

**NUMBERS, SPECIES AND DISTURBANCE OF  
WATERBIRDS, PARTICULARLY WADERS,  
RECORDED BY J. LANE AND OTHERS ON THE  
SWAN RIVER, PRINCIPALLY IN THE 1970s**

**RESEARCH MATERIALS CONSOLIDATION REPORT**

**JAK Lane  
WA Department of Parks and Wildlife**

**August 2014**

This particular **Research Materials Consolidation Report** is a PDF principally of (then) WA Department of Fisheries & Wildlife Research Officer Jim (JAK) Lane's papers concerning numbers, species and disturbance of waterbirds – particularly waders – on the Swan River, Perth, mainly in the 1970s.

## **CONTENT OF THIS RMCR**

This RMCR includes:

- Publications by others (e.g. Creed & Bailey 2009, 1998, Singor 2009) about waterbird numbers on the Swan River and their decline over time.
- Media article about a proposed jet ski area and disturbance of waterbirds on the Swan River.
- Correspondence about recreational prawning and disturbance of waterbirds on the Swan River.
- Correspondence detailing waterbird breeding in Alfred Cove (Swan River).
- Other correspondence re disturbance of waterbirds on the Swan River, e.g. letter by JL on 16<sup>th</sup> January 1987 re Swan River Planning and Management Strategy.
- Cannon-netting on the Swan River.
- Papers (e.g. response to EPA's System Six Report) of the WA Wader Study group re wader numbers, species, locations, banding, issues etc, particularly on the Swan River and other Swan Coastal Plain wetlands.
- Numbers of waders on Swan Coastal Plain Lakes.
- Canning River waterbird species list.
- Prawing at Pelican Point (Swan River).
- Alfred Cove (Swan River) waterbirds and mosquitoes.
- Waterbird counts on Swan River by JL and others.
- Some waterbird numbers extracted from JL's field notebooks.
- Model-boating at Alfred Cove (Swan River).
- Subdivision proposal at/near Alfred Cove (Swan River).
- Fencing of Pelican Point to minimise disturbance.
- Proposed reservation of wader areas on the Swan River.
- Spotlighting for waders on the Swan River.
- Correspondence between JL and community members re waterbirds on the Swan River.
- A 1982 report by JL detailing his observations of waterbirds on the Canning River.
- JL writing to DL Serventy reporting his observation of a Marsh Sandpiper at Point Waylen (Swan River) on 27<sup>th</sup> March 1972.
- Detailed notes by JL of his many surveys / counts of waterbirds on the Swan River.
- Bar chart of 'Wader Trapping Efficiency' on Swan River by JL.
- Graphs and bar charts by JL of his frequent counts of waterbird numbers on the Swan River.
- A few other bits and pieces

*Note that other RMCRs have similar, overlapping and/or related materials.*

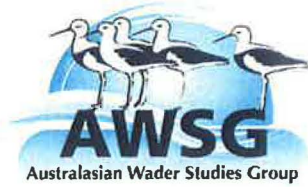
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TO DO: ~~June 16/8/2014~~  
They still need some  
emergency

All of these  
papers were  
photocopied  
on 16/8/2014  
for Archiving  
(PDF'ing)  
16/8/2014

Papers concerning numbers  
and species <sup>+ disturbance</sup> of wetlands,  
particularly wedens on the  
Swan River.

These papers pulled together from various  
wedens + Swan River suspension  
files on 12/8/2014 R



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## CONTINUING DECLINE IN WADER POPULATIONS AT PELICAN POINT, WESTERN AUSTRALIA, SINCE 1971

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Surveys of waders at Pelican Point, on the Swan River estuary in Perth WA, have been made weekly from November to February since 1971. There has been a general decline to almost zero in numbers of individuals and in frequency of 9 trans-equatorial migrants, but not of 4 local non-migratory waders. Non-wader water birds were also monitored. Some species have been seen less frequently than in earlier years (e.g. larger cormorants, terns, Silver Gull, Grey Teal). However, others have been relatively constant or were present more often than in earlier years (e.g. smaller cormorants, Fairy Tern, Black Swan). Changes at Pelican Point include greater recreational use especially by water craft and kite surfers. There has been a marked decrease in rainfall in the catchment area so that the water may be more saline. However the continued presence of local waders and other waterbirds suggests these changes cannot explain the decline in trans-equatorial waders.

### INTRODUCTION

Pelican Point (Point Currie) is a triangular area 500m X 200m which projects into the Swan River at Nedlands, 5km west of central Perth, Western Australia (Creed & Bailey 1998). It contains small trees/shrubs, low sand dunes and a lagoon, and has been separated from the rest of the river fore-shore by a fence since 1976. In 1990 Pelican Point, together with the adjacent shallow area of the Swan River,

Alfred Cove and Milyu, was designated the “Swan Estuary Marine Park” for the protection of waders (Figure 1).

The bird life on the Swan River was first reported by Alexander in 1921 and a description of Pelican Point and its birds was published by Serventy in 1938. The occurrence and behaviour of waders, which were present then in thousands, were studied extensively by Serventy for many years. Since 1971 a group has been has been visiting the

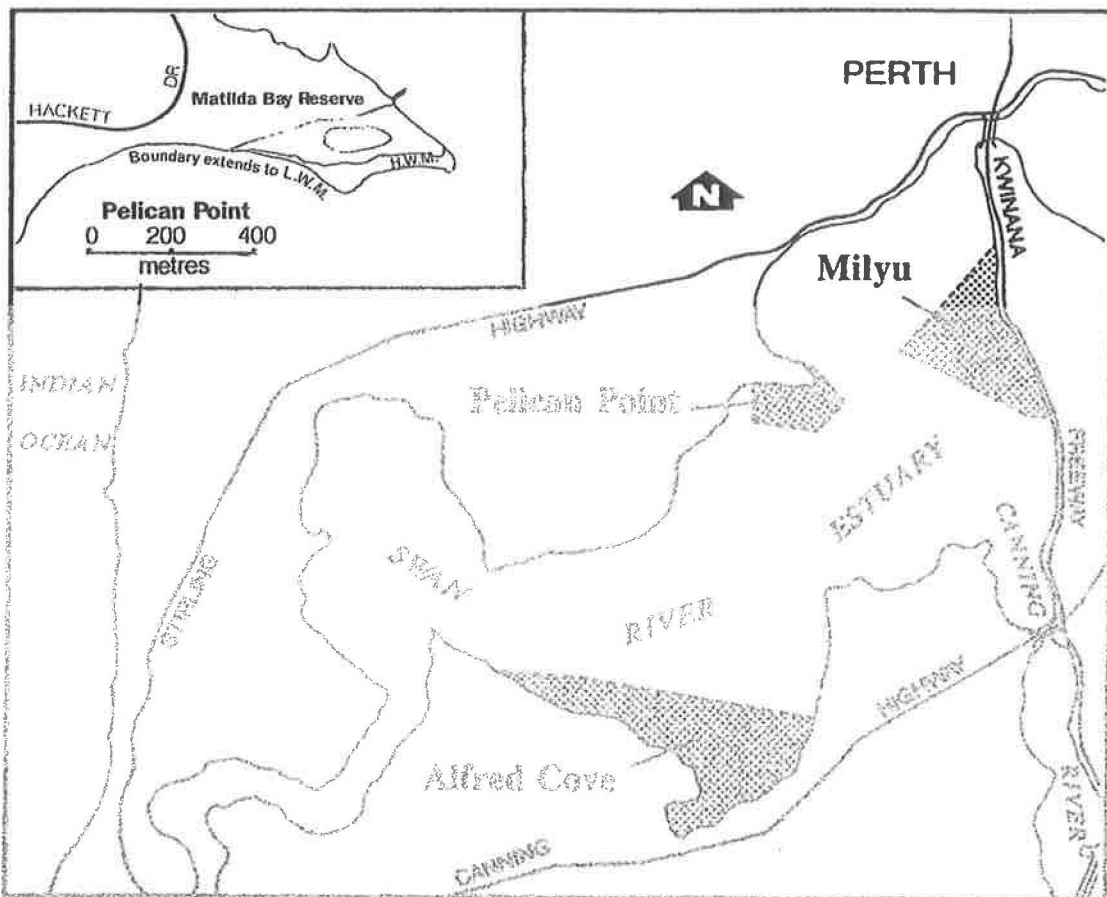


Figure 1. Three reserves comprising the Swan Estuary Marine Park in Western Australia. Pelican Point is enlarged in the inset.

Point weekly, originally in the summer months, to monitor the waders and other water birds. In 1985, the Metropolitan Bird Survey of all birds in Perth was initiated and from that time all species were monitored at Pelican Point throughout the year. The presence of all birds, compared with earlier records, was published in 1989 (Bailey & Creed 1989, Job 1972, Serventy 1938).

Subsequently, the frequency of occurrence of waders and the number of individual birds showed that there was a decrease in some species in 1981–91 compared with 1971–81 (Bailey & Creed 1993). By 1998 three species, Curlew Sandpiper, Sharp-tailed Sandpiper and Bar-tailed Godwit, were rarely seen and most other equatorial species had declined sharply. By contrast, there was little change in local waders (Creed & Bailey 1998).

The present paper reports further changes in the last 10 years of local and equatorial waders. In addition, the populations since 1971 of three other groups of water birds (ducks, terns and cormorants) is presented in order to establish whether the decline in waders can be due to local changes that make this part of the Swan River less attractive to all species.

## METHODS

Visits were made to Pelican Point weekly, usually at 5.30pm on a weekday in summer and 4.30pm in winter. Between 1971 and 1985 most visits were made in the summer months (September to April). Subsequently, visits were made throughout the year. During each visit, all waders and water birds were recorded and the numbers of each species was noted. If more than 100 birds were present, an estimate was made by comparing the total area occupied by the group with the area occupied by 50 or 100 birds. A detailed analysis of wader species was carried out for the months of November to February, in order to assess any changes since 1998 in the frequency (% of visits that birds were present) and numbers of individuals present per visit (Creed & Bailey 1998). The average frequency for 5 successive year periods was calculated (5 year moving average) to smooth out annual fluctuations and make overall trends more obvious. For other water birds (ducks, terns and cormorants) records from 1971 for the entire year were analysed for % of visits, and in addition number of individuals, which month they were present and the preferred habitat was noted.

## RESULTS

### The Waders

In the 1998 paper (which reported on November to February observations from 1971 to 1998) it was found that almost all species of migratory waders were seen less frequently in the later years. The only exception was Greenshank (*Tringa nebularia*) which had changed little. Since 1998, 3 of these species have rarely been seen: Bar-tailed Godwit (*Limosa lapponica*) was seen twice, Sharp-tailed Sandpiper (*Calidris acuminata*) once and Curlew Sandpiper (*Calidris ferruginea*) five times. Outside the months November to February individuals were occasionally recorded. Individual Common Sandpipers (*Actitis hypoleucos*) were recorded every year up

to 2008, for several successive weeks, but were then absent for intervals.

Three migratory waders, Red-necked Stint (*Calidris ruficollis*), Greenshank and Grey Plover (*Pluvialis squatarola*) were present in 50 to 70% of visits up to 1998 but have declined in the subsequent 10 years to 20 to 40% of recent visits (Fig 2A). At any one time there were often only single birds present of the latter 2 species but up to 100 individual Red-necked Stints have occasionally been seen. The Greenshank was normally seen in the lagoon, whereas the smaller waders preferred the sandy beach of the river.

In parallel with the decline in frequency, the number of individual birds present has also decreased since 1971. Table 1 shows the total number of each wader seen between November and February at 5 year intervals. All the migratory species appeared in fewer numbers.

Local non-migratory waders present included Black-winged Stilt (*Himantopus himantopus*), Red-capped Plover (*Chadrius ruficapillus*) and Red-necked Avocet (*Recurvirostris novaehollandiae*). These have continued to be present throughout the 36 year period. Though the frequency shows some variation for each, overall there is no marked change (Fig 2B). Total number of individual birds seen is also shown in Table 1. For comparison with migratory waders, only birds seen in November to February are included. Numbers are variable but all three species are still regularly present. Pied Oystercatchers (*Haematopus longirostris*) were first seen in 1986. Then the % of visits, when they were seen, increased to a maximum (77%) in 1990. They are still seen on the beach each year (usually 2 birds) but the frequency is variable. Stilts, Red-capped Plovers and Oystercatchers have all nested in the adjacent vegetation in the past 5 years.

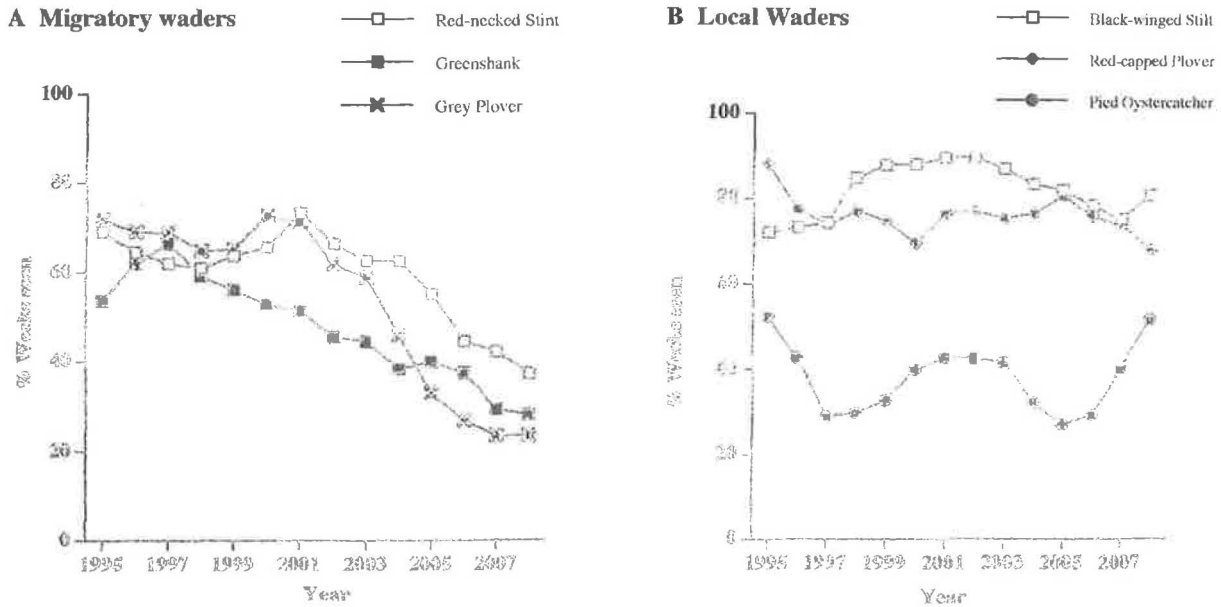
### Other Water Birds

A detailed list of water birds observed at Pelican Point has been published (Bailey & Creed 1989). Three groups of non-waders were selected for comparison with the waders on changes in numbers over the 36 years.

### Ducks

Australian Shelduck (*Tadorna tadornoides*), Black Duck (*Anas superciliosa*) and Grey Teal (*Anas gracilis*) are regularly seen at Pelican Point with variable frequency (Fig 3A). Up to 20 Shelduck have been present at any one time on the lagoon but were usually fewer. In 10 of the last 18 years a pair of adults has reared up to 9 young. At these times all other ducks were chased away by the male Shelduck. Black Duck, which have bred 9 times since 1980, swim in the lagoon and on the river. They occur throughout the year and are often in pairs with total numbers up to 75.

As many as 60 Grey Teal have been seen at any one time mostly in autumn (February to June). Until 1990 up to 60 birds were seen on about 60% of visits (Fig 3A). Since then the number of visits when seen has declined to about 10% and it is unusual to see more than 10 birds and often just a pair. Other ducks occasionally recorded are Australasian Shoveler, Hardhead, Wood Duck, and Chestnut Teal. Black Swans have been recorded in 9 of the previous 10 years (up



**Figure 2.** Frequency of occurrence of (A) 3 migratory waders and (B) 3 local waders recorded at Pelican Point during weekly visits from November to February. Each point represents the mean over 5 years up to the year indicated.

**Table 1.** Total number of waders seen on weekly visits to Pelican Point over 4 months, November to February, at 5 year intervals. The number of visits when species were present is shown in brackets.

	1972-73	1977-78	1982-83	1987-88	1992-93	1997-98	2002-03	2007-08
	16 visits	18 visits	14 visits	17 visits	17 visits	17 visits	17 visits	17 visits
Pied Oystercatcher	0	0	0	46 (14)	11 (4)	19 (4)	16 (4)	33 (14)
Grey Plover	107 (15)	89 (18)	83 (9)	66 (9)	79 (9)	20 (5)	5 (3)	4 (3)
Red-capped Plover	194 (14)	648 (16)	330 (13)	140 (17)	307 (12)	696 (15)	284 (14)	53 (10)
Black-winged Stilt	72 (13)	145 (13)	37 (12)	137 (14)	48 (6)	192 (13)	137 (11)	161 (16)
Red-necked Avocet	104 (6)	56 (5)	56 (3)	144 (8)	4 (1)	0	0	54 (4)
Common Sandpiper	4 (4)	3 (3)	2 (2)	10 (9)	3 (3)	0	1 (1)	3 (3)
Greenshank	6 (6)	1 (1)	1 (1)	2 (2)	9 (9)	4 (3)	4 (2)	1 (1)
Bar-tailed Godwit	285 (15)	59 (9)	5 (4)	12 (3)	0	0	0	1 (1)
Red Knot	311 (13)	1 (1)	164 (8)	0	2 (1)	16 (1)	0	0
Great Knot	0	0	12 (2)	0	55 (2)	0	0	0
Sharp-tailed Sandpiper	80 (12)	0	0	5 (1)	0	1 (1)	0	0
Red-necked Stint	6000 (13)	8000 (16)	3195 (13)	3733 (16)	1008 (13)	281 (12)	383 (9)	9 (5)
Curlew Sandpiper	3795 (14)	4572 (13)	450 (13)	18 (5)	3 (2)	9 (3)	2 (1)	3 (1)

Total number of waders seen on weekly visits to Pelican Point over 4 months, November to February, at 5 year intervals. The number of visits when species were present is shown in brackets.

