  |
| Gastropoda              |                   |    |    |    |    |    |    |    |    |    |    |          |    |    |  |
| Patellanax chapmani     | 0                 | 1  | 0  | 0  | 0  | 1  | 0  | 1  | 4  | 0  | 0  | 0        | 0  | 0  |  |
| Cellana tramoserica     | 0                 | 1  | 0  | 0  | 0  | 0  | 0  | 2  | 4  | 3  | 0  | 0        | 1  | 0  |  |
| Patelloida latistrigata | 7                 | 7  | 2  | 1  | 2  | 6  | 4  | 2  | 8  | 0  | 0  | 0        | 0  | 0  |  |
| Patelloida alticostata  | 0                 | 12 | 7  | 12 | 22 | 18 | 0  | 30 | 10 | 2  | 10 | 0        | 0  | 0  |  |
| Notoacmea petterdi      | 12                | 0  | 0  | 0  | 0  | 0  | 0  | 2  | 14 | 4  | 0  | 0        | 0  | 0  |  |
| Littorina unifasciata   | *                 | *  | *  | *  | *  | *  | *  | *  | *  | *  | *  | *        | *  | *  |  |
| Nerita atramentosa      | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 1  | 0  | *        | 85 | 48 |  |
| Bembicium nanum         | 0                 | 18 | 12 | 11 | 13 | 16 | 10 | 0  | 0  | 4  | 6  | 0        | 0  | 0  |  |
| Agnewia tritoniformis   | 0                 | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 4  | 0  | 0  | 0        | 0  | 0  |  |
| Austrochochlea spp.     | 0                 | 1  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0        | 0  | 0  |  |

Table 1. Counts of invertebrates made in  $0.25\text{m}^2$  areas of reef at Thorny Beach Reef and Breamlea.