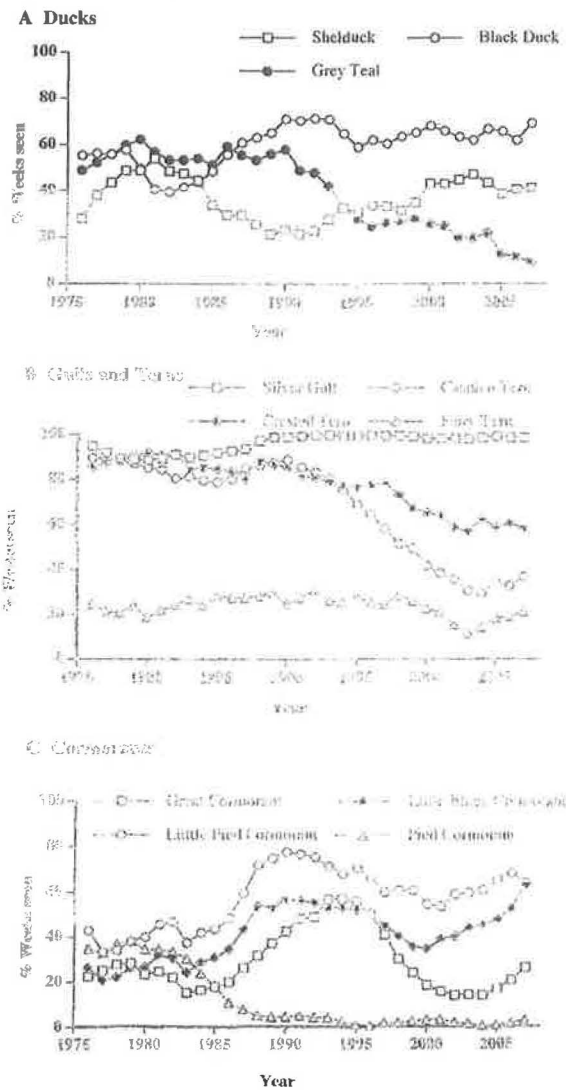
to 19% of visits); they were never seen between 1973 and 1983.

**Gulls and Terns**

In 80-90% of weekly visits, up to 1990 Silver Gulls (*Larus novaehollandiae*), Crested Terns (*Sterna bergii*) and Caspian Terns (*Sterna caspia*) were present (Fig 3B). Several 1,000 gulls were regularly over the Point or on the beach. Since then they have been present in 90-100% of visits but the number of individuals is much reduced. After 1990 there has been a decline in the % of visits when Crested and Caspian Terns were recorded. Crested Terns are now seen

on about 60% of visits and fewer birds are seen either on the beach or flying singly over the shallow water of the river. Caspian Terns have declined further to about 30% of visits but the number of individuals has remained constant (up to 10).

Fairy Terns appear between October and April in most years. Up to 25 individuals were often seen but in December 2006, 92 birds were breeding on the sandy beach. Previously single birds have nested.



**Figure 3.** Frequency of occurrence of (A) ducks, (B) gulls and terns and (C) cormorants recorded at Pelican Point throughout the year. Each point is the mean over 5 years up to the year indicated.

**Cormorants**

Throughout the year, all four species of cormorant and also Darters have been recorded at Pelican Point. A few individuals of the two larger species (Great Cormorant, *Phalacrocorax carbo*, and Pied Cormorant, *P. varius*) were mostly seen on the point, together with gulls, terns and the two smaller species. Pied Cormorants have declined since 1981 and have been seen on less than 8% of visits since 1984 (Fig 3C). Great Cormorants increased to a maximum (66% of weekly visits) in 1987 and have since declined.

Up to 20 individuals of Little Black Cormorants (*P. sulcirostris*) have been seen on the point but at times large flocks (up to 1,000), often with a few gulls and Little Pied Cormorants, *P. melanoleucos*, were seen on the river above shoals of fish into which they dived periodically. At other times they flew over the point in several groups of 10-50 birds along the river from west to east. Little Pied

Cormorants were not seen in such large groups. Both species have been seen more frequently since 1980 (Fig 3C).

Darters (*Anhinga melanogaster*) have been seen since 1985 on up to 30% of visits. There are often only 1 or 2 birds drying themselves but occasionally up to 10 birds were present. They are most commonly seen in the winter months (May to August).

**DISCUSSION**

The results reported in this paper confirm the trend in appearance of trans-equatorial migratory waders at Pelican Point reported by Creed & Bailey in 1998. Most species seen in large numbers in the early 1900s (Alexander 1921; Serventy 1938) are now rarely seen. By contrast, local non-migratory waders (especially Red-capped Plover and Black-winged Stilt) still occur frequently and numbers have changed little in 36 years. A similar decline in migratory waders has been recorded elsewhere on the Swan River (Singor 2009). In Eastern Australia wader surveys indicate that numbers of birds have also decreased dramatically. In the Coorong, South Australia, the number of migratory shorebirds recorded in 2002 had declined by 85-90% compared with 1982 including Red-necked Stint, Curlew Sandpiper, Sharp-tailed Sandpiper and Common Greenshank (Wainwright & Christie 2008). Local waders remained relatively consistent since 2000. Aerial surveys of the eastern 1/3 of Australia indicated that migratory birds were down by 73% and residential waders by 81% between 1983 and 2006 but much of this was on inland wetlands that have been progressively reduced by water extraction (Nebel *et al.* 2008).

There have been several possible explanations for the decline in migratory waders. Firstly a reduction in breeding in the northern hemisphere may have occurred. Data is not generally available for this but the % first year birds netted in Australia between 1998 and 2006 does not support a general decline (Minton *et al.* 2006a). Secondly, habitat degradation at stop-over sites along the east Asia flyways has occurred. Recovery of banded birds has been used to determine migration routes and stopover locations (Minton *et al.* 2006b). There are many reports of reclamation of mudflats and coastal regions for human development in both China and Japan (e.g. Ge *et al.* 2006). Both countries are important areas for migratory birds to refuel and rest and have signed agreements with Australia. Finally, in Australia, changes in waterways due to reclamation, climate change or pollution have occurred or birds are habitually disturbed by increased use for human recreation.

At Pelican Point local wader numbers have changed little and Pied Oystercatchers are now seen. The non-waders, Great Cormorant, Grey Teal, Caspian and Crested Terns have declined but other species are little changed. Breeding occurred in several groups. This suggests that the local area is still capable of supporting a considerable water bird population, with adequate food and shelter. There have been no marked changes in vegetation on the point in the last 10 years, although more plants grew immediately after the fence was erected in 1970. However, some changes have occurred which will discourage birds. The annual rainfall in the Perth region has decreased, particularly over the past 10 years, so

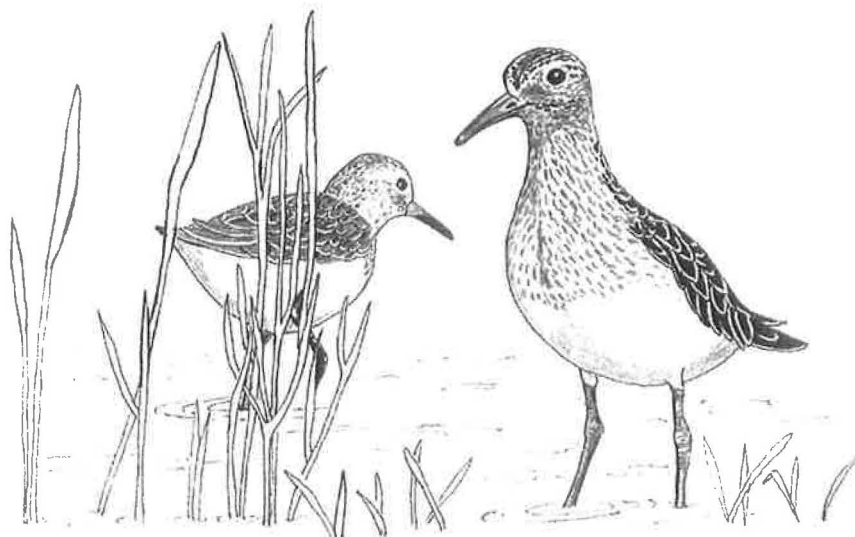
that the amount of fresh water entering the Swan River from catchment areas will be less with possible effects on salinity, pollution and food availability. Some ephemeral lakes on the coastal plain also dry earlier in summer affecting bird distribution. Furthermore, there has been much increase in the use of the Swan River for recreation. Ferries and private motor boats produce wash that undermines the beaches and the presence of wind surfs and particularly kite surfs have greatly increased in the water adjacent to Pelican Point and walkers with dogs regularly use the beach.

### ACKNOWLEDGEMENTS

The authors acknowledge the enthusiasm, support and contribution that have been provided by innumerable people over many years in the compiling of bird lists of Pelican Point.

### REFERENCES

- Alexander, W.B.** 1921. The birds of the Swan River district, Western Australia. *Emu* 20:149-168.
- Bailey, M. & K.E. Creed.** 1989. Observations of bird species at Pelican Point, Perth, Western Australia. *Western Australian Naturalist* 17:229-232.
- Bailey, M. & K.E. Creed.** 1993. Observations on waders recorded at Pelican Point, Western Australia from 1971-1991. *The Stilt* 22: 18-23.
- Creed, K.E. & M. Bailey.** 1998. Decline in migratory waders at Pelican Point, Swan River, Western Australia. *The Stilt* 33:10-14.
- Ge, Z., T. Wang, X. Zhou & W. Shi.** 2006. Seasonal changes and habitat selection of shorebird community at the South Yangtze River mouth and north Hangzhou Bay, China. *Acta Ecologica sinica* 26:40-47.
- Job, R.** 1972. Birds seen at Pelican Point, 1966-1968. *Western Australian Naturalist* 12:56-59.
- Minton, C., R. Jessop, P. Collins & C. Hassell.** 2006a. Arctic breeding success in 2005, based on juvenile ratios in waders in Australia in the 2005/2006 Austral summer. *The Stilt* 49:32-35.
- Minton, C., J. Wahl, R. Jessop, C. Hassell, P. Collins & H. Gibbs.** 2006b. Migration routes of waders which spend the non-breeding season in Australia. *The Stilt* 50:135-157.
- Nebel, S., J.L. Porter, R.T. Kingsford.** 2008. Long-term trends of shorebird populations in eastern Australia and impacts of freshwater extraction. *Biological Conservation* 141:971-980.
- Serventy, D.L.** 1938. Waders and other aquatic birds on the Swan River estuary, Western Australia. *Emu* 38:18-29.
- Singor, M.J.C.** 2009. Decline in wader numbers on the Swan River, Western Australia between 1981 and 2009. *Stilt* 55: 3-7.
- Wainwright, P. & M. Christie.** 2008. Wader surveys at the Coorong and S.E. coastal lakes, South Australia, February 2008. *The Stilt* 54:31-47.



## CONTINUING DECLINE IN WADER POPULATIONS AT PELICAN POINT, WESTERN AUSTRALIA, SINCE 1971

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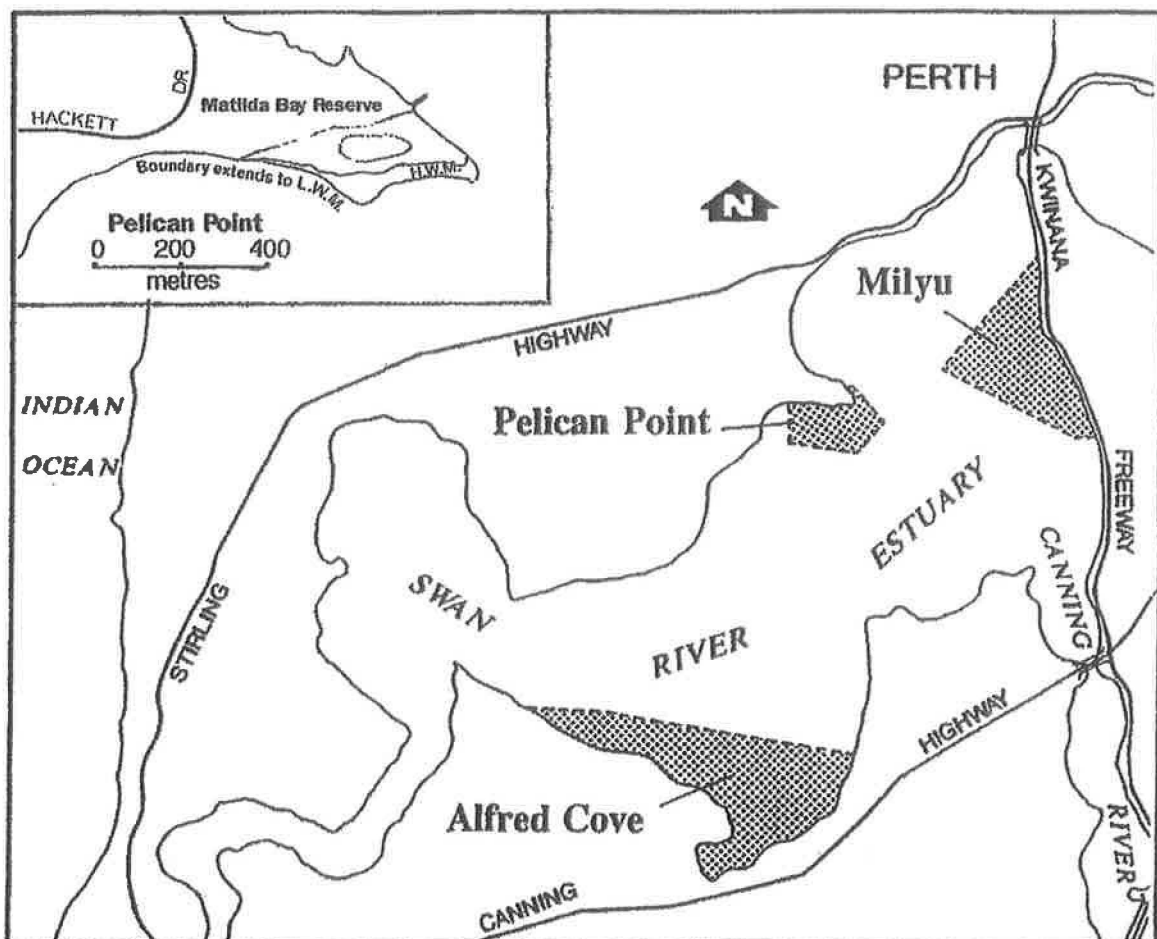
Surveys of waders at Pelican Point, on the Swan River estuary in Perth WA, have been made weekly from November to February since 1971. There has been a general decline to almost zero in numbers of individuals and in frequency of 9 trans-equatorial migrants, but not of 4 local non-migratory waders. Non-wader water birds were also monitored. Some species have been seen less frequently than in earlier years (e.g. larger cormorants, terns, Silver Gull, Grey Teal). However, others have been relatively constant or were present more often than in earlier years (e.g. smaller cormorants, Fairy Tern, Black Swan). Changes at Pelican Point include greater recreational use especially by water craft and kite surfers. There has been a marked decrease in rainfall in the catchment area so that the water may be more saline. However the continued presence of local waders and other waterbirds suggests these changes cannot explain the decline in trans-equatorial waders.

### INTRODUCTION

Pelican Point (Point Currie) is a triangular area 500m X 200m which projects into the Swan River at Nedlands, 5km west of central Perth, Western Australia (Creed & Bailey 1998). It contains small trees/shrubs, low sand dunes and a lagoon, and has been separated from the rest of the river fore-shore by a fence since 1976. In 1990 Pelican Point, together with the adjacent shallow area of the Swan River,

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**Figure 1.** Three reserves comprising the Swan Estuary Marine Park in Western Australia. Pelican Point is enlarged in the inset.

Point weekly, originally in the summer months, to monitor the waders and other water birds. In 1985, the Metropolitan Bird Survey of all birds in Perth was initiated and from that time all species were monitored at Pelican Point throughout the year. The presence of all birds, compared with earlier records, was published in 1989 (Bailey & Creed 1989, Job 1972, Serventy 1938).

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## METHODS

Visits were made to Pelican Point weekly, usually at 5.30pm on a weekday in summer and 4.30pm in winter. Between 1971 and 1985 most visits were made in the summer months (September to April). Subsequently, visits were made throughout the year. During each visit, all waders and water birds were recorded and the numbers of each species was noted. If more than 100 birds were present, an estimate was made by comparing the total area occupied by the group with the area occupied by 50 or 100 birds. A detailed analysis of wader species was carried out for the months of November to February, in order to assess any changes since 1998 in the frequency (% of visits that birds were present) and numbers of individuals present per visit (Creed & Bailey 1998). The average frequency for 5 successive year periods was calculated (5 year moving average) to smooth out annual fluctuations and make overall trends more obvious. For other water birds (ducks, terns and cormorants) records from 1971 for the entire year were analysed for % of visits, and in addition number of individuals, which month they were present and the preferred habitat was noted.

## RESULTS

### The Waders

In the 1998 paper (which reported on November to February observations from 1971 to 1998) it was found that almost all species of migratory waders were seen less frequently in the later years. The only exception was Greenshank (*Tringa nebularia*) which had changed little. Since 1998, 3 of these species have rarely been seen: Bar-tailed Godwit (*Limosa lapponica*) was seen twice, Sharp-tailed Sandpiper (*Calidris acuminata*) once and Curlew Sandpiper (*Calidris ferruginea*) five times. Outside the months November to February individuals were occasionally recorded. Individual Common Sandpipers (*Actotis hypoleucos*) were recorded every year up

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Three migratory waders, Red-necked Stint (*Calidris ruficolis*), Greenshank and Grey Plover (*Pluvialis squatarola*) were present in 50 to 70% of visits up to 1998 but have declined in the subsequent 10 years to 20 to 40% of recent visits (Fig 2A). At any one time there were often only single birds present of the latter 2 species but up to 100 individual Red-necked Stints have occasionally been seen. The Greenshank was normally seen in the lagoon, whereas the smaller waders preferred the sandy beach of the river.

In parallel with the decline in frequency, the number of individual birds present has also decreased since 1971. Table 1 shows the total number of each wader seen between November and February at 5 year intervals. All the migratory species appeared in fewer numbers.

Local non-migratory waders present included Black-winged Stilt (*Himantopus himantopus*), Red-capped Plover (*Chadrius ruficapillus*) and Red-necked Avocet (*Recurvirostris novaehollandiae*). These have continued to be present throughout the 36 year period. Though the frequency shows some variation for each, overall there is no marked change (Fig 2B). Total number of individual birds seen is also shown in Table 1. For comparison with migratory waders, only birds seen in November to February are included. Numbers are variable but all three species are still regularly present. Pied Oystercatchers (*Haematopus longirostris*) were first seen in 1986. Then the % of visits, when they were seen, increased to a maximum (77%) in 1990. They are still seen on the beach each year (usually 2 birds) but the frequency is variable. Stilts, Red-capped Plovers and Oystercatchers have all nested in the adjacent vegetation in the past 5 years.

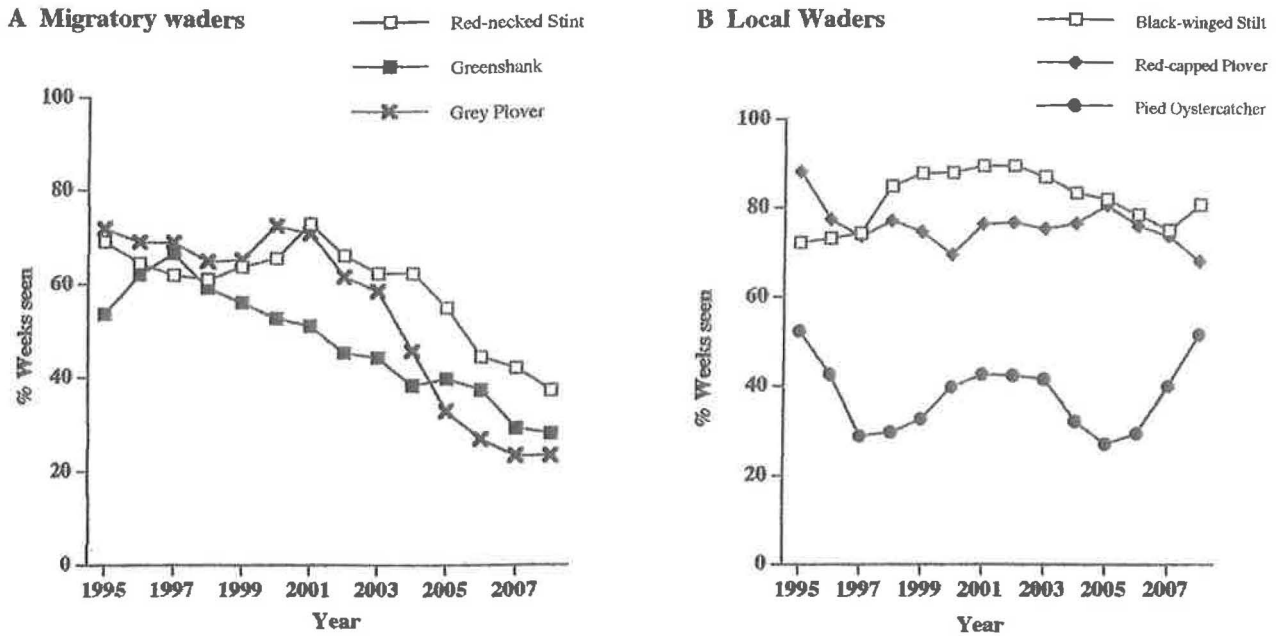
### Other Water Birds

A detailed list of water birds observed at Pelican Point has been published (Bailey & Creed 1989). Three groups of non-waders were selected for comparison with the waders on changes in numbers over the 36 years.

### Ducks

Australian Shelduck (*Tadorna tadornoides*), Black Duck (*Anas superciliosa*) and Grey Teal (*Anas gracilis*) are regularly seen at Pelican Point with variable frequency (Fig 3A). Up to 20 Shelduck have been present at any one time on the lagoon but were usually fewer. In 10 of the last 18 years a pair of adults has reared up to 9 young. At these times all other ducks were chased away by the male Shelduck. Black Duck, which have bred 9 times since 1980, swim in the lagoon and on the river. They occur throughout the year and are often in pairs with total numbers up to 75.

As many as 60 Grey Teal have been seen at any one time mostly in autumn (February to June). Until 1990 up to 60 birds were seen on about 60% of visits (Fig 3A). Since then the number of visits when seen has declined to about 10% and it is unusual to see more than 10 birds and often just a pair. Other ducks occasionally recorded are Australasian Shoveler, Hardhead, Wood Duck, and Chestnut Teal. Black Swans have been recorded in 9 of the previous 10 years (up



**Figure 2.** Frequency of occurrence of (A) 3 migratory waders and (B) 3 local waders recorded at Pelican Point during weekly visits from November to February. Each point represents the mean over 5 years up to the year indicated.

**Table 1.** Total number of waders seen on weekly visits to Pelican Point over 4 months, November to February, at 5 year intervals. The number of visits when species were present is shown in brackets.

	1972-73	1977-78	1982-83	1987-88	1992-93	1997-98	2002-03	2007-08
	16 visits	18 visits	14 visits	17 visits	17 visits	17 visits	17 visits	17 visits
Pied Oystercatcher	0	0	0	46 (14)	11 (4)	19 (4)	16 (4)	33 (14)
Grey Plover	107 (15)	89 (18)	83 (9)	66 (9)	79 (9)	20 (5)	5 (3)	4 (3)
Red-capped Plover	194 (14)	648 (16)	330 (13)	140 (17)	307 (12)	696 (15)	284 (14)	53 (10)
Black-winged Stilt	72 (13)	145 (13)	37 (12)	137 (14)	48 (6)	192 (13)	137 (11)	161 (16)
Red-necked Avocet	104 (6)	56 (5)	56 (3)	144 (8)	4 (1)	0	0	54 (4)
Common Sandpiper	4 (4)	3 (3)	2 (2)	10 (9)	3 (3)	0	1 (1)	3 (3)
Greenshank	6 (6)	1 (1)	1 (1)	2 (2)	9 (9)	4 (3)	4 (2)	1 (1)
Bar-tailed Godwit	285 (15)	59 (9)	5 (4)	12 (3)	0	0	0	1 (1)
Red Knot	311 (13)	1 (1)	164 (8)	0	2 (1)	16 (1)	0	0
Great Knot	0	0	12 (2)	0	55 (2)	0	0	0
Sharp-tailed Sandpiper	80 (12)	0	0	5 (1)	0	1 (1)	0	0
Red-necked Stint	6000 (13)	8000 (16)	3195 (13)	3733 (16)	1008 (13)	281 (12)	383 (9)	9 (5)
Curlew Sandpiper	3795 (14)	4572 (13)	450 (13)	18 (5)	3 (2)	9 (3)	2 (1)	3 (1)

Total number of waders seen on weekly visits to Pelican Point over 4 months, November to February, at 5 year intervals. The number of visits when species were present is shown in brackets.

to 19% of visits); they were never seen between 1973 and 1983.

**Gulls and Terns**

In 80-90% of weekly visits, up to 1990 Silver Gulls (*Larus novaehollandiae*), Crested Terns (*Sterna bergii*) and Caspian Terns (*Sterna caspia*) were present (Fig 3B). Several 1,000 gulls were regularly over the Point or on the beach. Since then they have been present in 90-100% of visits but the number of individuals is much reduced. After 1990 there has been a decline in the % of visits when Crested and Caspian Terns were recorded. Crested Terns are now seen

on about 60% of visits and fewer birds are seen either on the beach or flying singly over the shallow water of the river. Caspian Terns have declined further to about 30% of visits but the number of individuals has remained constant (up to 10).

Fairy Terns appear between October and April in most years. Up to 25 individuals were often seen but in December 2006, 92 birds were breeding on the sandy beach. Previously single birds have nested.

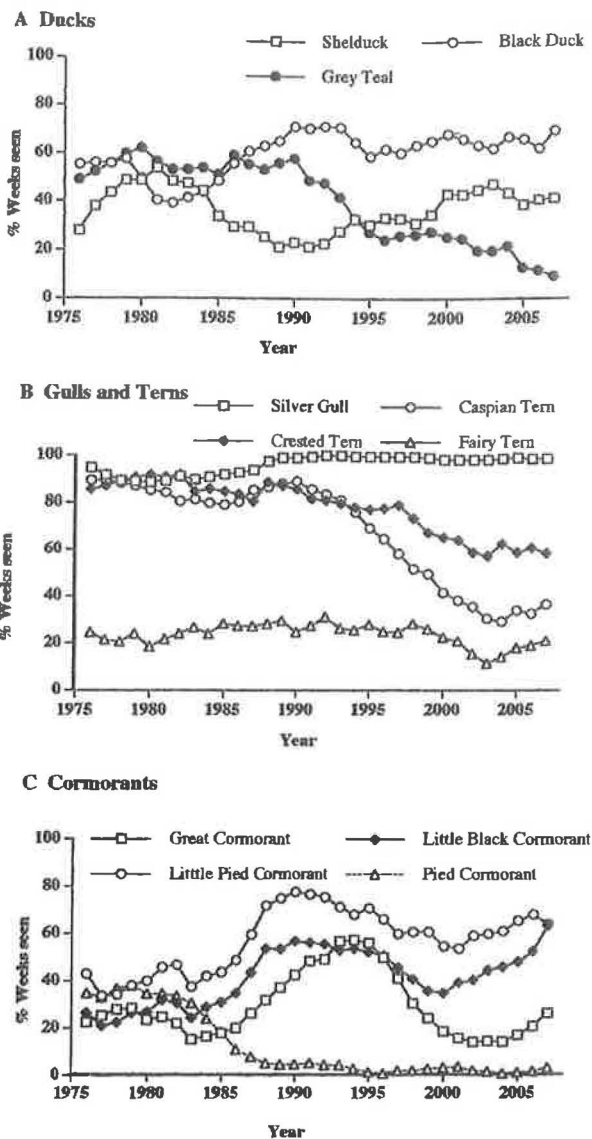


Figure 3. Frequency of occurrence of (A) ducks, (B) gulls and terns and (C) cormorants recorded at Pelican Point throughout the year. Each point is the mean over 5 years up to the year indicated.

### Cormorants

Throughout the year, all four species of cormorant and also Darters have been recorded at Pelican Point. A few individuals of the two larger species (Great Cormorant, *Phalacrocorax carbo*, and Pied Cormorant, *P. varius*) were mostly seen on the point, together with gulls, terns and the two smaller species. Pied Cormorants have declined since 1981 and have been seen on less than 8% of visits since 1984 (Fig 3C). Great Cormorants increased to a maximum (66% of weekly visits) in 1987 and have since declined.

Up to 20 individuals of Little Black Cormorants (*P. sulcirostris*) have been seen on the point but at times large flocks (up to 1,000), often with a few gulls and Little Pied Cormorants, *P. melanoleucos*, were seen on the river above shoals of fish into which they dived periodically. At other times they flew over the point in several groups of 10-50 birds along the river from west to east. Little Pied

Cormorants were not seen in such large groups. Both species have been seen more frequently since 1980 (Fig 3C).

Darters (*Anhinga melanogaster*) have been seen since 1985 on up to 30% of visits. There are often only 1 or 2 birds drying themselves but occasionally up to 10 birds were present. They are most commonly seen in the winter months (May to August).

### DISCUSSION

The results reported in this paper confirm the trend in appearance of trans-equatorial migratory waders at Pelican Point reported by Creed & Bailey in 1998. Most species seen in large numbers in the early 1900s (Alexander 1921; Serventy 1938) are now rarely seen. By contrast, local non-migratory waders (especially Red-capped Plover and Black-winged Stilt) still occur frequently and numbers have changed little in 36 years. A similar decline in migratory waders has been recorded elsewhere on the Swan River (Singor 2009). In Eastern Australia wader surveys indicate that numbers of birds have also decreased dramatically. In the Coorong, South Australia, the number of migratory shorebirds recorded in 2002 had declined by 85-90% compared with 1982 including Red-necked Stint, Curlew Sandpiper, Sharp-tailed Sandpiper and Common Greenshank (Wainwright & Christie 2008). Local waders remained relatively consistent since 2000. Aerial surveys of the eastern 1/3 of Australia indicated that migratory birds were down by 73% and residential waders by 81% between 1983 and 2006 but much of this was on inland wetlands that have been progressively reduced by water extraction (Nebel *et al.* 2008).

There have been several possible explanations for the decline in migratory waders. Firstly a reduction in breeding in the northern hemisphere may have occurred. Data is not generally available for this but the % first year birds netted in Australia between 1998 and 2006 does not support a general decline (Minton *et al.* 2006a). Secondly, habitat degradation at stop-over sites along the east Asia flyways has occurred. Recovery of banded birds has been used to determine migration routes and stopover locations (Minton *et al.* 2006b). There are many reports of reclamation of mudflats and coastal regions for human development in both China and Japan (e.g. Ge *et al.* 2006). Both countries are important areas for migratory birds to refuel and rest and have signed agreements with Australia. Finally, in Australia, changes in waterways due to reclamation, climate change or pollution have occurred or birds are habitually disturbed by increased use for human recreation.

At Pelican Point local wader numbers have changed little and Pied Oystercatchers are now seen. The non-waders, Great Cormorant, Grey Teal, Caspian and Crested Terns have declined but other species are little changed. Breeding occurred in several groups. This suggests that the local area is still capable of supporting a considerable water bird population, with adequate food and shelter. There have been no marked changes in vegetation on the point in the last 10 years, although more plants grew immediately after the fence was erected in 1970. However, some changes have occurred which will discourage birds. The annual rainfall in the Perth region has decreased, particularly over the past 10 years, so

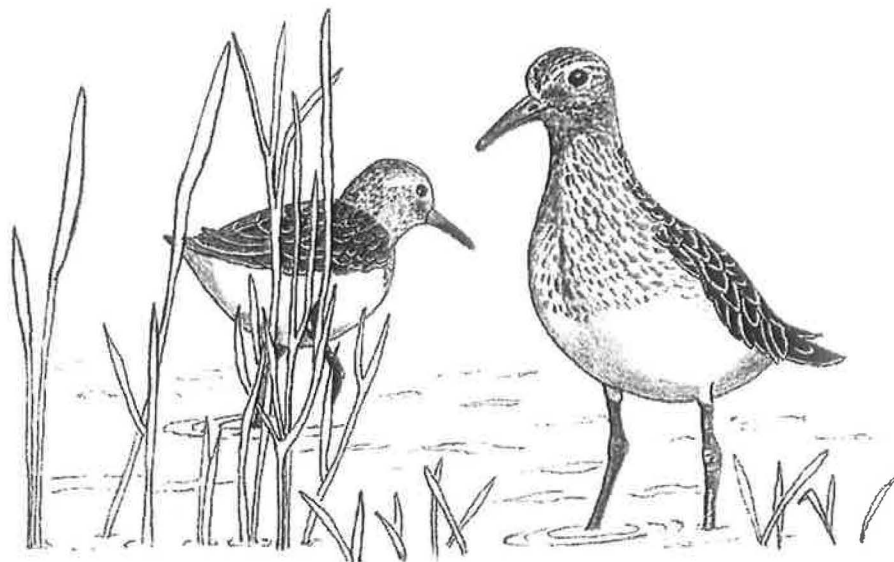
that the amount of fresh water entering the Swan River from catchment areas will be less with possible effects on salinity, pollution and food availability. Some ephemeral lakes on the coastal plain also dry earlier in summer affecting bird distribution. Furthermore, there has been much increase in the use of the Swan River for recreation. Ferries and private motor boats produce wash that undermines the beaches and the presence of wind surfs and particularly kite surfs have greatly increased in the water adjacent to Pelican Point and walkers with dogs regularly use the beach.

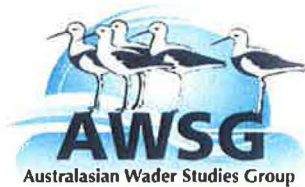
### ACKNOWLEDGEMENTS

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### REFERENCES

- Alexander, W.B.** 1921. The birds of the Swan River district, Western Australia. *Emu* 20:149-168.
- Bailey, M. & K.E. Creed.** 1989. Observations of bird species at Pelican Point, Perth, Western Australia. *Western Australian Naturalist* 17:229-232.
- Bailey, M. & K.E. Creed.** 1993. Observations on waders recorded at Pelican Point, Western Australia from 1971-1991. *The Stilt* 22: 18-23.
- Creed, K.E. & M. Bailey.** 1998. Decline in migratory waders at Pelican Point, Swan River, Western Australia. *The Stilt* 33:10-14.
- Ge, Z., T. Wang, X. Zhou & W. Shi.** 2006. Seasonal changes and habitat selection of shorebird community at the South Yangtze River mouth and north Hangzhou Bay, China. *Acta Ecologica Sinica* 26:40-47.
- Job, R.** 1972. Birds seen at Pelican Point, 1966-1968. *Western Australian Naturalist* 12:56-59.
- Minton, C., R. Jessop, P. Collins & C. Hassell.** 2006a. Arctic breeding success in 2005, based on juvenile ratios in waders in Australia in the 2005/2006 Austral summer. *The Stilt* 49:32-35.
- Minton, C., J. Wahl, R. Jessop, C. Hassell, P. Collins & H. Gibbs.** 2006b. Migration routes of waders which spend the non-breeding season in Australia. *The Stilt* 50:135-157.
- Nebel, S., J.L. Porter, R.T. Kingsford.** 2008. Long-term trends of shorebird populations in eastern Australia and impacts of freshwater extraction. *Biological Conservation* 141:971-980.
- Serventy, D.L.** 1938. Waders and other aquatic birds on the Swan River estuary, Western Australia. *Emu* 38:18-29.
- Singor, M.J.C.** 2009. Decline in wader numbers on the Swan River, Western Australia between 1981 and 2009. *Stilt* 55: 3-7.
- Wainwright, P. & M. Christie.** 2008. Wader surveys at the Coorong and S.E. coastal lakes, South Australia, February 2008. *The Stilt* 54:31-47.





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## DECLINE IN WADER NUMBERS ON THE SWAN RIVER, WESTERN AUSTRALIA BETWEEN 1981 AND 2009

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Alfred Cove is the last remaining significant wader site along the Swan River. This article provides an update on the status of the wader population at Alfred Cove. Observations were made from 2006 to 2009 and compared with data from 20 years ago. The only species to increase in number were Pied Oystercatchers which were not recorded between 1981 and 1985. Maximum counts of other species declined by 48 and 99 percent, the greatest declines were recorded for Red-necked Stints and Curlew Sandpipers.

### INTRODUCTION

The Swan River Estuary, Perth, Western Australia is a site of international significance for Red-necked Stint *Calidris ruficollis* (Bamford *et al.* 2008). The Swan River system occurs in wide channels and extensive flood plains with low relief and is part of the Avon and Swan Coastal Plain drainage system in Western Australia. Large tracks of the Swan River wetlands have been reclaimed since settlement and are highly urbanised. One of the major roosts is found at Alfred Cove which is nine kilometers from the centre of Western Australia's biggest city, Perth, and forms part of the Swan Estuary Marine Park. Alfred Cove together with the other two reserves, Milyu and Pelican Point, which form the park, are separate estuarine lands and waters within the Swan River. Pelican Point and Alfred Cove are four kilometres

apart and Pelican Point is on the opposite side of the Swan River. Waders move between the three sites on a daily basis (Bamford 1999). Alfred Cove consists of a stretch of intertidal mudflats bordered by a chain of off shore sandbanks. There is an adjacent area of salt marsh and low samphire wetlands interspersed with shallow tidal pools (Figure 1). Together with the other reserves it provides the main feeding and resting areas for trans-equatorial migratory waders in the Swan Estuary. The reserves and water are managed by the Western Australian, Department of Environment and Conservation.