\* = > 100 individuals

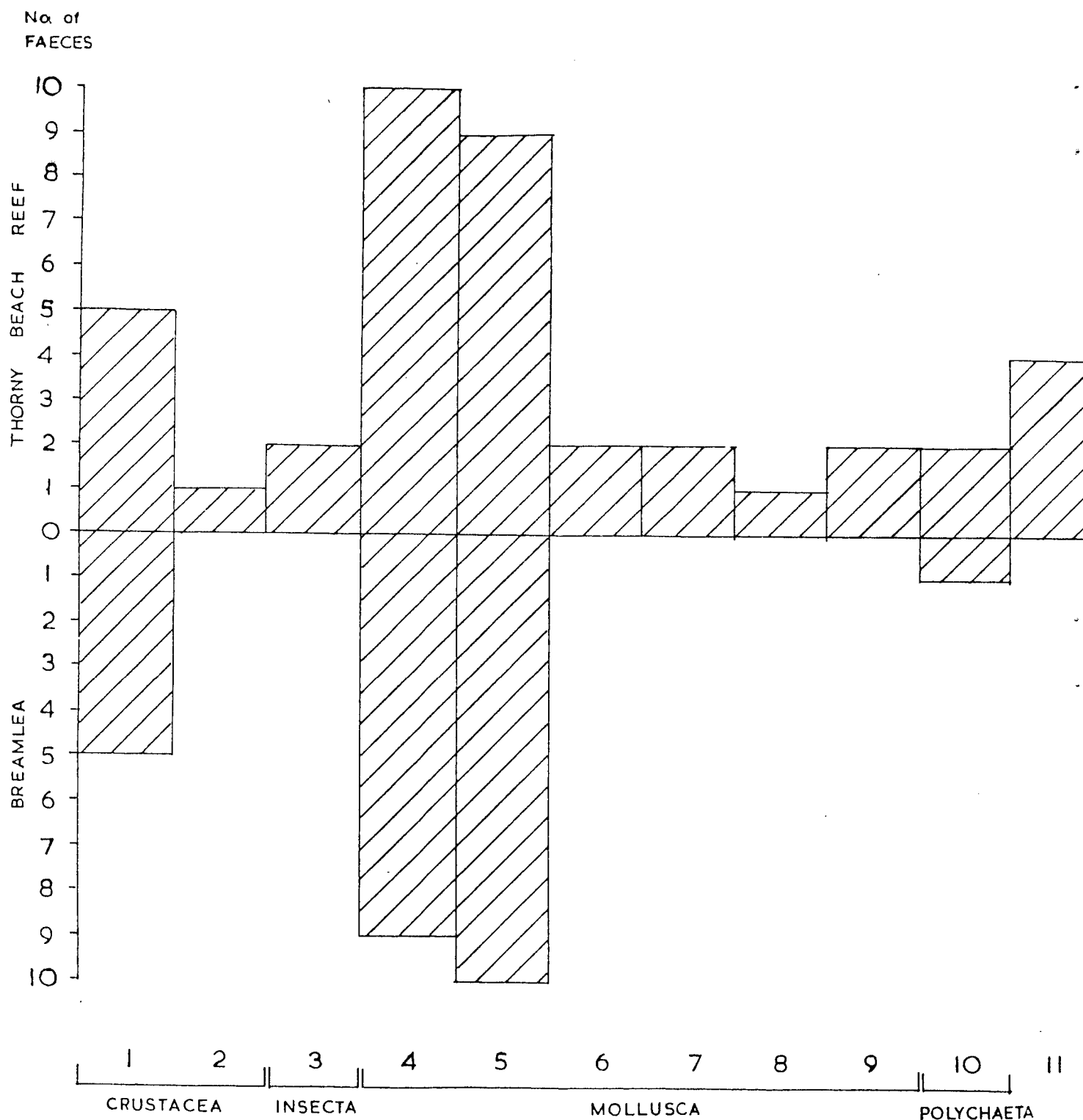


Figure 1. Occurrence of prey types in the faeces collected at Thorny Beach Reef and Breamlea. 10 faeces were examined from each site.

Key to Prey: 1=Amphipoda, 2=Unidentified Carb, 3=Unidentified insects, 4=*Modiolus pulex*, 5=*Littorina unifasciata*, 6=*Cellana Tramoserica*, 7=*Patelloida alticostata*, 8=*Agnewia tritoniformis*, 9=Unidentified molluscs, 10=Unidentified polychaete worms, 11=Algae.



Prey species such as *M. pulex* and *Patelloida alticostata* are confined to this zone. However, another common prey species, *L. unifasciata* is widespread across the reef platform up to the supra-littoral zone. It would appear that this species by itself may not be sufficient to make it energetically expedient for the Hooded Plover to forage on the reef during the mid-tide or high-tide phases. Instead during these tide phases the birds move off the reef and forage on adjacent beaches.

#### REFERENCES

- Blakers, M., Davies, S.J.J.F and Reilly, P.N. (1984) The Atlas of Australian birds. Melbourne University Press, Carlton.
- Dakin, W.J. (1980) Australian Seashores. Rev. Ed. Angus and Robertson, Sydney.
- Lane, B. and Davies, J. (in print). The shorebirds of Australia.
- Schulz, M. (1984). The feeding behaviour of the Hooded Plover (*Charadrius rubricollis* Gmelin) in an ocean-shore environment. Unpubl. Hons. Thesis, Monash Univ.
- Schulz, M., Grant, A. and Lumsden, L. (1984). Some aspects of the feeding behaviour and diet in the Hooded Plover, *Charadrius rubricollis* (Charadriidae), during the non-breeding season. The Stilt 5, 2-8.

#### BANDING RECOVERIES

##### Symbols used

Age Code:            U = unknown;            P = nestling;            J = juvenile;  
                       1 = within the first year of life;  
                       +1 = within the first year or older;  
                       2 = within the second year;  
                       +2 = within the second year or older, etc.

How Aged:            PF = plumage and feather wear;            P = plumage;  
 Sex:                    U = unknown;            M = male;            F = female;  
 How Sexed:            P = plumage pattern.

##### Method of encounter:

01 = probably trapped but the device is unknown to the Banding Office;  
 02 = trapped by device unknown to Banding Office;  
 03 = trapped in mist net;  
 04 = trapped in cage trap;  
 05 = trapped with a cannon net;  
 08 = caught by hand or with handheld net;  
 61 = shot;            67 = shot for food.

##### Status after encounter:

00 = unknown by Banding Office for bird and band;  
 05 = bird is dead and the band was removed;  
 13 = bird released alive with band;  
 14 = bird released alive and the band was removed.