Limited research into the movement of waders on the Swan Estuary has been undertaken. Bamford (1999) notes that as the tide rose and covered the mudflats, waders moved to the higher sandbanks.

*"The smaller waders such Red-necked Stint moved first*

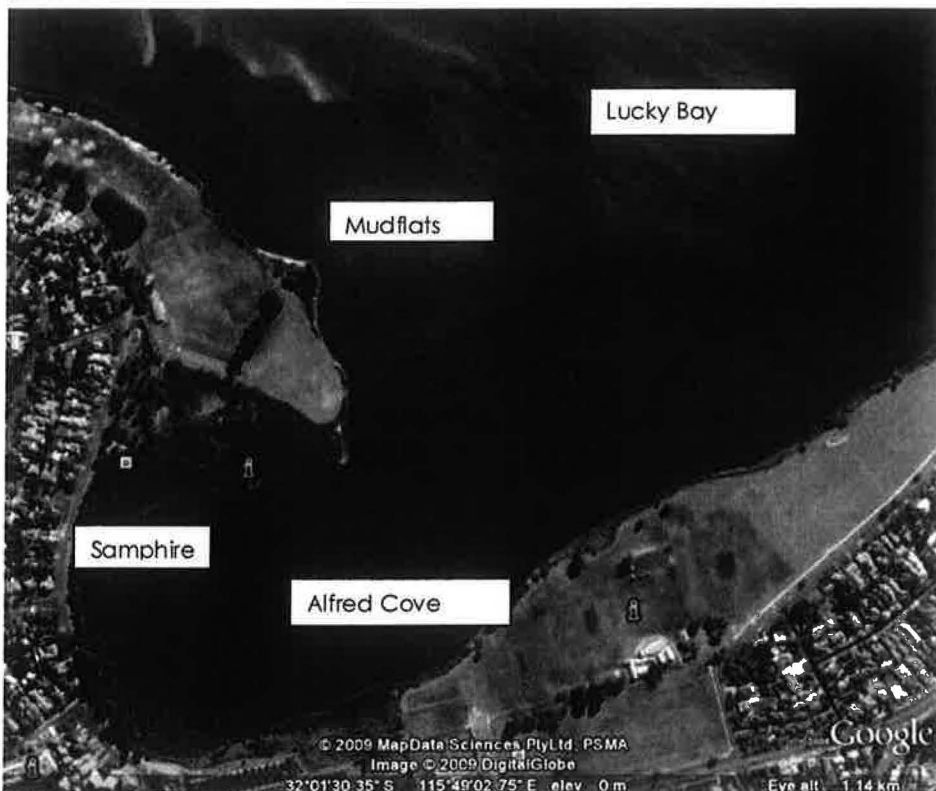


Figure 1 Map of Alfred Cove, Swan River, Western Australia.

from the sandbars to Milyu. They remained there till just on sunset and then left en masse in a westerly direction. There is some speculation about their ultimate roosting destination. Rottnest Island was one consideration. Curlew Sandpiper and Sharp-tailed Sandpiper were observed exhibiting the same behaviour at Alfred Cove where they departed in a westerly direction in the evening. As the tide continued to rise and flooded the sand banks the larger waders moved the samphire flats of Alfred Cove or across the river to Pelican Point". (Bamford, 1999).

**METHODS**

Data obtained during the "Waterbirds in Nature Reserves" surveys conducted from 1981-1985, provide a good insight into the wader populations that were present at Alfred Cove in the early 1980's (Jaensch 1988). The number of surveys conducted during 1981-1985 was 218. These surveys have been used for comparative purposes.

Wader counts conducted in 1987 and 1988 by Peel

Howden and Jack Hunt are presented to provide a comparison with current survey data.

In this study a total of 48 surveys were conducted from October 2006 till February 2009 to assess the number and species of waders frequenting the Alfred Cove mud flats. The surveys were held at high and low tides.

**RESULTS**

Historical and current data is presented in tables 1 and 2. Changes in wader numbers between 1981-85 and 2006-2009 are shown in Table 3. Overall numbers of birds decreased over the study period. Only Pied Oystercatcher increased in number.

The reduction in wader numbers at Alfred Cove corresponds with the findings made at Pelican Point (Creed 1998). A similar decline has been reported at that site. Ad hoc counts of waders in Alfred Cove have also been made. Higher wader counts made outside the official survey periods include; Whimbrel (3) on 22 December 1991, Ruddy Turnstone (6) on 4 November 1991, Greater Sand Plover (3)

**Table 1.** Wader counts made at Alfred Cove in 1987 and 1988 by Peel Howden (PH) and Jack Hunt (JH).

Species	Observer	Year											
		1987	1987	1987	1988	1988	1988	1988	1988	1988	1988	1988	
		Date	1-Dec	18-Dec	29-Dec	17-Jan	11-Feb	20-Feb	1-Mar	19-Mar	14-Apr	6-May	5-Jun
			PH	PH	PH	PH	JH	PH	JH	PH	PH	PH	PH
<b>Haematopodidae</b>													
Australian Pied Oystercatcher	<i>Haematopus longirostris</i>		4		3	8		11	12		3	6	
<b>Recurvirostridae</b>													
Black-winged Stilt	<i>Himantopus himantopus</i>		10	15	15	3	23	11	3	35	15	30	
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>				17								
<b>Charadriidae</b>													
Grey Plover	<i>Pluvialis squatarola</i>		20	41	60	1	72	21	12	15	7	30	2
Red-capped Plover	<i>Charadrius ruficapillus</i>		20	17		2	15						
<b>Scolopacidae</b>													
Black-tailed Godwit	<i>Limosa limosa</i>									1		2	
Bar-tailed Godwit	<i>Limosa lapponica</i>		3	14	13	2	41	30	6	3		20	7
Common Sandpiper	<i>Actitis hypoleucos</i>		1	2	2		1	2		2	2		
Terek Sandpiper	<i>Xenus cinereus</i>			1									
Common Greenshank	<i>Tringa nebularia</i>		3	6	14	2	18	5	5	5	8	10	
Great Knot	<i>Calidris tenuirostris</i>		50	30	13	143	340	96	110	1	34	50	
Red Knot	<i>Calidris canutus</i>			3		2	30	6	10				
Red-necked Stint	<i>Calidris ruficollis</i>		11	90		112	6	34	350	4			
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>				4		11		2				
Curlew Sandpiper	<i>Calidris ferruginea</i>		4	1	2	2	50	6	100		8		
<b>TOTAL</b>			<b>126</b>	<b>220</b>	<b>143</b>	<b>277</b>	<b>607</b>	<b>222</b>	<b>610</b>	<b>66</b>	<b>77</b>	<b>148</b>	<b>9</b>

on 2.11.1988 and Broad-billed Sandpiper (2) on 8 November 1993. Other species that have been observed at Alfred Cove are Sooty Oystercatcher (1) on 25 October 1993, Inland Dotterel (1) on 28 February 1991 and Lesser Sand Plover (2) on 7 November 1993.

**Species accounts**

**Red-necked Stint *Calidris ruficollis***

The Red-necked Stint was very common on the Swan River in years gone by. In the early eighties a sighting of up to 10,000 birds was recorded. In the late nineties a flock of around 3000 was still reported. Red-necked Stint were virtually absent during the current survey period 2006-2009 and this represents a dramatic reduction on past numbers of over 99%. Some Red-necked Stint have been leg-flagged on the Swan River in order to track their movements. The results indicate the population moves around the Swan coastal plain. Leg-flagged Red-necked Stint have also been sighted on Rottnest Island and in the Peel Inlet to the south of Perth.

**Black-winged Stilt *Himantopus himantopus***

The wetland survey of 1981-1985 reports that ten to 15 pairs bred each year in the flooded samphire at Alfred Cove, with eggs as early as June and as late as December. The number of breeding Black-winged Stilt has since declined. Black-winged Stilt were observed breeding in 2007 and 2008 on small islands in the samphire foreshore however these attempts had a low success rate. Observations indicate that several pairs still attempt to breed each year. Field notes recall a nest with two eggs on 11 September 2007 and a nest with two eggs on 7 October 2008. Three juvenile were observed on 13 December 2008. Black-winged Stilt were present all year round.

**Grey Plover *Pluvialis squatarola***

The call of the Grey Plover is still commonly heard over the mudflats at Alfred Cove. The visiting population of Grey Plover has declined in relation to past records. Past records note 60 Grey Plover on 29 December 1987 and 72 on 11 February 1988. The Grey Plover still maintains a population of around 20 birds at Alfred Cove during the summer months. They roost close together along the edge of the samphire at high tide.

**Pied Oystercatcher *Haematopus longirostris***

The large influx of Pied Oystercatchers over the summer months is a fairly recent phenomenon. Pied Oystercatchers were not mentioned at all in the 1981-1985 wetland surveys. The report first mentions a sighting of 12 Pied Oystercatchers in January 1987. Since then the number of Pied Oystercatchers has increased. For example; 55 Pied Oystercatcher on 1 January 1992, 83 on 9 February 2003 and up to a hundred Pied Oystercatchers were sighted in March 2002. High numbers were present during the study period (Table 2). Their dispersal pattern at high tide is unknown but is likely to be to other sites along the Swan River. The sandbar at Point Walter is one site they move to.

Table 2. Wader counts made at Alfred Cove from 2006-2009.

Species	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
<b>Haematopidae</b>																										
Australian Pied Oystercatcher <i>Haematopus longirostris</i>	P	P	70																							
<b>Recurvirostridae</b>																										
Black-winged Stilt <i>Himantopus himantopus</i>																										
Red-necked Avocet <i>Recurvirostra novaehollandiae</i>																										
Band-tailed Stilt <i>Chadropteryx leucophaea</i>																										
<b>Charadriidae</b>																										
Pacific Golden Plover <i>Pluvialis fulva</i>																										
Grey Plover <i>Pluvialis squatarola</i>																										
Red-capped Plover <i>Charadrius ruficapillus</i>																										
<b>Scopelidae</b>																										
Black-tailed Godwit <i>Limosa limosa</i>																										
Bar-tailed Godwit <i>Limosa lapponica</i>																										
Whimbrel <i>Numenius phaeopus</i>																										
Terek Sandpiper <i>Numenius cinereus</i>																										
Grey-tailed Tattler <i>Tringa brevipes</i>																										
Common Greenshank <i>Tringa nebularia</i>																										
Ruddy Turnstone <i>Arenaria interpres</i>																										
Great Knot <i>Calidris tenuirostris</i>																										
Red Knot <i>Calidris canutus</i>																										
Red-necked Stint <i>Calidris ruficollis</i>																										
Sharp-tailed Sandpiper <i>Calidris acuminata</i>																										
Curlew Sandpiper <i>Calidris ferruginea</i>																										
Unidentified waders																										
present																										
<b>Total</b>	37	31	91	34	72	64	63	56	58	72	118	132	115	145	145	145	145	145	145	145	145	145	145	145	145	145

the smaller wader species could access this location and be

**Table 3.** Comparison between the highest wader counts of 1981-1985 and 2006-2009.

Species		1981-1985	2006-2009	% decrease
		since 1981-85 (counts over 50)		
<b>Haematopodidae</b>				
Australian Pied Oystercatcher	<i>Haematopus longirostris</i>	0	79	increased
<b>Recurvirostridae</b>				
Black-winged Stilt	<i>Himantopus himantopus</i>	146	61	42
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	187	41	22
Banded Stilt	<i>Cladorhynchus leucocephalus</i>	16	5	
<b>Charadriidae</b>				
Pacific Golden Plover	<i>Pluvialis fulva</i>	2	1	
Grey Plover	<i>Pluvialis squatarola</i>	101	27	27
Red-capped Plover	<i>Charadrius ruficapillus</i>	250	34	14
Greater Sand Plover	<i>Charadrius leschenaultii</i>	1	0	
Black-fronted Dotterel	<i>Elseya melanops</i>	1	0	
Hooded Plover	<i>Thinornis rubricollis</i>	1	0	
Red-kneed Dotterel	<i>Erythrogonys cinctus</i>	30	0	
Banded Lapwing	<i>Vanellus tricolor</i>	2	0	
<b>Scolopacidae</b>				
Black-tailed Godwit	<i>Limosa limosa</i>	2	0	
Bar-tailed Godwit	<i>Limosa lapponica</i>	80	10	13
Whimbrel	<i>Numenius phaeopus</i>	0	1	
Eastern Curlew	<i>Numenius madagascariensis</i>	2	0	
Common Sandpiper	<i>Actitis hypoleucos</i>	6	0	
Terek Sandpiper	<i>Xenus cinereus</i>	2	1	
Grey-tailed Tattler	<i>Tringa brevipes</i>	2	3	
Common Greenshank	<i>Tringa nebularia</i>	19	20	
Marsh Sandpiper	<i>Tringa stagnatilis</i>	3	0	
Wood Sandpiper	<i>Tringa glareola</i>	4	0	
Ruddy Turnstone	<i>Arenaria interpres</i>	1	1	
Great Knot	<i>Calidris tenuirostris</i>	120	8	7
Red Knot	<i>Calidris canutus</i>	200	32	16
Sanderling	<i>Calidris alba</i>	1	0	0
Red-necked Stint	<i>Calidris ruficollis</i>	10000	79	1
Long-toed Stint	<i>Calidris subminuta</i>	1	0	0
Pectoral Sandpiper	<i>Calidris melanotos</i>	2	0	0
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	100	16	16
Curlew Sandpiper	<i>Calidris ferruginea</i>	1078	4	0
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	1	0	0
Ruff	<i>Philomachus pugnax</i>	1	0	0

1981-1985 from Jaensch 1988.

## DISCUSSION

The mudflats at Alfred Cove are still the most important wader site on the Swan River. Instead of hosting thousands of waders as in the past, these days the numbers are more likely to be less than 200. Furthermore a large percentage of the waders are endemic not migratory. This reflects a dramatic reduction in numbers over the past 20 years.

Over summer the water levels in the river drop due to a reduced inflow of water from the catchment areas and the mud flats become exposed at low tide. The increased availability of mud flats over the summer months coincides with the arrival and presence of migratory waders. It was only at low tides when the mud flats were fully exposed that

counted. At high tide when the off shore islands were either partially or totally under water most medium and large size waders moved into the samphire wetlands to feed and roost. These were Whimbrel, Bar-tailed Godwit, Great Knot, Pacific Golden Plover, Grey Plover, Common Greenshank, Black-winged Stilt and Red-necked Avocet. The functionality of the mud flats differed between wader species in that for some it provided a permanent site throughout summer and for others it acted merely as a transitional stopover.

There are a number of factors that could have contributed to the decline in wader numbers. The health of the Swan River is under considerable pressure. The middle and upper basins of the river repeatedly fail to meet targets for

dissolved oxygen and Chlorophyll-a. These are key indicators for the health of a river system.

The Swan River is a shallow river system and has to contend with an inflow of fertilizer run-off which were blamed for the widespread algal blooms. More recently the blooms have been attributed to climate change. (West Australian 2008). The river does not get flushed out frequently enough to disperse the accumulation of nutrients due to reduced rainfall.

Acid sulfate is a natural but deadly part of the soil along the Swan River and is released when the ground close to the river is disturbed through residential and other developments. Acid sulfate leaches into the Swan River system and kills fish and prawn stocks. The once common bottom dwelling Western School Prawn *Metapenaeus dalli* have largely disappeared as have some fish species like Cobbler, *Cnigoglonis macrocephalus*.

How these factors impact on the health of the river's invertebrate population is unknown but it could well be a contributing factor that has resulted in reduced wader numbers. The soil substrate in the intertidal zone is the habitat for benthic fauna that are an important food source for waders.

Even when the mud flats were fully exposed and presented the best feeding opportunities for waders the numbers observed were low.

The management plan for the "Swan Estuary Marine Park and Adjacent Nature Reserves" 1999-2009 mentions damage done to the larger benthic fauna as a possible reason for the decline in waders. This may occur as a result of

people trampling through the mud and sand flats. No groups of people were observed on the mudflats during the surveys.

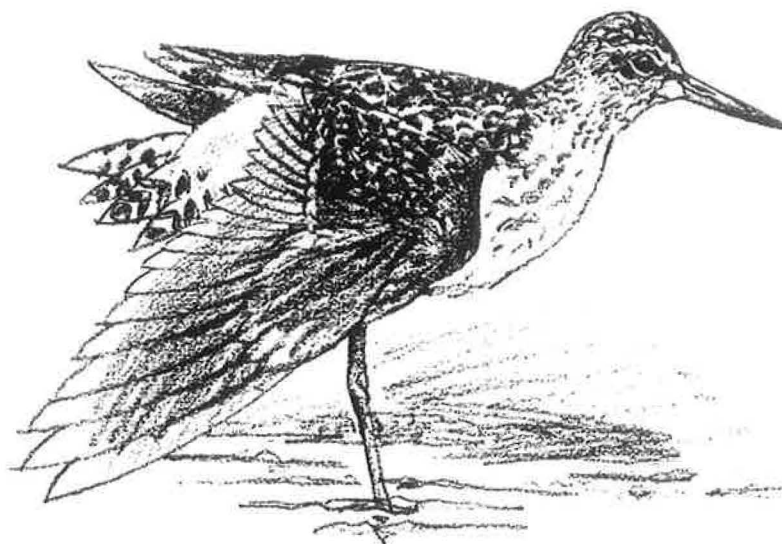
Recreational pressures on the reserve caused by activities such as yachting, fishing, wind surfing, canoeing which often transgress the boundaries of the reserve could be a contributing factor. The installation of a low barrier fence to separate pedestrians and dogs from the roosting and feeding sites at Alfred Cove has proven most effective.

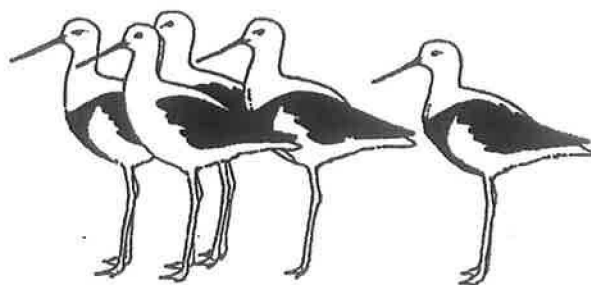
## ACKNOWLEDGEMENTS

The late Peel Howden for his surveys in the eighties.

## REFERENCES

- Bamford, M.** 1999. Movements of waders on the Swan Estuary. Western Australian Bird Notes. No. 89. March 1999, page 10–11.
- Creed, K.E. & M. Bailey.** 1998. Decline in migratory waders at Pelican Point, Swan River, Western Australia. Stilt 33: 10–14
- Jaensch, R, Vervest, R, and M. Hewish** 1988; Waterbirds in Nature Reserves of South-Western Australia 1981–1985: Reserve accounts. RAOU report No. 30.
- Keeling, S.** 1982. A study of the Point Waylen – Alfred Cove Area. Western Australian Bird Notes No 23. September 1982
- Keeling, S.** 1987. Alfred Cove five years on. Western Australian Bird Notes No 43. September 1987 page 1–2.
- Swan Estuary Marine Park and Adjacent Nature Reserves. Management Plan 1999–2009.** No 41.
- Department of Conservation and Land Management Perth.** Western Australia, 1999.
- West Australian Newspaper.** 13 December 2008, Page 9. "Experts call on State to save ailing Swan River".





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## DECLINE IN MIGRATORY WADERS AT PELICAN POINT, SWAN RIVER, WESTERN AUSTRALIA

Kate E. Creed and Max Bailey

GPO Box K803, Perth 6001 Western Australia, AUSTRALIA

### ABSTRACT

Since 1971, waders at Pelican Point on the Swan River, Western Australia have been counted weekly during the months of November to February. The numbers of five migratory wader species, Bar-tailed Godwit, Red-necked Stint, Curlew Sandpiper, Sharp-tailed Sandpiper and Grey Plover, have declined during the 26 year study. There has also been a slight overall reduction in the numbers of Great and Red Knots and for the resident Red-necked Avocet. The numbers of Red-capped Plover and Black-winged Stilt have stayed fairly constant. Only Greenshank has been seen more frequently. Twenty years ago, 1,000 Red-necked Stint and Curlew Sandpiper were frequently present at one time; now 100 birds are rarely seen together. The numbers of other species are smaller and more variable. It is concluded that the decline in numbers is due to a decrease in the number of birds reaching the Swan River rather than changes at Pelican Point.

### INTRODUCTION

Pelican Point is a sandy spit projecting into the Swan River at Crawley, 6 km west of the centre of Perth. Each year many waders arrive in Australia after travelling south across the equator from their breeding sites in the Arctic Tundra (Hayman *et al.* 1986). Together with a few species that breed in Australia, some of these birds collect in the Swan River Estuary. Detailed wader records from the Swan River including Pelican Point were first published in 1921 (Alexander 1921) and the point was the centre of several years' investigation by Serventy and his colleagues (1938, 1962) and a detailed survey was carried out in 1966-68 (Job 1972).

We have already published records of waders seen at Pelican Point for the 20 years from 1971-1992 (Bailey and Creed 1993). We concluded that the same species of waders were seen in 1991 as in 1971 but some species were seen less often. Since then, there has been much anecdotal evidence that wader numbers on the Swan River have declined but no published records to support this. We have therefore investigated the wader counts for the subsequent six years, up to 1998, and reanalysed the earlier data. This time we have concentrated on the 4 months (November to February) when migratory species are present so that we could make a more accurate comparison with the abundance of local species. In particular, we have analysed the frequency when a species was seen in the 26 years and the number of individuals observed on any visit.

### METHODS

One or more visits were made to Pelican Point in most weeks from November to February in the 16 years from 1971-1998 (except 1975-76). These counts usually occurred at 5.30 pm on a weekday with 13-25 visits each year. In 1975-76 only 6 visits were made. During each visit, all bird species were recorded and the numbers of each wader species was counted. If more

than 100 birds were present, an estimate was made by comparing the total area occupied by the group with the area occupied by 50 or 100 birds. A detailed analysis of the 11 wader species (8 migratory, 3 local species) (Table 1) was carried out in order to assess any changes in the frequency (% visits present) and numbers per visit over the 26 years. In addition to recording the data for each separate year, the average for successive 5 year periods was calculated (moving 5 year average) to make overall trends more obvious.

Of 23 species of wader seen between 1971 and 1982, 10 occurred in 18 or more years. Sharp-tailed Sandpiper *Calidris acuminata* was seen in 14 years and Great Knot *Calidris tenuirostris* in 16 years, whereas other species occurred in 2-8 years (Bailey and Creed 1993). The Common Sandpiper *Actotis hypoleucos* (18 years) was not included in the present analysis because a single bird tended to be present for several weeks in succession then absent for long periods. The records for Great Knot and Red Knot (19 years) were amalgamated because of the difficulty in telling the two species apart in the field with certainty. The Sharp-tailed Sandpiper was included since it was earlier reported to be the third most common species of wader on the point after Red-necked Stint *Calidris ruficollis* and Curlew Sandpiper *Calidris ferruginea* (Serventy 1938; Serventy 1948).

### RESULTS

#### Habitat

Pelican Point is a triangular area of about 2 hectares on the northern shore of the Swan River (Fig 1). It has been separated from adjacent public open space since 1976 when a 500 m long fence was built to limit access to the general public. The other two sides have sandy beaches. The area contains a lagoon, which fills up through the ground at high tide, and a variety of vegetation, including sedges round the lagoon and *Eucalyptus rudis*, *Melaleuca cuticularis* and *Callitris preissii* (Teatree) near

Table 1. Percentage of visits when migratory and local waders were seen in November to February 1971/72 and 26 years later in 1997/98

Species		1971-72 %	1997-98 %
<b>Migratory waders</b>			
Bar-tailed Godwit	<i>Limosa lapponica</i>	86	0
Common Greenshank	<i>Tringa nebularia</i>	48	58
Red and Great Knots	<i>Calidris canutus</i> & <i>C. tenuirostris</i>	62	6
Red-necked Stint	<i>Calidris ruficolis</i>	90	67
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	48	6
Curlew Sandpiper	<i>Calidris ferruginea</i>	76	17
Grey Plover	<i>Pluvialis squatarola</i>	90	28
<b>Local waders</b>			
Black-winged Stilt	<i>Himantopus himantopus</i>	43	78
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	52	0
Red-capped Plover	<i>Charadrius ruficapillus</i>	86	83

the fence. The beaches lie between the river and low sand dunes sparsely covered with *Trachyandra divaricata* and various grasses. In 1990, Pelican Point, together with Alfred Cove and Milyu on the south side of the river, were made into the 'Swan Estuary Marine Park' for the protection of waders. Since then the only major change has been slight erosion of the sandy point and partial removal of introduced plant species such as *Leptospermum laevigatum* and *Casuarina glauca*. The use of the adjacent river for recreation has increased. In particular wind surfers periodically land on the sandy

beach and motor boats pass within 100m of the point.

**Frequency of occurrence**

Most species of migratory wader were seen on fewer visits in 1997-8 compared with 1971-2 (Table 1). For four of these species (Fig.2), a marked decline occurred over several years, but the years when maximum declines occurred were different for each species. A steep drop occurred after about 1973 for Bar-tailed Godwit *Limosa lapponica*, 1981 for Grey Plover

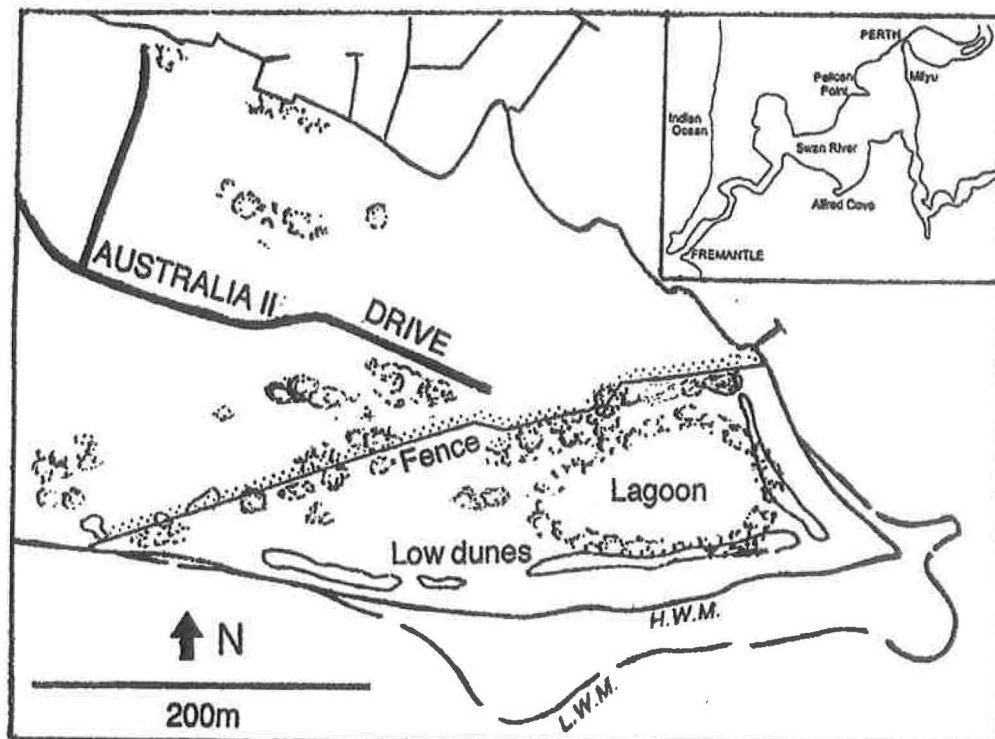


Figure 1: Pelican Point on the Swan River showing the fence and lagoon with associated vegetation. Most waders are seen on the beach south of the point or in the lagoon.

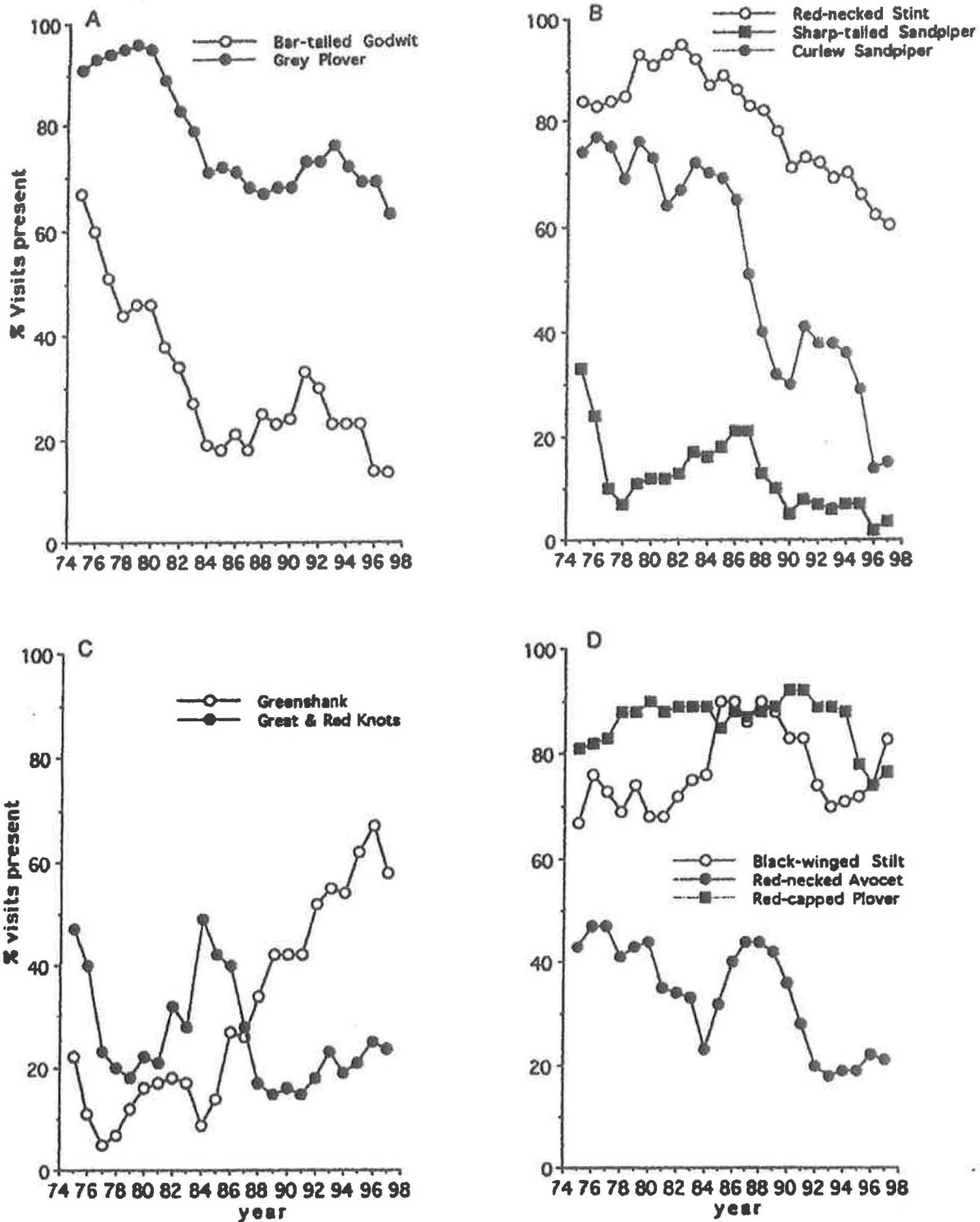


Figure 2: Frequency of occurrence of migratory (A, B and C) and local (D) waders recorded at Pelican Point during weekly visits from November to February. Each point represents the mean over five years up to the year indicated.

*Pluvialis squatarola*, 1985 for Curlew Sandpiper and 1988 for Red-necked Stint. For all four species there was a slight but transient recovery in 1991. Sharp-tailed Sandpiper were present on 48% and 59% of visits in 1971 and 1972 and subsequently they were only seen on

more than 25% of visits in two years. The highest frequency of occurrence was in 1991 (28%) and no birds were seen in 10 of the years. The Red and Great Knots rallied for several years before becoming rare. Only one migratory migrant, Common Greenshank *Tringa*

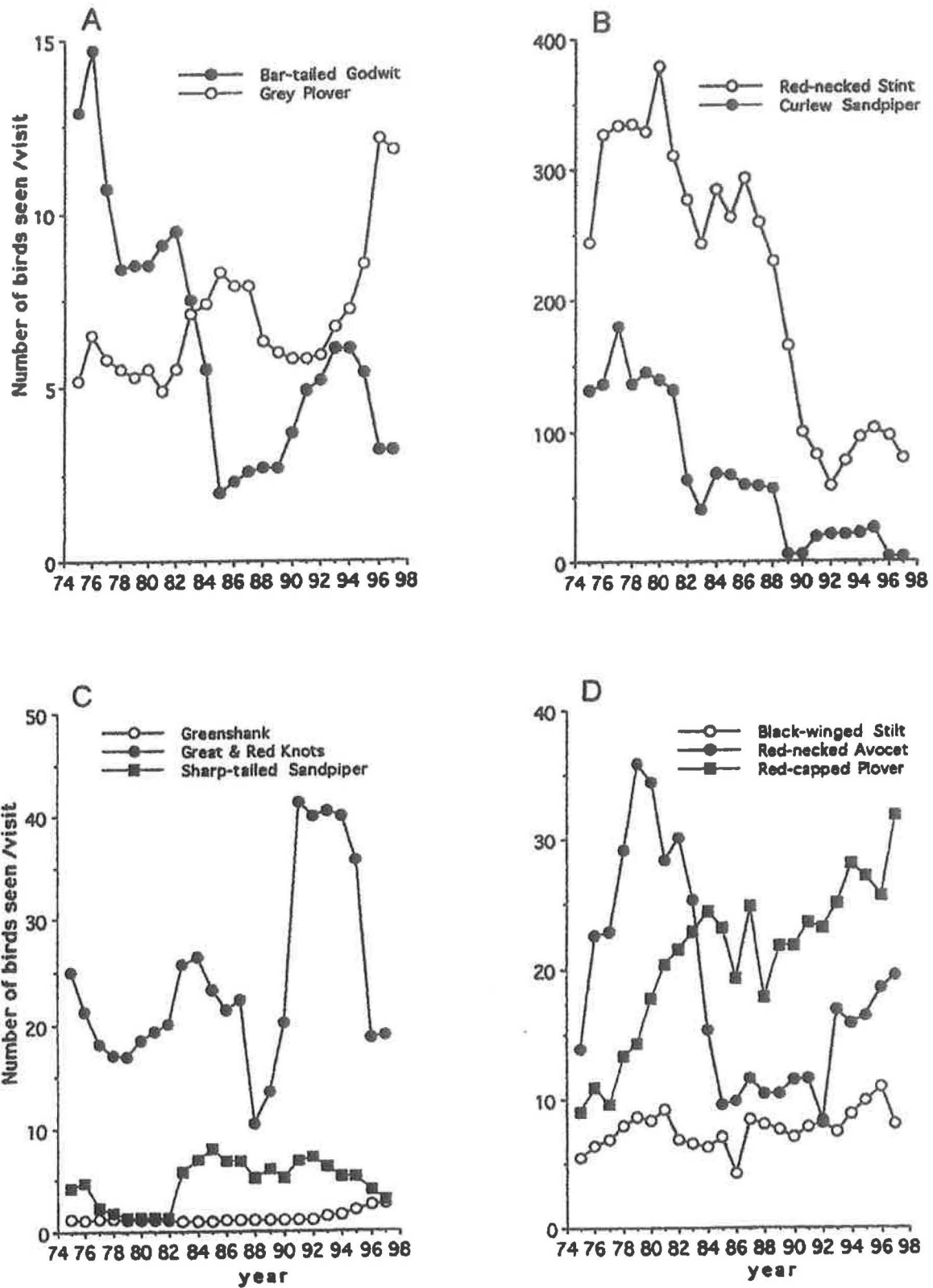


Figure 3: Average number of birds seen on each visit when present in November to February. Each point represents the average of all counts for 5 years up to the year indicated.

*nebularia*, was seen more frequently in recent years, a steep increase occurring from 1984.

Of the three local species Red-necked Avocet *Recurvirostra novaehollandiae* declined overall but it showed considerable fluctuations. Red-capped Plover *Charadrius ruficapillus* has been relatively constant until the last 2 years, whereas Black-winged Stilt *Himantopus himantopus* showed some increase between 1971 and 1991 but decreased in 1992.