## AUSTRALIAN BIRD &amp; BAT BANDING SCHEMES

## REPORT ON BAND RECOVERIES

## BANDING AND RECOVERY LOCATIONS

| BANDING AND RECOVERY LOCATIONS                                    |  | DATE<br>(YYMMDD)                   | AGE<br>CODE | HOW<br>AGED | SEX | HOW<br>SEXED | METHOD<br>CODE | STATUS<br>CODE |
|---|--|------------------------------------|-------------|-------------|-----|--------------|----------------|----------------|
| Band no.: 100-14485   | Species: 130 PIED OYSTERCATCHER          |                                    |             |             |     |              |                |                |
| Banded: PIPECLAY LAGOON   | TAS                                      | 781119                             | P           | U           | U   |              | 08             | 13             |
| Latitude: 42 deg 59min 0sec S ; Longitude: 147 deg 32min 0sec E . |  |                                    |             |             |     |              |                |                |
| Recovered: RALPHS BAY (WEST)                                      | TAS                                      | 840902                             | U           |             | U   |              | 01             | 13             |
| Latitude: 43 deg 1min 0sec S ; Longitude: 147 deg 26min 0sec E.   |  |                                    |             |             |     |              |                |                |
| Distance: 8.95560 km  | Direction: 245 degs.                     | Time elapsed: 5 yrs 9 mths 13 days |             |             |     |              |                |                |
| Bander: THE SHOREBIRD STUDY GROUP (BOAT)                          | Finder: THE SHOREBIRD STUDY GROUP (BOAT) |                                    |             |             |     |              |                |                |
| Band no.: 100-81151   | Species: 130 PIED OYSTERCATCHER          |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON)                  | VIC                                      | 790127                             | 1           | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSCLIFF                                | VIC                                      | 830625                             | +1          | U           | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 25.0884 km  | Direction: 152 degs.                     | Time elapsed: 4 yrs 4 mths 29 days |             |             |     |              |                |                |
| Bander: THE VICTORIAN WADER STUDY GROUP                           | Finder: THE VICTORIAN WADER STUDY GROUP  |                                    |             |             |     |              |                |                |
| Band no.: 100-81151   | Species: 130 PIED OYSTERCATCHER          |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON)                  | VIC                                      | 790127                             | 1           | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSCLIFF                                | VIC                                      | 840602                             | +2          | U           | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 25.0884 km  | Direction: 152 degs.                     | Time elapsed: 5 yrs 4 mths 6 days  |             |             |     |              |                |                |
| Bander: THE VICTORIAN WADER STUDY GROUP                           | Finder: THE VICTORIAN WADER STUDY GROUP  |                                    |             |             |     |              |                |                |
| Band no.: 100-81151   | Species: 130 PIED OYSTERCATCHER          |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON)                  | VIC                                      | 790127                             | 1           | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSCLIFF                                | VIC                                      | 850602                             | +2          | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 25.0900 km  | Direction: 152 degs.                     | Time elapsed: 6 yrs 4 mths 6 days  |             |             |     |              |                |                |
| Bander: THE VICTORIAN WADER STUDY GROUP                           | Finder: THE VICTORIAN WADER STUDY GROUP  |                                    |             |             |     |              |                |                |
| Band no.: 100-82080   | Species: 130 PIED OYSTERCATCHER          |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON)                  | VIC                                      | 800308                             | +2          | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSCLIFF                                | VIC                                      | 810613                             | U           |             | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 25.0884 km  | Direction: 152 degs.                     | Time elapsed: 1 yrs 3 mths 5 days  |             |             |     |              |                |                |
| Bander: THE VICTORIAN WADER STUDY GROUP                           | Finder: THE VICTORIAN WADER STUDY GROUP  |                                    |             |             |     |              |                |                |
| Band no.: 100-82080   | Species: 130 PIED OYSTERCATCHER          |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON)                  | VIC                                      | 800308                             | +2          | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSCLIFF                                | VIC                                      | 830625                             | +2          | U           | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 25.0884 km  | Direction: 152 degs.                     | Time elapsed: 3 yrs 3 mths 17 days |             |             |     |              |                |                |
| Bander: THE VICTORIAN WADER STUDY GROUP                           | Finder: THE VICTORIAN WADER STUDY GROUP  |                                    |             |             |     |              |                |                |