#### Number of each species

Several hundred Curlew Sandpiper and Red-necked Stint were frequently seen during visits in the first 10 years. However, recently it would be unusual to see even 100 birds at one time (Fig 3). During the 26 years, Bar-tailed Godwit have declined from more than 20 per visit to less than 10. Average numbers of Knots, Grey Plover and Sharp-tailed sandpiper were always small but have all shown a slight increase over the 26 years (Fig 3). Likewise it was unusual to see more than 2 Greenshank until recently when more birds were seen. Of local resident species, Red-capped Plover and Black-winged Stilt have increased over the years whereas Red-necked Avocet initially increased then decreased again to an average of 10-20 birds since 1985.

#### DISCUSSION

Over 26 years there has been an overall decrease in numbers of waders at Pelican Point and also the frequency that a particular species is seen in the four month period November to February. The decline started in different years for four migratory species. Furthermore, Sharp-tailed Sandpipers were the third most frequently seen species by Serventy (1938;1948) and the high values for 1971 and 1972 suggest that the frequency may have declined just prior to the start of our observations. Of the migratory species only the Greenshank has been seen more often in recent years. The numbers of individuals of Curlew Sandpiper, Red-necked Stint and Bar-tailed Godwit seen on each visit has shown a marked drop over the past 26 years.

The reduction in birds could be due to conditions on the Swan River, changes at the feeding/roosting stops through East Asia or in the breeding areas in the Arctic. Pelican Point has changed little in the past 20 years and appears to remain attractive to waders since Greenshank have occurred more often in recent years and two local resident species, Red-capped Plover and Black-winged Stilt, have been seen on 65 to 90 % of visits throughout the 26 years. Furthermore a greater number of individuals of these species has been recorded when they are present. This suggests the decline is probably due to numbers arriving rather than local changes at Pelican Point. This conclusion is supported by the impression that there are generally fewer waders on the Swan River and coastal regions of Western Australia.

#### ACKNOWLEDGEMENTS

The authors gratefully acknowledge the enthusiasm, support and contribution that has been provided by innumerable people over many years in the compiling of bird lists of Pelican Point. Currently Charles Merriam is maintaining the bird lists.

#### REFERENCES

- Alexander, W.B. 1921. The birds of the Swan River District, Western Australia. *Emu* 20, 149-168.
- Bailey, M. & K.E. Creed. 1993. Observations on waders recorded at Pelican Point, Western Australia, from 1971 to 1991. *The Stilt* 22, 18-23.
- Hayman, P., J. Marchant & A.J. Prater. 1986. *Shorebirds: an identification guide to the waders of the world*. Croom Helm; London.
- Job, R. 1972. Birds seen at Pelican Point, 1966-1968. *Western Australian Naturalist* 12, 56-69.
- Serventy, D.L. 1938. Waders and other aquatic birds on the Swan River estuary, Western Australia. *Emu* 38, 18-29.
- Serventy, D.L. 1948. The birds of the Swan River District, Western Australia. *The Emu* 47, 241-255.
- Serventy, D.L., D.S.Farmer & C.A.Nicholls. 1962. Trapping and maintaining shore birds in captivity. *Bird Banding* 33, 123-130.



**Keeping tabs:** Environmental consultant Mike Bamford and CALM employees remove captured birds for tagging. Birds fly to the area to escape the Siberian winter. PICTURES: ROBERT DUNCAN

# Ski area to have buffer



**Caught:** Birds are trapped in nets fired out over the river near Milyu Nature Reserve in South Perth.

BY LIZ TICKNER

CALM will design a buffer zone for the Department of Transport's proposed jet ski area near the Milyu Nature Reserve in South Perth.

South Perth City Council met CALM representatives on Thursday to discuss concerns that the jet ski activity would disturb hundreds of the Swan estuary's migratory birds.

Chief executive Lyn Metcalf said the council had asked CALM to consider the amount of pollution caused by two-stroke jet ski engines when determining the size of the buffer zone.

"They run on a mixture of petrol and oil and they generally have a higher pollution level than the four-stroke (engines)," he said.

CALM's marine operations manager Peter Dans said the size of the buffer zone would be determined in two weeks.

South Perth mayor John Hardwick said jet skis could cause immeasurable harm to wader birds which inhabited Milyu during the northern winter.

The number of migratory birds on the Swan estuary was decreasing and any further disturbance, such as that caused by jet skis, could mean their end.

The department's proposal could result in up to 60 jet skis using the area bordering Milyu, which runs along the foreshore near the Mill Point Road exit on Kwinana Freeway.

"The area used to account for 10 per cent of the waterski area on the river but is set to become 80 per cent of the jet ski area," Mr Hardwick said.

Australia was a signatory to international treaties which protected the habitats of migratory birds, he said.

Environmental consultant Mike Bamford said the birds flew to Milyu to recover from the breeding season in Siberia.

Dr Bamford is working with CALM and Perth Zoo officers and volunteers, catching the birds in nets and banding them to help keep track of the numbers.

"There are only a few hundred stints left and tens of sandpipers — 15 years ago there were thousands," Dr Bamford said.

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W A T E R W A Y S  
C O M M I S S I O N



PEEL INLET  
MANAGEMENT  
AUTHORITY

Our Ref: TR:CP:17.0.1

Your Ref:

Enquiries: Tom Rose

PROTECTING OUR WATERWAYS

Mr Chris Portlock  
Parks, Recreation, Planning and Tourism Division  
Planning and Visitors Services  
Department of Conservation and Land Management  
50 Hayman Road  
Como, WA 6152

Dear Chris,

**The effects of recreational prawning: Conservation and management of bird feeding habitat in the shallows of the Swan River**

Further to your correspondence on the above issue (29.3.95), I wanted to provide some comments on the need to minimise the impact of prawning on bird feeding habitat. I have also enclosed a copy of my preliminary study on the impact of recreational prawning on the benthos which was done in 1987.

Recreational prawning can put heavy pressure on sandy shallow water habitats in the Swan-Canning Estuary. I have counted literally hundreds of prawning sweeps made over the same area on very busy nights. I have also observed loud noises and music, the littering of rubbish and dead fish, fires, lights, and barking running and chasing dogs along the beaches where prawning takes place. In the water, the physical action of prawning can scour the benthos, trample and break the substrate and generally disturb aquatic organisms in both the benthic substrate and water column. Netting itself also suspends the organisms or collects them and removes them to the exposed beach. If maintained at chronic levels, literature suggests that smaller opportunistic and probably less calorically nutritious animals (in terms of bird feeding) will colonise the scoured areas.

Although there is no definitive scientific proof that prawning activities disturb and impact the benthos yet, intuition and observations indicate that it does. If one follows a conservative and cautious philosophy towards wildlife management, as well as embraces the conservative principle, one would have to try and protect some shallow water exposed flats (prime bird feeding habitat) in order to guard against potentially disastrous consequences for migratory waders or feeding birds. For this reason I would strongly advise you to provide some form of rotating management system where portions of shallow flats in Alfred Cove, Milyu or Pelican Point are protected from potential disturbances caused by human activity. In other words, close them to human activity. In the spirit of multiple use philosophy, this doesn't mean the complete closure of entire beach and shallow areas in parks or reserves from human activity, only reasonably sized portions for various time periods.

I tom\user\docs\tom\environment\PRAWNIMP.LET

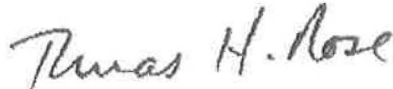
8/21 Sholl Street, (P.O. Box 332) Mandurah, Western Australia, 6210, Telephone: (09) 535 3411, Fax: (09) 535 3411.

I won't enter into the argument or provide comments on whether this can be done practically, but I feel CALM should try implement some form of closure or rotation during bird migration periods, particularly during active recreational prawning periods. Wind surfing would also have the potential to impact on birds and this activity should also be looked at. However, I have yet to observe whether such activity is as destructive or impacting as prawning.

With regards to my preliminary study, I feel that if it weren't psuedo-replicated and I had provided more trial plots, I could have proven in a very significant way that heavy recreational prawning pressure does impact the benthic fauna or community and therefore the potential for bird feeding.

I hope these comments are of some help in clarifying management of the shallows and flats in CALM Reserves where popular recreational prawning occurs. Please do not hesitate to call me if you have any further questions on this issue on 535 - 3760.

Yours sincerely,



Dr Thomas H. Rose  
Regional Manager - Peel Inlet Management Authority

14.4.95

Dr B. Hamilton  
Swan River Planning Strategy  
Waterways Commission  
184 St Georges Tce  
PERTH W.A. 6000

Dear Bruce

Those Alfred Cove breeding details you were after:

Black-winged Stilt (Himantopus himantopus). At least 10 pairs nest regularly each year on the marshes of the Cove. Breeding success, or lack of it, depends upon the level of disturbance by dogs and people.

Pacific Black Duck (Anas superciliosa). 5-10 pairs nest in the Cove each year, commonly in the Juncus kraussii rushbeds.

Spotless Crakes (Porzana tabuensis). Secretive species uncommonly seen. Breeds in the J. kraussii rushbeds. A dozen old nests found (destroyed) after fire.

Little Grassbirds (Megalurus gramineus). Breeds in the rushbeds.

Buff-banded Rail (Rallus philippensis). Secretive species breeds in the rushes. Probably 3-5 pairs each year.

Red-capped Plover (Charadrius ruficapillus). Approx. 5 pairs nest regularly on the shoreline of Pt. Waylen (the Pt. which encircles Alfred Cove). Many breeding attempts fail due to excessive disturbance - people + dogs.

Surprising what can be found through careful searching!

These details provided by Roger Jaensch of Royal Australasian Ornithologists Union. Collected over past 6 years as part of larger, volunteer-based survey of waterbird usage of the Wetland Nature Reserves of south-west of W.A., under contract to CALM.

Yours sincerely

JIM LANE  
Principal Research Scientist

March 26, 1987

Copy: R. Jaensch

SWAN RIVER PLANNING AND MANAGEMENT STRATEGY

Points to be made by CALM should include:

1. CALM's top priority, so far as the Swan River is concerned, is to see the proposed Aquatic Reserves at Alfred Cove, Como (Kwinana Fwy) and Pelican Point declared. See System 6 Redbook for details. Moves were made within CALM in late 1986. Refer to Manager of Metro Region for circulating papers which include comments from Research.
2. The most important management issue to be addressed is present unrestricted recreational access to proposed Aquatic Reserves. Some controls on use will be needed if these areas are to continue to support estuary's migratory wader populations (3,000 - 4,000 birds with peaks to 12,000). Uncontrolled dogs are the most serious problem at present.
3. Migratory wader populations need a roosting site of say 150 metres of river foreshore (ideally a small area at Pelican Point) kept free of dogs, joggers, walkers, prawners, sailboards etc. at all times (i.e. totally undisturbed).
4. Value of Swan River to waterbirds is adequately described in paper presented by R.P. Jaensch of Royal Australasian Ornithologists Union at Swan River Symposium in 1986.
5. Canning River wetlands (Riverton Bridge to Nicholson Road) have considerable value for conservation (vegetation and waterbird populations) and their management should also be determined by an adequately funded State Government instrumentality with statutory responsibility for conservation, not by local shires.
6. Policy of retention of native fringing vegetation (rushbeds, paperbarks etc.) along banks of Swan and Canning should be enforced.
7. The fact that the Swan River supports 1,000's of waterbirds of more than 70 species (but won't continue to for many more years without increased protective action - principally from recreation pressures), and that Perth is one of very few capital cities in the world to have such an asset, deserves far greater recognition than currently afforded it. Guided bird walks (no facilities required - simply a knowledgeable guide) would prove popular, especially with tourists.

  
J. LANE

Principal Research Scientist

January 16, 1987



January 11, 1982

Minister for Fisheries and Wildlife,  
Perth,  
Western Australia.

MEDIA RELEASE

Permits have been issued to Mr. Nick Dunlop, a Murdoch University student, to enable him to conduct research on the biology of the Crested tern (*Sterna bergii*), the Minister for Fisheries and Wildlife, Mr. Gordon Masters, announced today.

Mr. Masters said that to gather the necessary information Mr. Dunlop must catch, examine and release non-breeding birds at sites on the Swan River.

The only roost of sufficient size to allow these fast and agile birds to be trapped is located at Pelican Point in the Matilda Bay reserve.

The Permits have been issued by the Department of Fisheries and Wildlife and the National Parks Authority for the capture of the birds with a cannon-net - a device which uses blank 12 gauge cartridges to fire a fine weighted net over the birds.

Mr. Masters said the cannon-net is used extensively world-wide for this type of research and the firing of the net and capture of the birds will not in any way injure or disturb the birds, and after examination they will be immediately released.

The netting will be carried out on weekdays between January 15-30.

\*\*\*\*\*

STRUCTURE

(JNT - CONTENTS?)

698 811809

811188

Reyes

- Section 1 - Introduction  
1.1. - Waders defined  
1.2. - Western Australian Wader Study Group
- Section 2 - General comments  
2.1. - Japan-Australia Treaty  
2.2. - Wader use of wetlands on Swan coastal plain
- Section 3 - Comments on specific localities  
3.1. - C 66: Leschenault Inlet  
3.2. - M 60, M 61 and M 62: Aquatic reserve, South Perth; aquatic reserve, Attadale; and Pelican Point, Crawley  
3.3. - M 93: Cockburn wetlands, eastern chain  
3.4. - M 95: Forrestdale lake  
3.5. - M 96: Garden island  
3.6. - M 102: Lake Richmond, Rockingham  
3.7. - M 103: Lakes Cooleongup and Walyungup

1.1 Waders defined

The precise ornithological definition of the term "wader" is both complex and scientific, and to reproduce it here would add little to this submission. In general terms, however, "waders" may be described as members of the following groups of water birds:

- (i) Oystercatchers
- (ii) Plovers
- (iii) Stilts and Avocets
- (iv) Sandpipers

(JNT - In the assemblage of birds commonly known as waders or shorebirds, representatives of the following families have been recorded from the System 6 area - painted snipe Rostratulidae, oystercatchers Haematopedidae, stilts and avocets Recurvirostridae, stone curlews Burhinidae, pratincoles Glareolidae, plovers Charadriidae and sandpipers and snipe Scolopacidae?).

At least 29 such species (JNT - species within these families) occur regularly within the Darling System, of which 9 are Australian residents. The remainder are helarctic migrants, which breed mainly in Siberia during the northern summer and then migrate southwards, spending the period from October to April in more temperate regions, including southwestern Australia. (JNT - Not all of these migrant species, however, leave Australia during the winter months, for many immature birds may stay here for much of their first two years of life).

1.2 Western Australian Wader Study Group (JNT - Should this not precede "1.1 Waders defined"?)

The Western Australian Wader Study Group is an informal association of ornithologists, mainly of amateur status, who share a common interest in the study of waders. The Group was formed in 1979 for the purpose of coordinating and encouraging the study of waders in Western Australia.

The activities of the Group have been centred on trapping and banding birds, which are released after the taking of certain measurements and other data. In addition, periodic censuses have been made to enable regional population estimates to be made.

Equipment used by the Group is on loan from the Department of Fisheries and Wildlife, and close contact is maintained not only with that Department but also with the C.S.I.R.O. Division of Wildlife Research and the Royal Australasian Ornithologists' Union.

The comments on the Darling System Study Report which are contained in the remainder of this submission are made on the basis of data collected by members of the Group since September 1979.

2.1 Japan-Australia Treaty

On 30 April 1981, there came into force the Japan-Australia Agreement for the Protection of Migratory Birds and Birds in Danger of Extinction and Their Environment.

Article V of that Agreement provides that "Each Government shall endeavour to establish sanctuaries and other facilities for the management and protection of migratory birds and birds in danger of extinction and also of their environment."

Of the 66 bird species listed in the Annex to the Agreement, at least 20 (no less than 20?) are waders which are regular migrants to the Darling System. All Aust-

therefore

ralian governments/have an obligation to protect and conserve these wader migrants, and the Environmental Protection Authority is urged to stress this point in making its final recommendations to the Government of Western Australia.

A copy of the Agreement is enclosed with this submission. (JNT - surely the EPA has access to copies of the Agreement?)

### 3.1 C 66: Leschenault Inlet

During 1979 and 1980, one member of the Group was resident in Bunbury and was thus able to make regular observations of waders using Leschenault Inlet.

On page 131, the Report states that "The most important area is the northern section, which is a breeding ground and refuge for migratory birds, including green-shank.". Whilst this statement is undoubtedly true for many water birds, it is otherwise for most wader species. Observations over the past two years indicate that the area most frequented by waders is at the southern end of the Inlet, in the vicinity of the mouth of the Preston River Diversion. The greenshank, however, often congregates in loose flocks to feed on the soft mud at the extreme north of the Inlet.

Some measure of the importance to waders of this southern area is provided by the results of counts carried out during the past two summers. More than 1 400 rednecked stints were present on one occasion, and significant numbers of grey plovers and Bartailed Godwits were regularly observed. A total of 17 species of Holarctic migrants was recorded during the course of the counts, the results of which are summarized in an attachment to this submission.

The accessibility of the southern area makes it an excellent study site, as well as providing members of the public with the opportunity to view a number of rare and interesting birds almost in the midst of a growing city. It is therefore an asset of both scientific and aesthetic value, and is worthy of preservation.

The main threat to the southern area lies in expansion of the existing power station, and it is understood that plans for the development of the western extremity of the site are already being implemented. (JNT - isn't it proposed to build a second power station rather than expand the existing one?)

The Group therefore proposes that -

- (i) the southern extremity of Leschenault Inlet, including the mouth of the Preston River Diversion and associated samphire flats, be included in any reservation of the waters and shores of Leschenault Inlet; and
- (ii) the State Energy Commission, in consultation with the Department of Fisheries and Wildlife, should plan any future development of the area in such a way that its impact on wader habitat is kept to a minimum.

(JNT - do Doug Watkins and Mike Bamford think Lake Clifton (C 55 Clifton MPA at page 121) or Peel Inlet (C 50 at page 115) worth a mention?)

### 3.2 M 60: Aquatic reserve, South Perth; M 61: Aquatic reserve, Attadale; and M 62: Pelican Point, Crawley

M 60. This area is known to support large wader concentrations, although its suitability for catching and banding is as yet unproved.

M 61. The Group has caught and banded waders on the Lucky Bay side of Point Waylen on a number of occasions and can testify to the large flocks of different wader species which frequent the shallows there. This area and Pelican Point, Crawley, may turn out to be the only two places on the Swan river estuary where the intensive study of waders is feasible.

M 62. This is the most regularly visited of the sites at which the Group carries on its catching and banding programme and, as various ornithologists have studied waders there for many years, a substantial amount of data, both published and unpublished, has been accumulated. Although bird numbers have apparently declined greatly in the 1960s and 1970s, Pelican Point remains the most important locality in the System 6 area for those who take an interest in waders.

(JNT - should M443 (Herdsman Lake) be discussed, if only because of the damage to wader habitat being caused by the deepening of the lake?)

### 3.3 M 93: Cockburn wetlands, eastern chain

Thompson Lake has been visited by the Group and is an important wader locality when water levels drop in summer.

### 3.4 M 95: Ferrestdale Lake

This lake has been the subject of a survey conducted by one of our members and provides important wader habitat in summer. The occurrence there of the extremely uncommon longtoed stint makes the preservation of this water body vital.

## 3.5 M 96: Garden Island

The only area in which substantial concentrations of waders have been found to occur is Brown Bay at the northern end of the causeway. Such wader species as sanderling and turnstones, which are not found in the Swan river estuary or on the coastal lakes, occur there.

## 3.6 M 102: Lake Richmond

(JNT - what is there to say about this lake?)

## 3.7 M 103; Lakes Coolesgup and Walyungup

Wader counts have been carried out at both lakes and mistnetting once at Lake Coolesgup, which is notable for harbouring banded stilts. The Report states at page 109 that the "salt lakes near the eastern end of (Rottnest Island) provide water-bird habitats that are not duplicated on the Coastal Plain", but the presence of the banded stilts indicates that Lake Coolesgup shares at least one property of these lakes.

(JNT - are there any other water bodies about which we should comment?)

## Comment

4.1 The Group has yet to complete its third season of wader counts and wader catching and banding and has visited only a few of the water bodies in the metropolitan area, let alone of those farther afield. All that can be said is that suitable habitat for these birds is becoming very scarce, especially along the Swan river itself, and that the southwestern corner of the State is vital for both migrant and resident species, as it is for so much of the rest of our fauna. The circulation of waders between river foreshores and coastal lakes has hardly been investigated, but there is certainly evidence from banded birds that it does take place. /So much work lies ahead, both in the field and in the writing up of results, that we are very conscious of the lack of detailed evidence provided in this submission and of the gap between what we have so far been able to achieve and the results produced by students of waders in the eastern States.

/The System 6 wetlands complement each other in providing wader habitat and the destruction of one wetland may have a damaging effect on the capacity of wetlands as a whole to sustain populations of wader species.

## NOTE

We shall be meeting at Pelican Point at 5 pm this coming Saturday (21 November) and hope to discuss then what to put into our final submission.

JNT

MAXIMUM NUMBERS OF MIGRATORY WADERS ON SWAN C.P. LAKES, 1973-81

	Cooloongup	Walyungup	Thompson	Bibra	Yangebup	Ferresdale	Herdsmar	Jandabup	Toondabup	Grangara
Lesser Golden Plover						1				
Grey Plover			1							
Little Ringed Plover						1				
Large-billed Sand Plover						1				
Wood Sandpiper			1			2	1			
Common Sandpiper							1			
Greenshank			3	1	2	2	1	2		
Marsh Sandpiper			1		1	1				
Black-tailed Godwit			2	1	2	2				
Bar-tailed Godwit				1						
Red Knot						1				
Great Knot							1			
Sharp-tailed Sandpiper			3	2	2	3	2	2		
Pectoral Sandpiper			1		1	1	1			
Red-necked Stint			4	4	3	4	2	4		
Long-toed Stint			2	1	2	2	2	2		
Curlew Sandpiper			3	2	3	3	1			
Sanderling										
White-rumped Sandpiper						1				
Ruff			1	1	1	1				
Oriental Pratincole					1		1			
"diversity-abundance" scores						26	13			

data for AWSG submission  
to the System 6 report

MAXIMUM NUMBERS OF MIGRATORY WADERS ON SWAN C.P. LAKES, 1973-81

	Coolongup	Walyungup	Thompson	Bibra	Yangebup	Forrestdale	Hertsman	Jandabup	Toondabup	Granger
Lesser Golden Plover						1				
Grey Plover			1							
Little Ringed Plover						1				
Large-billed Sand Plover						1				
Wood Sandpiper			1			2	1			
Common Sandpiper							1			
Greenshank			3	1	2	2	1	2		
Marsh Sandpiper			1		1	1				
Black-tailed Godwit			2	1	2	2				
Bar-tailed Godwit				1						
Red Knot						1				
Great Knot							1			
Sharp-tailed Sandpiper			3	2	2	3	2	2		
Pectoral Sandpiper			1		1	1	1			
Red-necked Stint			4	4	3	4	2	4		
Long-toed Stint			2	1	2	2	2	2		
Curlew Sandpiper			3	2	3	3	1			
Sanderling										
White-rumped Sandpiper						1				
Ruff			1	1	1	1				
Oriental Pratincole					1		1			
Diversity-abundance scores						26	13			

data for AWSG submission  
to the System 6 report

W.A. WADER STUDY GROUP

REPORT ON A WADER COUNT HELD ON 28TH AND 29TH NOVEMBER 1981

On the weekend of 28-29 November 1981, members of W.A.W.S.G. conducted a survey of waders on the Swan Coastal Plain. The following sites were selected as being likely to harbour waders at the time, and were visited accordingly:

Herdsmen Lake  
Alfred Cove  
South Perth Foreshore  
Pelican Point  
Rottnest Island  
Garden Island  
Cockburn Sound  
Lake Cooloongup  
Lake Walyungup

The results of the count are attached. In considering these results, the following points should be noted :-

- (i) Due to time constraints, only the lakes on Rottnest Island were surveyed comprehensively, it not being possible to visit many of the beaches.
- (ii) It was not possible to arrange a visit to Garden Island on the weekend of the count. The figures given were obtained a week later.
- (iii) The figures for Herdsmen Lake are a composite of separate counts made by two observers during the weekend.
- (iv) Mullaloo Beach and the western extremities of the Swan Estuary were not counted. Both of these locations could be expected to harbour a small number of waders.
- (v) The water levels in most of the freshwater lakes were too high for significant numbers of waders to be present, and for this reason they were not visited.

(vi) At the time of the count, many Black-winged Stilts were known to be frequenting wet meadows and temporary swamps still remaining after the relatively wet winter. The total figure for that species should not therefore be assumed to represent a reliable index to the size of the population present.

Also attached is a table which compares the overall species totals with those obtained by the count of 30th November 1980. As an item of interest, figures from a count made at Albany on 5th December 1981 are also shown.

As can be seen from the table, most species of migratory waders were observed to be less numerous in 1981 than in 1980. A total of 3,876 migrants were counted in 1980 as against 2,623 in 1981, a reduction of 32%.

In addition to counting in the Perth area, group members were active further afield. Counts were also made at Karakin Lake (near Lancelin) and Peel Inlet. The observation of Long-toed Stints, Pectoral Sandpipers and Australian Pratincoles at the former site is of particular interest.

Thanks are extended to all who helped make the count a success.

For further information, please contact :-

K.R. Mills  
5 Burns Street  
Narrogin W.A. 6312.  
(Phone 098 811809)

	Walyungup	Cooloongup	Cockburn Sound	Garden Is.	Rottnest Is.	Pelican Pt.	Sth. Perth	Alfred Cove	Herdsmen L.	TOTAL
Pied Oystercatcher				6	1					7
Banded Lapwing					3					3
Grey Plover	3		6	11	3	2	10	50		85
Mongolian Plover				1						1
Red-capped Plover	4	30	50	25	7		20	30	5	171
Black-fronted Plover									8	8
Black-winged Stilt	10	80						30	17	137
Banded Stilt					990					990
Red-necked Avocet								75		75
Ruddy Turnstone			5	22						27
Grey-tailed Tattler			1		2	3				6
Common Sandpiper			10	7				1	3	21
Greenshank	3		1					1		5
Bar-tailed Godwit			12	12		1		10		35
Great Knot				5				20		25
Sharp-tailed Sandpiper									11	11
Red-necked Stint	3	350	25	500	681	31	40	700	12	2342
Curlew Sandpiper			3		22		1	30		56
Sanderling				9						9
TOTAL	23	460	113	598	1709	37	71	947	56	4014

	<u>Swan Coastal Plain</u>		<u>Albany</u>
	Nov. 1980	Nov. 1981	5th Dec. 1981
Pied Oystercatcher	*	7	3
Sooty Oystercatcher	*	-	1
Banded Lapwing	*	3	-
Grey Plover	118	85	68
Lesser Golden Plover	2	-	6
Mongolian Plover	-	1	-
Large Sand Plover	1	-	22
Red-capped Plover	*	171	19
Black-fronted Plover	*	8	-
Black-winged Stilt	*	137	-
Banded Stilt	*	990	-
Red-necked Avocet	*	75	30
Ruddy Turnstone	161	27	1
Whimbrel	3	-	-
Eastern Curlew	-	-	1
Grey-tailed Tattler	3	6	6
Common Sandpiper	14	21	1
Greenshank	8	5	48
Bar-tailed Godwit	51	35	52
Red Knot	8	-	64
Great Knot	79	25	229
Sharp-tailed Sandpiper	1	11	92
Red-necked Stint	3155	2342	2085
Curlew Sandpiper	217	56	28
Sanderling	55	9	-

\* Resident species not included in count.

Wader count conducted at Karakin Lakes Wetland Nature Reserve

1st & 2nd December 1981

Grey Plover	1
Red-capped Plover	6
Black-winged Stilt	c 1000
Greenshank	3
Sharp-tailed Sandpiper	200
Pectoral Sandpiper	6
Red-necked Stint	43
Long-toed Stint	8
Curlew Sandpiper	2
Australian Pratincole	2

Wader count conducted at Peel Inlet

29th November 1981

Grey Plover	24
Red-capped Plover	7
Red-necked Avocet	27
Common Sandpiper	3
Greenshank	4
Whimbrel	1
Bar-tailed Godwit	90
Red-necked Stint	42

Ms B. Churchwood  
Secretary  
W.A. Tree Society  
Station House  
CLAREMONT 6010

Dear Ms Churchwood,


My list of waterbirds for the Canning River from Riverton  
Bridge to Nicholson Road Bridge is as follows:

White Egret  
White-faced Heron  
Black Duck  
Grey Teal  
Moorhen  
Coot  
Pied Cormorant  
Little Pied Cormorant  
Little Black Cormorant  
Little Grebe  
Hoary-headed Grebe  
Silver Gull  
Whistling Kite  
Black Swan  
Nankeen Night Heron  
Sacred Kingfisher  
Reed Warbler  
Darter  
Greenshank  
Tattler  
Osprey  
Caspian Tern  
Crested Tern

These species were recorded during a half-day survey in April  
1972. I am sure that additional surveys would add considerably  
to the list.

I trust this information will be of some use.

Yours sincerely,



J.A.K. LANE  
Research Officer

October 27, 1978.

DIRECTOR

Re: Prawning and the Pelican Point Bird Sanctuary

Over the past few years I have become increasingly concerned about the rising level of disturbance on the Pelican Point bird sanctuary.

As you know, Pelican Point has long been the main night-time roosting site for the Swan River's migratory wading bird population. Over the past two wader seasons, however, the number of birds frequenting the Point has dropped off considerably. In fact, during the latter part of last season (that is, January to April) the Point was almost completely deserted by roosting waders.

I am sure that the main reason for this desertion has been the Point's sudden increase in popularity with prawners. From my observations, the Point was very rarely used by prawners prior to the summer of 1976/77. Last summer, however, a few prawners began trawling along the eastern shore on the odd occasion. This year prawning parties are working both shores of the Point, night after night. Last Tuesday night, for example, there were six parties of prawners, totalling some thirty people, spread around the entire shoreline of the Point - each party with its own gas lamp lighting up the area. At 5 pm there had been approximately six hundred migratory waders roosting on the Point; by 10 pm there were less than twenty. Importantly, the birds did not move to another part of the river. Instead they flew off towards the oceanfront.

I am concerned that if prawning continues at Pelican Point, even on the present scale, the area will be deserted completely by roosting waders. If that were to happen then a majority of waders may also desert the Swan River as their summer feeding ground. This Department's efforts to protect the waders' main feeding grounds at Point Waylen/Alfred Cove, Pelican Point and Como Beach would then have been in vain.

Although I am generally opposed to restrictions on public access and activities, I believe that such restrictions are unavoidable if Pelican Point is to serve as a sanctuary for the birdlife of the Swan.

I am therefore obliged to request that the Pelican Point bird sanctuary be permanently closed to prawning, and that such closure be considered as a matter of some urgency.

I do not believe that it will be necessary to close either Como Beach or Pt Waylen to prawning as these areas are not important as wader roosting sites.

J.A.K. LANE  
Research Officer  
Waterbird Research Unit.

November 24, 1977.

Wednesday - 2nd November '77.

Grant Pearson and I inspected the Alfred Cove samphire marsh area at 0800 hours on Wednesday 2nd November with Bob Newman and Jack Jeffery of Melville City Council and Wayne of the Public Health Department.

Mosquito larvae were very abundant over much of the marsh area. It was, in fact, the heaviest infestation I have seen in the past 18 months at the Cove. Most of the larvae were 3rd or 4th instar. Very few pupae or adults were seen.

Bob Newman treated the infested areas with 27 kilos of granulated 1% Abate using a Seymour No. 75 Universal Spreader. This application was far in excess of the recommended application rate of 5-10 kg/hectare - due mainly to the type of spreader used. The Seymour Spreader will not be used for future treatments.

The following waterbirds were observed:

- 5 Pelicans fishing in the cove
- 1 White Egret fishing in the cove
- approx. 7 Pied Stilt feeding on the marsh area
- 1 Common Sandpiper
- 1 Greenshank
- 1 Black Duck with 6 downy ducklings

The search was not exhaustive.

This was the first heavy infestation at Alfred Cove since last summer, and the first to require treatment. If left untreated it would undoubtedly have resulted in a severe nuisance problem in nearby residential areas. Natural controls would not have significantly reduced the number of adults emerging. Very few birds and no fish inhabited the infested areas, and even with ideal conditions (i.e. hot weather and strong winds) the infested pools would not have dried out until after emergence.

Thursday - 3rd November '77.

A check on the Cove at 1415 hrs on Thursday 3rd Nov. revealed that all larvae in treated pools had been killed. A few small pools which had been left untreated were a "soup" of larvae.

Birds observed were:

- 2 Pelicans - fishing in the Cove
- Silver Gulls
- 22 Pied Stilt - resting on the shore of the Cove
- 1 Common Sandpiper " " " "
- 1 Greenshank " " " "
- 1 Grey Plover " " " "
- 2 Broods of Black Duck ducklings; 1 adult with 7 and

another brood of 5 were seen - all southern end of the samphire marsh and into the rushes.

Friday - 4th November '77

At 0740 hrs. Bob Newman and I treated those pools of larvae which had been missed on Wednesday. Some of the pools up to 2 m square contained a thick soup of larvae and pupae. 0.3 kg of 1% granulated Abate was applied by hand.

Birds observed were:

4 Pelicans - fishing in the Cove  
21 Pied Stilt - resting on the bank of the cove.  
1 Grey Plover  
1 Greenshank  
Silver Gulls  
1 Caspian Tern - fishing in the Cove.

In the trees around the Cove were:

Western Silvereyes  
"28" Parrots in E. rudis.  
2 Rainbow Birds

J.A.K. LANE  
Research Officer

November 7, 1977.

N. B. For future Abate applications 5-10 kg/ha is equal to 0.5 - 1.0 gm/m<sup>2</sup>.

2 lbs pipe

# 2.70 - 3 marks

8.10

1.35

9.85

Tues 21 Dec 76

R. Fuller



0600

50° at 1000 ft Park N. 11

dry hill side to the road bed

14 Pelican

3 in. Pine

10 Common Sedge

116 Black Birch

88 Silver Birch

55 Red-bark Birch

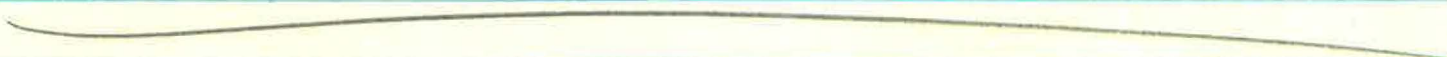
5 Larch

6 Coastal Fir

5 Canada Spruce

End

0740



2 lbs pipe.

\$ 2.70 - 3.00

8.10

1.35

9.85

Tues 21 Dec 76

~~R. P. Miller~~

0600 - 50% down Fresh N.W. breeze.  
Sandy high water to plus exact bed

- 14 Pelicans
- 3 Br. Heron
- 10 Common Sandpiper
- 196 Blue-winged Teal
- 88 Scaup
- 55 Red-w. T. Owl
- 5 WBC
- 6 Crested Tern
- 5 Common Noddy

0740 Sun.

1976

16/8/2014

PINAKLEN - ADJACENT COVE

WADJEL SURVEY SAT 30 OCT 76

START 0605 - FINISH 0730

3922 ALONG

START -> AT WADJEL

17 Black Swan

25 Avocet

9 Mountain Duck

2 Black Duck

11 Grebe (small)

3 Pied Stilt - inshore

2 Red-necked Stilt - inshore

~~Wedge~~ Pied Cormorant (few)

Coots (many)

4 Pelican

40 Cooty Plover - many with brown & black plumage

14 Godwit

5 Great Knot

118 Curlew Sandpiper

9 Knots - red used on one at least.

2 Cassin Tern

6 Crested Tern

1 Black Cormorant (overhead)

All on outer edge of flats (3 sand islands & shallows)

All flats covered except for outer edge & narrow inner fringe

Shrub all over by of island

Plant with 1 leaf cold white

Her 2 aphids

Her 1 with 1 adult young in egg

Found at 0230

Found to be same as 0250

Plant P. Coburn 0330 of 4th  
island



Definitely  
~~Looks like~~ notes of J. Lewis

visit to Saint Clonans Island,  
near Augusta WA, with fisherman  
Peter Coburn, on Mon 01/11/1976

  
6/8/2014

Shrub all over top of island

Most with 1 egg cold 24/10/76

then 2 eggs

then 1 with 1 adult egg - no egg

Time at 0230

Back to Rovers 1. 0250.

Paul P. Coburn 530

of 500  
total birds



Definitely  
~~looks like~~ notes of J. Lewis

visit to Saint Clement Island,  
near Augusta WA, with fishermen  
Peter Coburn, on Mon 01/11/1976

  
6/8/2014

NB fully wets from previous around Pt. English ment - need ZENS  
& enforcement  
also digging for worms around edge of amphipods - need zins.

PT WATKIN resting along shoreline - no flats  
exposed (between next island & border  
with Alfred Cove)

c 600 mixed Stint + Curlew Sandpipers  
(approx 50:50, counted 242 birds)

also  
1 Green Shank  
6 Grey Plover  
18 Pied Stilt

distributed by  
1 person walking  
around edge  
at 0655 hrs.