## AUSTRALIAN BIRD &amp; BAT BANDING SCHEMES

## REPORT ON BAND RECOVERIES

| BANDING AND RECOVERY LOCATIONS                                    |   | DATE<br>(YYMMDD)                     | AGE<br>CODE | HOW<br>AGED | SEX | HOW<br>SEXED | METHOD<br>CODE | STATUS<br>CODE |
|---|---|--------------------------------------|-------------|-------------|-----|--------------|----------------|----------------|
| Band no.: 100-82080   | Species: 130 PIED OYSTERCATCHER         |                                      |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC              |   | 800308                               | +2          | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |   |                                      |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSLIFF VIC                             |   | 850602                               | +2          | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E . |   |                                      |             |             |     |              |                |                |
| Distance: 25.0900 km  | Direction: 152 degs.                    | Time elapsed: 5 yrs 2 mths 25 days   |             |             |     |              |                |                |
| Bander: THE VICTORIAN WADER STUDY GROUP                           | Finder: THE VICTORIAN WADER STUDY GROUP |                                      |             |             |     |              |                |                |
| Band no.: 051-00106   | Species: 139 MONGOLIAN PLOVER           |                                      |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON NSW                              |   | 750131                               | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |   |                                      |             |             |     |              |                |                |
| Recovered: STOCKTON BRIDGE STOCKTON NSW                           |   | 760123                               | U           |             | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |   |                                      |             |             |     |              |                |                |
| Distance: .000000 km  | Direction: 0 degs.                      | Time elapsed: 0 yrs 11 mths 23 days  |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: MR SG LANE                      |                                      |             |             |     |              |                |                |
| Band no.: 051-00106   | Species: 139 MONGOLIAN PLOVER           |                                      |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON NSW                              |   | 750131                               | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |   |                                      |             |             |     |              |                |                |
| Recovered: KODRAGANG ISLAND NSW                                   |   | 770108                               | U           |             | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E . |   |                                      |             |             |     |              |                |                |
| Distance: 7.55618 km  | Direction: 348 degs.                    | Time elapsed: 1 yrs 11 mths 8 days   |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: MR FWC VAN GESSEL               |                                      |             |             |     |              |                |                |
| Band no.: 051-00106   | Species: 139 MONGOLIAN PLOVER           |                                      |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON NSW                              |   | 750131                               | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |   |                                      |             |             |     |              |                |                |
| Recovered: KODRAGANG ISLAND NSW                                   |   | 770108                               | U           |             | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E . |   |                                      |             |             |     |              |                |                |
| Distance: 7.56000 km  | Direction: 348 degs.                    | Time elapsed: 1 yrs 11 mths 8 days   |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: MR A LEISHMAN                   |                                      |             |             |     |              |                |                |
| Band no.: 051-00106   | Species: 139 MONGOLIAN PLOVER           |                                      |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON NSW                              |   | 750131                               | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |   |                                      |             |             |     |              |                |                |
| Recovered: STOCKTON BRIDGE STOCKTON NSW                           |   | 770318                               | U           |             | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |   |                                      |             |             |     |              |                |                |
| Distance: .000000 km  | Direction: 0 degs.                      | Time elapsed: 2 yrs 1 mths 18 days   |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: MR SG LANE                      |                                      |             |             |     |              |                |                |
| Band no.: 051-00106   | Species: 139 MONGOLIAN PLOVER           |                                      |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON NSW                              |   | 750131                               | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |   |                                      |             |             |     |              |                |                |
| Recovered: KODRAGANG ISLAND NSW                                   |   | 851226                               | +1          | P           | U   |              | 03             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 44min 0sec E . |   |                                      |             |             |     |              |                |                |
| Distance: 8.74914 km  | Direction: 327 degs.                    | Time elapsed: 10 yrs 10 mths 26 days |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: MRS WP BARDEN                   |                                      |             |             |     |              |                |                |

## AUSTRALIAN BIRD &amp; BAT BANDING SCHEMES

## REPORT ON BAND RECOVERIES

| BANDING AND RECOVERY LOCATIONS                                    |  | DATE<br>(YYMMDD)                   | AGE<br>CODE | HOW<br>AGED | SEX | HOW<br>SEXED | METHOD<br>CODE | STATUS<br>CODE |
|---|--|------------------------------------|-------------|-------------|-----|--------------|----------------|----------------|
| Band no.: 051-01796   | Species: 139 MONGOLIAN PLOVER            |                                    |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON                                  | NSW                                      | 761228                             | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |  |                                    |             |             |     |              |                |                |
| Recovered: STOCKTON BRIDGE STOCKTON                               | NSW                                      | 770318                             | +2          |             | U   |              | 03             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |  |                                    |             |             |     |              |                |                |
| Distance: .000000 km  | Direction: 0 degs.                       | Time elapsed: 0 yrs 2 mths 21 days |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: MR SG LANE                       |                                    |             |             |     |              |                |                |
| Band no.: 051-01796   | Species: 139 MONGOLIAN PLOVER            |                                    |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON                                  | NSW                                      | 761228                             | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |  |                                    |             |             |     |              |                |                |
| Recovered: RECLAIMED LAND NR MANILA HBR PHILLIPINES               |  | 860419                             | U           |             | U   |              | 67             | 05             |
| Latitude: 14 deg 32min 0sec N ; Longitude: 120 deg 58min 0sec E . |  |                                    |             |             |     |              |                |                |
| Distance: 6196.41 km  | Direction: 323 degs.                     | Time elapsed: 9 yrs 3 mths 22 days |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: MR ROME S DE PANO JR             |                                    |             |             |     |              |                |                |
| Band no.: 041-13109   | Species: 140 DOUBLE-BANDED PLOVER        |                                    |             |             |     |              |                |                |
| Banded: LAUDERDALE  | TAS                                      | 830403                             | +1          | P           | U   |              | 05             | 13             |
| Latitude: 42 deg 55min 0sec S ; Longitude: 147 deg 29min 0sec E . |  |                                    |             |             |     |              |                |                |
| Recovered: EDWARD'S STREAM, NEW ZEALAND                           |  | 851008                             | +1          | P           | F   | P            | 04             | 13             |
| Latitude: 44 deg 3min 0sec S ; Longitude: 170 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Distance: 1862.87 km  | Direction: 101 degs.                     | Time elapsed: 2 yrs 6 mths 5 days  |             |             |     |              |                |                |
| Bander: THE SHOREBIRD STUDY GROUP (BOAT)                          | Finder: MESSRS PIERCE & MALONEY          |                                    |             |             |     |              |                |                |
| Band no.: 081-15346   | Species: 150 WHIMBREL                    |                                    |             |             |     |              |                |                |
| Banded: PELICAN ISLAND PORT MACQUARIE                             | NSW                                      | 830327                             | +2          | P           | U   |              | 03             | 13             |
| Latitude: 31 deg 26min 0sec S ; Longitude: 152 deg 54min 0sec E . |  |                                    |             |             |     |              |                |                |
| Recovered: KARAGINSKI ISLAND NE KAMCHATKA USSR                    |  | 830820                             | U           |             | U   |              | 61             | 03             |
| Latitude: 58 deg 50min 0sec N ; Longitude: 164 deg 0min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Distance: 10056.1 km  | Direction: 5 degs.                       | Time elapsed: 0 yrs 4 mths 24 days |             |             |     |              |                |                |
| Bander: MR GP CLANCY  | Finder: DR P TOMKOVICH                   |                                    |             |             |     |              |                |                |
| Band no.: 082-43509   | Species: 153 BAR-TAILED GODWIT           |                                    |             |             |     |              |                |                |
| Banded: ROEBUCK BAY   | WA                                       | 810902                             | 2           | U           | M   | U            | 03             | 13             |
| Latitude: 18 deg 4min 0sec S ; Longitude: 122 deg 19min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SHANGHAI SHI CHONGMING DAO CHINA                       |  | 850501                             | U           |             | U   |              | 01             | 00             |
| Latitude: 31 deg 38min 0sec N ; Longitude: 121 deg 27min 0sec E . |  |                                    |             |             |     |              |                |                |
| Distance: 5500.35 km  | Direction: 359 degs.                     | Time elapsed: 3 yrs 7 mths 29 days |             |             |     |              |                |                |
| Bander: THE WA WADER STUDY GROUP                                  | Finder: THE NATIONAL BIRD BANDING CENTER |                                    |             |             |     |              |                |                |
| Band no.: 050-56861   | Species: 160 TEPEK SANDPIPER             |                                    |             |             |     |              |                |                |
| Banded: KODRAGANG ISLAND  | NSW                                      | 740309                             | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E . |  |                                    |             |             |     |              |                |                |
| Recovered: STOCKTON BRIDGE  | NSW                                      | 751107                             | +2          | U           | U   |              | 01             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E . |  |                                    |             |             |     |              |                |                |
| Distance: 4.01000 km  | Direction: 157 degs.                     | Time elapsed: 1 yrs 7 mths 29 days |             |             |     |              |                |                |
| Bander: MR FWC VAN GESSEL   | Finder: MR GP CLANCY                     |                                    |             |             |     |              |                |                |

## AUSTRALIAN BIRD &amp; BAT BANDING SCHEMES

## REPORT ON BAND RECOVERIES

| BANDING AND RECOVERY LOCATIONS  |                              | DATE<br>(YYMMDD) | AGE<br>CODE | HOW<br>AGED | SEX | HOW<br>SEXED | METHOD<br>CODE | STATUS<br>CODE |
|---|------------------------------|------------------|-------------|-------------|-----|--------------|----------------|----------------|
| Band no.: 050-56861   | Species: 160 TEREK SANDPIPER |                  |             |             |     |              |                |                |
| Banded: KOORAGANG ISLAND  | NSW                          | 740309           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Recovered: KOORAGANG ISLAND   | NSW                          | 771111           | +2          | U           | U   |              | 01             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Distance: .000000 km Direction: 0 degs. Time elapsed: 3 yrs 8 mths 2 days     |                              |                  |             |             |     |              |                |                |
| Bander: MR FWC VAN GESSEL Finder: MR FWC VAN GESSEL                           |                              |                  |             |             |     |              |                |                |
| Band no.: 050-56861   | Species: 160 TEREK SANDPIPER |                  |             |             |     |              |                |                |
| Banded: KOORAGANG ISLAND  | NSW                          | 740309           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Recovered: KOORAGANG ISLAND   | NSW                          | 850322           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 44min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Distance: 3.11980 km Direction: 269 degs. Time elapsed: 11 yrs 0 mths 13 days |                              |                  |             |             |     |              |                |                |
| Bander: MR FWC VAN GESSEL Finder: MRS WP BARDEN                               |                              |                  |             |             |     |              |                |                |
| Band no.: 050-80726   | Species: 160 TEREK SANDPIPER |                  |             |             |     |              |                |                |
| Banded: KOORAGANG ISLAND  | NSW                          | 771209           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Recovered: STOCKTON BRIDGE STOCKTON   | NSW                          | 780407           | +2          | U           | U   |              | 01             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Distance: 4.01228 km Direction: 157 degs. Time elapsed: 0 yrs 3 mths 29 days  |                              |                  |             |             |     |              |                |                |
| Bander: MR FWC VAN GESSEL Finder: MR SG LANE                                  |                              |                  |             |             |     |              |                |                |
| Band no.: 050-80726   | Species: 160 TEREK SANDPIPER |                  |             |             |     |              |                |                |
| Banded: KOORAGANG ISLAND  | NSW                          | 771209           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 46min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Recovered: KOORAGANG ISLAND   | NSW                          | 850322           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 44min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Distance: 3.11980 km Direction: 269 degs. Time elapsed: 7 yrs 3 mths 13 days  |                              |                  |             |             |     |              |                |                |
| Bander: MR FWC VAN GESSEL Finder: MRS WP BARDEN                               |                              |                  |             |             |     |              |                |                |
| Band no.: 051-00128   | Species: 160 TEREK SANDPIPER |                  |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON  | NSW                          | 750927           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Recovered: STOCKTON BRIDGE STOCKTON   | NSW                          | 780210           | +2          | U           | U   |              | 01             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Distance: .000000 km Direction: 0 degs. Time elapsed: 2 yrs 4 mths 13 days    |                              |                  |             |             |     |              |                |                |
| Bander: MR SG LANE Finder: MR SG LANE   |                              |                  |             |             |     |              |                |                |
| Band no.: 051-00128   | Species: 160 TEREK SANDPIPER |                  |             |             |     |              |                |                |
| Banded: STOCKTON BRIDGE STOCKTON  | NSW                          | 750927           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 54min 0sec S ; Longitude: 151 deg 47min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Recovered: KOORAGANG ISLAND   | NSW                          | 850322           | +2          | U           | U   |              | 02             | 13             |
| Latitude: 32 deg 52min 0sec S ; Longitude: 151 deg 44min 0sec E.              |                              |                  |             |             |     |              |                |                |
| Distance: 5.96300 km Direction: 308 degs. Time elapsed: 9 yrs 5 mths 25 days  |                              |                  |             |             |     |              |                |                |
| Bander: MR SG LANE Finder: MRS WP BARDEN                                      |                              |                  |             |             |     |              |                |                |



## AUSTRALIAN BIRD &amp; BAT BANDING SCHEMES

## REPORT ON BAND RECOVERIES

| BANDING AND RECOVERY LOCATIONS                                    |  | DATE<br>(YYMMDD)                   | AGE<br>CODE | HOW<br>AGED | SEX | HOW<br>SEXED | METHOD<br>CODE | STATUS<br>CODE |
|---|--|------------------------------------|-------------|-------------|-----|--------------|----------------|----------------|
| Band no.: 032-20571   | Species: 162 RED-NECKED STINT            |                                    |             |             |     |              |                |                |
| Banded: PIPECLAY LAGOON (EAST SIDE)                               | TAS                                      | 791123                             | +2          | U           | U   |              | 05             | 13             |
| Latitude: 42 deg 58min 0sec S ; Longitude: 147 deg 32min 0sec E . |  |                                    |             |             |     |              |                |                |
| Recovered: LUHUA VILLAGE FUJIAN PROVINCE CHINA                    |  | 860326                             | U           |             | U   |              | 01             | 00             |
| Latitude: 25 deg 44min 0sec N ; Longitude: 119 deg 22min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 8135.93 km  | Direction: 333 degs.                     | Time elapsed: 6 yrs 4 mths 3 days  |             |             |     |              |                |                |
| Banders: THE SHOREBIRD STUDY GROUP (BOAT)                         | Finder: YU RENGUAN                       |                                    |             |             |     |              |                |                |
| Band no.: 032-29193   | Species: 162 RED-NECKED STINT            |                                    |             |             |     |              |                |                |
| Banded: RALPHS BAY (WEST)   | TAS                                      | 810920                             | +2          | P           | U   |              | 05             | 13             |
| Latitude: 43 deg 1min 0sec S ; Longitude: 147 deg 26min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SHANGHAI CHONGMING DAO CHINA                           |  | 850500                             | U           |             | U   |              | 01             | 00             |
| Latitude: 31 deg 36min 0sec N ; Longitude: 121 deg 18min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 8682.25 km  | Direction: 337 degs.                     | Time elapsed: 3 yrs 7 mths 10 days |             |             |     |              |                |                |
| Banders: THE SHOREBIRD STUDY GROUP (BOAT)                         | Finder: THE NATIONAL BIRD BANDING CENTER |                                    |             |             |     |              |                |                |
| Band no.: 032-33596   | Species: 162 RED-NECKED STINT            |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC              |  | 811125                             | +2          | U           | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: KHASAN DISTRICT PRIMORYE REGION USSR                   |  | 821001                             | U           |             | U   |              | 61             | 03             |
| Latitude: 42 deg 28min 0sec N ; Longitude: 130 deg 48min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 9024.45 km  | Direction: 349 degs.                     | Time elapsed: 0 yrs 10 mths 6 days |             |             |     |              |                |                |
| Banders: THE VICTORIAN WADER STUDY GROUP                          | Finder: MR VI TATARINOV                  |                                    |             |             |     |              |                |                |
| Band no.: 032-35435   | Species: 162 RED-NECKED STINT            |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC              |  | 820724                             | 1           | P           | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: SHANGHAI CHONGMING DAO CHINA                           |  | 840600                             | U           |             | U   |              | 01             | 00             |
| Latitude: 31 deg 36min 0sec N ; Longitude: 121 deg 18min 0sec E.  |  |                                    |             |             |     |              |                |                |
| Distance: 8079.09 km  | Direction: 339 degs.                     | Time elapsed: 1 yrs 10 mths 7 days |             |             |     |              |                |                |
| Banders: THE VICTORIAN WADER STUDY GROUP                          | Finder: THE NATIONAL BIRD BANDING CENTER |                                    |             |             |     |              |                |                |
| Band no.: 051-04864   | Species: 164 RED KNOT                    |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC              |  | 781106                             | J           | U           | U   |              | 03             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC           |  | 781125                             | J           | U           | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E.   |  |                                    |             |             |     |              |                |                |
| Distance: .000000 km  | Direction: 0 degs.                       | Time elapsed: 0 yrs 0 mths 19 days |             |             |     |              |                |                |
| Banders: MR SG LANE   | Finder: THE VICTORIAN WADER STUDY GROUP  |                                    |             |             |     |              |                |                |
| Band no.: 051-04864   | Species: 164 RED KNOT                    |                                    |             |             |     |              |                |                |
| Banded: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC              |  | 781106                             | J           | U           | U   |              | 03             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                    |             |             |     |              |                |                |
| Recovered: WERRIBEE SEWERAGE FARM (SPIT, PT WILSON) VIC           |  | 781227                             | J           | U           | U   |              | 05             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E.   |  |                                    |             |             |     |              |                |                |
| Distance: .000000 km  | Direction: 0 degs.                       | Time elapsed: 0 yrs 1 mths 21 days |             |             |     |              |                |                |
| Banders: MR SG LANE   | Finder: THE VICTORIAN WADER STUDY GROUP  |                                    |             |             |     |              |                |                |

## AUSTRALIAN BIRD &amp; BAT BANDING SCHEMES

## REPORT ON BAND RECOVERIES

| BANDING AND RECOVERY LOCATIONS                                    |  | DATE<br>(YYMMDD)                    | AGE<br>CODE | HOW<br>AGED | SEX | HOW<br>SEXED | METHOD<br>CODE | STATUS<br>CODE |
|---|--|-------------------------------------|-------------|-------------|-----|--------------|----------------|----------------|
| Band no.: 051-04864   | Species: 164 RED KNOT                    |                                     |             |             |     |              |                |                |
| Banded: MERRIBEE SEWERAGE FARM (SPIT PT WILSON)                   | UTC                                      | 781106                              | J           | U           | U   |              | 03             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                     |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSLIFF                                 | UTC                                      | 821031                              | U           |             | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E.  |  |                                     |             |             |     |              |                |                |
| Distance: 25.0884 km  | Direction: 152 degs.                     | Time elapsed: 3 yrs 11 mths 25 days |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: THE VICTORIAN WADER STUDY GROUP  |                                     |             |             |     |              |                |                |
| Band no.: 051-04844   | Species: 164 RED KNOT                    |                                     |             |             |     |              |                |                |
| Banded: MERRIBEE SEWERAGE FARM (SPIT PT WILSON)                   | UTC                                      | 781106                              | J           | U           | U   |              | 03             | 13             |
| Latitude: 38 deg 3min 0sec S ; Longitude: 144 deg 32min 0sec E .  |  |                                     |             |             |     |              |                |                |
| Recovered: SWAN ISLAND QUEENSLIFF                                 | UTC                                      | 851019                              | +2          | PF          | U   |              | 05             | 13             |
| Latitude: 38 deg 15min 0sec S ; Longitude: 144 deg 40min 0sec E.  |  |                                     |             |             |     |              |                |                |
| Distance: 25.0884 km  | Direction: 152 degs.                     | Time elapsed: 6 yrs 11 mths 13 days |             |             |     |              |                |                |
| Bander: MR SG LANE  | Finder: THE VICTORIAN WADER STUDY GROUP  |                                     |             |             |     |              |                |                |
| Band no.: 061-38111   | Species: 165 GREAT KNOT                  |                                     |             |             |     |              |                |                |
| Banded: 10 KM SOUTH OF ANNA PLAINS                                | WA                                       | 820824                              | 2           | U           | U   |              | 05             | 13             |
| Latitude: 19 deg 15min 0sec S ; Longitude: 121 deg 20min 0sec E . |  |                                     |             |             |     |              |                |                |
| Recovered: HANGZHOU BAY, SHANGHAI SUBURB CHINA                    |  | 850405                              | U           |             | U   |              | 03             | 13             |
| Latitude: 30 deg 47min 0sec N ; Longitude: 121 deg 25min 0sec E.  |  |                                     |             |             |     |              |                |                |
| Distance: 5536.32 km  | Direction: 0 degs.                       | Time elapsed: 2 yrs 7 mths 12 days  |             |             |     |              |                |                |
| Bander: THE WA WADER STUDY GROUP                                  | Finder: MR WANG TIANHOU                  |                                     |             |             |     |              |                |                |
| Band no.: 061-38249   | Species: 165 GREAT KNOT                  |                                     |             |             |     |              |                |                |
| Banded: 10 KM SOUTH OF ANNA PLAINS                                | WA                                       | 820824                              | +2          | PF          | U   |              | 05             | 13             |
| Latitude: 19 deg 15min 0sec S ; Longitude: 121 deg 20min 0sec E . |  |                                     |             |             |     |              |                |                |
| Recovered: SHANGHAI CHONGMING DAO CHINA                           |  | 860416                              | U           |             | U   |              | 01             | 00             |
| Latitude: 31 deg 36min 0sec N ; Longitude: 121 deg 18min 0sec E.  |  |                                     |             |             |     |              |                |                |
| Distance: 5626.86 km  | Direction: 359 degs.                     | Time elapsed: 3 yrs 7 mths 23 days  |             |             |     |              |                |                |
| Bander: THE WA WADER STUDY GROUP                                  | Finder: THE NATIONAL BIRD BANDING CENTER |                                     |             |             |     |              |                |                |
| Band no.: 061-38594   | Species: 165 GREAT KNOT                  |                                     |             |             |     |              |                |                |
| Banded: 10 KM SOUTH OF ANNA PLAINS                                | WA                                       | 820824                              | 1           | U           | U   |              | 05             | 13             |
| Latitude: 19 deg 15min 0sec S ; Longitude: 121 deg 20min 0sec E . |  |                                     |             |             |     |              |                |                |
| Recovered: LUHUA VILLAGE FUJIAN PROVINCE CHINA                    |  | 860326                              | U           |             | U   |              | 01             | 00             |
| Latitude: 25 deg 44min 0sec N ; Longitude: 119 deg 22min 0sec E.  |  |                                     |             |             |     |              |                |                |
| Distance: 4981.20 km  | Direction: 357 degs.                     | Time elapsed: 3 yrs 7 mths 2 days   |             |             |     |              |                |                |
| Bander: THE WA WADER STUDY GROUP                                  | Finder: YU RENGUAN                       |                                     |             |             |     |              |                |                |
| Band no.: 061-39485   | Species: 165 GREAT KNOT                  |                                     |             |             |     |              |                |                |
| Banded: 6K SW OF BROOME   | WA                                       | 820330                              | U           |             | U   |              | 05             | 13             |
| Latitude: 17 deg 58min 0sec S ; Longitude: 122 deg 16min 0sec E . |  |                                     |             |             |     |              |                |                |
| Recovered: SHANGHAI CHONGMING DAO CHINA                           |  | 860416                              | U           |             | U   |              | 01             | 00             |
| Latitude: 31 deg 36min 0sec N ; Longitude: 121 deg 18min 0sec E.  |  |                                     |             |             |     |              |                |                |
| Distance: 5485.78 km  | Direction: 358 degs.                     | Time elapsed: 4 yrs 0 mths 17 days  |             |             |     |              |                |                |
| Bander: THE WA WADER STUDY GROUP                                  | Finder: THE NATIONAL BIRD BANDING CENTER |                                     |             |             |     |              |                |                |



## AUSTRALIAN BIRD &amp; BAT BANDING SCHEMES

## REPORT ON BAND RECOVERIES

| BANDING AND RECOVERY LOCATIONS                                    |                              | DATE<br>(YYMMDD)                  | AGE<br>CODE | HOW<br>AGED | SEX | HOW<br>SEXED | METHOD<br>CODE | STATUS<br>CODE |
|---|------------------------------|-----------------------------------|-------------|-------------|-----|--------------|----------------|----------------|
| Band no.: 061-34370   | Species: 169 SWINHOE'S SNIFE |                                   |             |             |     |              |                |                |
| Banded: 15KM SE OF DARWIN   | NT                           | 841222                            | U           |             | U   |              | 01             | 13             |
| Latitude: 12 deg 29min 0sec S ; Longitude: 130 deg 55min 0sec E . |                              |                                   |             |             |     |              |                |                |
| Recovered: NEAR BAOB, CAMARINES SUR, PHILIPPINES                  |                              | 850828                            | U           |             | U   |              | 08             | 00             |
| Latitude: 13 deg 27min 0sec N ; Longitude: 123 deg 22min 0sec E.  |                              |                                   |             |             |     |              |                |                |
| Distance: 2986.45 km  | Direction: 343 degs.         | Time elapsed: 0 yrs 8 mths 6 days |             |             |     |              |                |                |
| Bander: MR AL HERTOZ  | Finder: MR GF MAYAO          |                                   |             |             |     |              |                |                |



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