### ALFRED COVE

10 Grey Teal  
13 Pied Stilt  
5 + Green Shank  
3 + Common Sandpipers  
2 Coots?  
1 Black Duck  
1 Crested Tern  
1 Little Pied Cormorant  
1 Grey Plover  
Cottles

heard one Little Cormorant in reeds.

PELICAN PT

0600 - 0705

Geoff Shannon + Chris Cowell.

c 60	Red necked
2	Grey Plover
186	Avocet
9	Pied Still
10	Red-capped
1	Greenbank
13	Grey Teal
4	Pelicans - on logs
4	Caspian Tern
c 40	Coastal Tern
1	Common Sandpiper
c	12 Black Cormorant
4	Pied Cormorant
c 300	<del>Swamp</del> Little Black Cormorant
	Silver Gulls
2	Spotted Coots (no question about it)

KWENTANA C-57 :

Count & Feeding.

2 Whimbrels

1 Common Sandpiper

170 Stint

3 Greater Sandpiper

3 Pipit.

1 Pelican + 2 overland

3 Black Cormorant

3 L.H. Red C.

~~2~~ 2-300 L.H. Red C.

Shear over

July 13th - 1898

Vehicle - 1898 - 1898

~~1898~~

13 ~~Pat~~

10 ~~Pat~~

1 ~~Pat~~

2 ~~Pat~~

1 ~~Pat~~

3 ~~Pat~~

2 ~~Pat~~

1 ~~Pat~~

1 ~~Pat~~

July 14th 1900  
S. 2012

Vehicle Tracks - fence - signs

~~Blue heron~~

- All seen
- ~~13 Red Start~~
  - ~~10 Gray Duck~~
  - ~~1 White Red~~
  - 2 Woodcock + 3
  - ~~1 Gray Plover~~
  - 3 Common Snipe
  - ~~Crows~~
  - 2 Crows ?
  - 1 Black Duck
  - 1 Cackled Tanager
  - head Little heron

~~17 Sparrows Gulls~~

~~17 Sparrows + 24~~

~~9 Northern Doves~~

~~2 West Doves~~

~~3 Gulls + 8~~

~~2 Swifts~~

~~2 White Swifts~~

~~Long Billed Gull~~

~~4 Pigeons~~

~~2 Song Sparrows~~

~~53 L.P. Gulls = 14 Gulls~~

~~5 Gulls~~

~~127 Doves 9 Gulls~~

~~2 Cross Terns~~

~~6 Gulls~~

~~Black Gull overhead~~

+ 17 Red-capped Manilla

~~17 Sparrows~~ ~~Grills~~

~~1 Arrow + 24~~

~~9 Mountain Duck~~

~~2 Black Duck~~

~~3 Cuckoo + 8~~

~~2 Star~~

~~2 Wh. Swift~~

~~Leg. Pet. Count~~

~~24 Pheasant~~

~~3 1/2 pt. ...~~

~~2 G. Duck~~

~~53 L.P. G. Duck~~ ~~14 G. Duck~~

~~5 G. Duck~~

~~127 Duck~~ ~~9 small~~

~~2 C. Tern~~

~~6 G. Duck~~

~~Black G. overland~~

~~+ 17 Red-capped Duck~~

→ ... 18

1 Concours but

18  
1  
2

1  
2

2  
3

→ Boxes

1 Correns Unit

~~Correns Unit~~

~~18 Field Unit~~

~~100~~

~~6 Correns Unit~~



2 Units  
3



Fine Warm Sunny Day  
WED 7 APRIL 76

Alfred Cove 1700 hrs - high tide

Standing in pools of water at Pt Lyell marsh  
west

- Feeding party of 7 Banded Stilts  
(6 with rich Chestnut Band on Breast)  
1 with faint grey band  
+ 1 Pint Stilt

also

- 2) Feeding
- 3) 1 White Egret
- 4) 2 Grey Plover
- 5) 1 Silver Gull
- 6) 16 Pint Stilt
- 7) ~~16~~ 4 Bar Leaded Cootid

Other species observed were

- 2 WFN.  
2 Plover  
24 Cassin Tern.  
27 L. NB Pint Coot  
2 + 1 Cormorant  
1 Heavy Leaded Grebe  
3 Black C.  
48 + 5 Grey Teal  
1 Crested Tern  
6 Pint Stilt  
2 Black Duck  
2 Common Sandpiper  
1 Black Shouldered Kite  
horreng  
1 White Egret.

Birds of Alfred Cove Thu 18 MAR 76  
1875 - 1900 hrs - JAKL

- 1 Pelican - feeding in shallow
- 1 White Egret
- 2 White-faced Heron
- 1 Grey Teal
- 4 Grey Plover
- 3 Greenshank
- 5-6 Common Sandpiper
- 10 Pied Stilt
- Silver Gull
- 4 Caspian Tern - feeding
- 1 Crested Tern - feeding

The only species seen in the settlement was ~~the~~ WHT.  
All others were either on or over the bay and around the  
shoreline. Note: 2 days after laying at Akaka  
in pools.

Just on deck 2 vehicles arrived.

Car: 3 people went prospecting on W. Hayslip flats

Landrover: disassembled boat on cove.

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WATERBERG SPECIES RECORDED AT ALFRED COVE BY JAKE

	SPECIES	(JAN 1970 to 18 MAR 76)	MAX NO
1	Hairy-headed Grebe		28
2	Pelican		7
3	Black Cormorant		21
4	Little Black Cormorant		3
5	Pied Cormorant		1
6	Little Pied Cormorant		50
7	Darter		2
8	White Egret	MBT	1
9	White-faced Heron		2
10	Black Swan		5
11	Mountain Duck		2
12	Black Duck		3
13	Grey Teal		20
14	Osprey		1
15	Grey Merganser	MBT	20
16	Greenshank	MBT	12
17	Common Sandpiper	MBT	6
18	Curlew Sandpiper	MBT	24
19	Pied Stilt		16
20	Silver Gull		
21	Caspian Tern		11
22	Crested Tern	MBT	3
23	Rail or Grebe		
23 SPECIES		6 MBT	

MBT = species listed in JAPAN-AUSTRALIA MIGRATORY BIRDS TREATY.

JAKES

ALFRED COVE : INFORMATION FROM PRE-1976 NOTEBOOKS

- MON 15 MAY 72 : 1700 hrs "Scamphire Hkts - 2 White-headed Stilt,  
Bay - 2 Black Swan"
- 22 June 72 : approx 1415 hrs "3 swans, 2 White-faced Heron in  
scamphire, 9 Grey Teal, 1 Hairy-headed grebe,  
1 White Gull, 5 White-headed Stilt (last 2 species in  
scamphire)
- 29 June 72 : ~~2 UFH~~ 2 UFH, 1 White Gull, 2 Black Swan,  
28 Hairy-headed grebe, 4 Little Pied Cormorant.
- 30 AUG 72 : approx 1500 hrs : 9 Black Cormorant, 1 Pied Cormorant  
1 Little Pied Cormorant, 2 Mountain Duck.
- 31 AUG 72 : approx 1500 hrs : Silver Gulls, 2 Mountain Duck, 1 White-  
faced Heron.
- 1 SEP 72 : approx 1330 hrs : 3 LPC, 1 BC, few Silver Gulls.
- 2 SEP 72 : approx 1030 hrs : 21 BC, 10 LPC, 1 Pheasant, 1 Black Duck  
few Silver Gulls.
- 3 SEP 72 : 5 Caspian Tern, 2 Black Swan, 2 Mountain Duck,  
2 Greenshank, few Silver Gulls, 6 BC, 5 LPC.
- 4 SEP 72 : 11 Caspian Tern, 2 Black Duck, 2 Mountain Duck  
Silver Gulls, 2 BC, 9 LPC, 2 Common Sandpiper.  
Finish 1458.
- 5 SEP 72 : approx 1415 hrs : 9 BC, 10 LPC, 3 Black Duck  
2 Mountain Duck, 4 Caspian Tern, numerous  
Silver Gulls.
- 6 SEP 72 : approx 1330 hrs : 7 LPC, 4 BC, 2 Caspian Tern,  
3 Greenshank, few Silver Gulls.
- 8 SEP 72 : approx 1700 hrs : 1 LPC, 1 BC, few Silver Gulls.
- 9 SEP 72 : approx 1600 hrs : 5 LPC, 2 Mountain Duck, 2 Common  
Sandpiper, 2 UFH, few Silver Gull.
- 10 SEP 72 : approx 1400 hrs : 4 BC, 7 LPC, 1 LBC, 2 Mountain  
Duck, 5 Black Swan.

- 11 SEP 72 approx 1500 hrs : 3 BC, 7 LPC, 2 Greenhants  
few Silver Gulls.
- 12 SEP 72 approx 1600 hrs : 4 BC, 5 LPC, 1 Pelican, 1 Common  
Sandpiper, 4 Greenhant.
- 13 SEP 72 approx 1515 hrs : 1 LPC, 2 Pelican, 1 Common  
Sandpiper, 4 Greenhant.
- 14 SEP 72 approx 1500 hrs : few ~~to~~ LPC, Silver Gull, 1 Common  
Sandpiper, 3 Greenhant.
- 15 SEP 72 approx 1530 hrs : 2 LPC, 1 Crested Tern, 1 Grey Plover,  
2 Greenhant, 1 Common Sandpiper.
- 16 SEP 72 approx 1600 hrs : 2 BC, 1 WFH, few Silver Gull, 2 Mountain  
Duck, 1 Black Duck, 1 LPC, 3 Greenhant, 1 Common  
Sandpiper.
- 17 SEP 72 approx 1715 hrs : 6 LPC, 3 BC, 2 Black Swan, 2 Pelican  
3 Crested Tern, 3 Hairy-vented Gulls, 1 Black Duck,  
3 Greenhant, 1 Grey Plover, 1 Common Sandpiper.
- 18 SEP 72 approx 1430 hrs : 3 LPC, few S. Gulls, 4 Greenhant,  
1 Grey Plover
- 19 SEP 72 approx 1430 hrs : 3 Greenhant, 1 Common Sandpiper,  
1 LPC, 1 WFH, Silver Gulls
- 20 SEP 72 approx 1450 hrs : LPC, BC, Silver Gulls, 2 Mountain  
Duck, 4 Greenhant, 1 Common Sandpiper.
- 21 SEP 72 approx 1430 hrs : 1 LPC, 2 BC, 1 WFH, 1 BD,  
few ~~to~~ SG, 5 G, 3 ~~to~~ Common Sp.
- 22 SEP 72 approx 1415 hrs : 6 Common Sp, 7 G, 1 BD,  
1 WFH, LBC, LPC, SG.
- 23 SEP 72 approx 1530 hrs ; 7 G, 2 Common Sp., LPC,  
SG, 1 BD.
- 24 SEP 72 approx 1330 hrs ; 3 Crested T., 1 LPC, SG, 8 G,  
4 Common Sp, 1 LBC, 1 Pelican.
- 25 SEP 72 approx 1430 hrs : 2 Common Sp, 5 G, 1 LPC,  
SG.

- 28 SEP 72 approx 1645 hrs : 2 Wh Still, 5 G, 2 Common Sp.,  
2 LPC, SG, 1 Crested Tern, 1 Caspian Tern.
- 29 SEP 72 approx 1600 hrs : 9 G, 2 Common Sp., SG.
- 1 OCT 72 approx 1430 hrs : SG, 1 Wh Still, c8 G, 2 Common  
Sp, 1 Plover, c10 LPC, 1 Crested Tern, 1 Caspian  
Tern, 1 Pelican
- 2 OCT 72 approx 1445 hrs : 4 G, 3 Common Sp., 1 Grey  
Plover, SG, 2 BC, 1 LPC, 1 LBC.
- 4 OCT 72 approx 1430 hrs : 1 Pelican, 1 BC, SG,  
1 Crested Tern, 1 Common Sp., 7 G, 1 Caspian  
Tern.
- 6 OCT 72 approx 1430 hrs : 2 Pelican, 2 Grey Plover, 2 Common  
Sandpiper, 7 G, 2 LPC, 3 LBC, SG, 1  
Caspian Tern.
- 8 OCT 72 approx 1415 hrs : 1 Common Sp, 1 Crested Tern, SG.
- 10 OCT 72 approx 1615 hrs : 6 Common Sp, SG.
- 12 OCT 72 approx 1315 hrs : 1 Common Sp, 1 Crested Tern, SG.
- 16 OCT 72 approx 1545 hrs : 3 Pelicans, 5 Common Sp, 3 BC  
1 LPC, 1 White Egret, 1 Crested Tern. SG.
- 18 OCT 72 approx 1615 hrs : 6 Common Sp, 2 Crested Tern,  
1 Caspian Tern, SG, 1 WfH.
- 20 OCT 72 approx 1315 hrs : 2 Common Sp, SG.
- 22 OCT 72 approx 1545 hrs : LPC, BC, LBC, 2 Pelican, 1 Common  
Sp., SG
- 25 OCT 72 approx 1615 hrs : 1 LBC, 2 Pelican, 1 Crested Tern,  
2 Common Sp, 1 GP
- 31 OCT 72 approx 1600 hrs : 1 Crested Tern, 3 Common Sp,  
3 G, 2 GP, 7 LPC, 1 BC, SG.
- 3 NOV 72 approx 0730 hrs : 2 Pelican, 2 Common Sp,  
1 G, 1 Crested Tern, 1 LPC, 1 LBC, 5 BC, SG.
- 6 NOV 72 approx 1545 hrs : 1 Common Sp, 1 Wh Still,  
SG, 1 WfH, 1 LPC.
- 11 NOV 72 approx 1630 hrs : 2 Common Sp, 2 Caspian Tern,  
1 Crested T, 5 Pelican, SG.

15 NOV 72 approx 1530 hrs : 3 Common Sp, 1 G, 1 Crested Tern, 1 GP,  
SG.

16 NOV 72 approx 1530 hrs : 2 G, 1 Common Sp, 1 GP

25 JAN 73 approx 1530 hrs : 50 LPC, 1 LBC, 2 BSC, 7 G,  
3 ~~SG~~ Hh Skitt, 2 Grey Teal,

12 JAN 1970 : 1830 hrs : 16 Hh Skitt, 20 Grey Plover, 1 Wt Heron

14 JAN 70 : 0930 hrs : 1 GP, 1 G, 24 ~~G~~ Curlew Sandpiper

16 FEB 70 : 1015 hrs : 2 GP, 4 G.

23 JULY 1973 : ~~approx~~ 1 Common Sp, 10 Caspian Tern, 2 Crested Tern  
Silver Gulls, 1 Black Swan.

1 APRIL 1973 : approx 1430 hrs : 7 Pelican, 2 Swan, 1 White Egret  
1 Common Sp. 22 Hairy headed Gulls, 12 Greenshank,  
11 Grey Teal, LPC, SG.

ABERDEEN COUNTY WATERFOWL SPECIES LIST

Mon 15 MAR 76

1525 - 1615 hrs

- JAKL

1.	20	Grey Teal	
2.	16	White-headed Stilt	
3.		Caspian Tern	
4.		Silver Gull	
5.	5	Greenland	
6.		White Gull	
7.		Little Red Cormorant	
8.	2	White-faced Heron	
9.	4	Grey Plover	
10.	<del>4</del>	Common Sandpiper	
11.	1	Ouzel	
12.	2	Waders	
13.		Little Black Cormorant	
<del>14.</del>	* 1	Black-shouldered Kite	*
<del>15.</del> 14.		Crested Tern	
<del>16.</del> 15.	1	Rail or Coot	

Thur 18 MAR 76

0800 - 0845 hrs

Additional species

10.	<del>the</del> Black Cormorant
18.	2 Black Duck.

FILE NOTE - For Mr Shugg to note.

Mrs Gray of Lentona Road, Alfred Cove rang me this morning to complain about the use of Alfred Cove for model-boating.

According to her the Cove has been used on Saturday and Sunday afternoons of the past three weekends by approx. 30 people in 12 cars with 5-6 remote controlled boats, 2'-4' long. Apparently the group use a rowboat to place buoys around the Cove, then spend the rest of the afternoon racing their boats around the course.

Mrs Gray said that she wasn't complaining about the noise, but about the disturbance to birdlife. Apparently last weekend there were 20 Black Swans, plus pelicans and other smaller birds in the Cove. These left the Cove as soon as the model-boating commenced.

Mrs Gray was surprised to learn that, at the moment, Fisheries and Wildlife do not have control of the Cove and may therefore be powerless to stop it being used for model-boating. I told her that I would see what could be done, and drew the matter to Mr Shugg's attention.



J.A.K. LANE  
Research Officer

May 5, 1977.

## ALFRED COVE FAUNA RESERVE : LOT 36 SUBDIVISION PROPOSAL

### BACKGROUND

The tidalflats, marshes, rushbeds and shallows of Alfred Cove and Point Waylen form the most important area of waterbird habitat on the Swan and Canning Rivers. More than 40 different species of waterbirds have been recorded there and at least 16 of these are migrants from the northern hemisphere. Each summer several thousand wading birds inhabit the tidalflats of Pt. Waylen and the Cove, feeding on the abundant invertebrate life which these areas provide. During November 1972 more than 4,000 waders were recorded feeding over the extensive tidal sandflats of Pt. Waylen.

Because of the area's great importance to birdlife, the Department of Fisheries and Wildlife has endeavoured to have Alfred Cove and the adjoining shallows and foreshore of Pt. Waylen set aside as a reserve for the purpose of Conservation of Flora and Fauna and vested in the Western Australian Wildlife Authority. On February 13, 1973 this proposal was agreed to in principle by a meeting of representatives of the Melville City Council, the Department of Lands and Surveys, the Metropolitan Regional Planning Authority, the Swan River Conservation Board, and the Department of Fisheries and Wildlife.

Subsequent progress towards reservation has been slow, due mainly to difficulties in determining the precise location of High Water Mark and the consequent need to establish a transect line along the foreshore. Survey work has now been completed and final agreement on the boundaries of the reserve has been reached. It is therefore probable that the reserve will be proclaimed during this year.

### THE HABITAT

Four principal types of waterbird habitat occur in the Alfred Cove - Point Waylen area. They are:

- i) Tidal sand - and mudflat,

cont'd...

2/...

- ii) Shallow waters,
- iii) Samphire marsh, associated pools and mudflat
- iv) Rush and sedge community.

Although some waterbird species make use of two or more types, most species are restricted to particular habitats. For example, large flocks of transequatorial migratory waders are found only on the tidal sand - and mudflats. Pelicans, swan and teal feed in shallow waters while Stilt, Greenshank, Common Sandpiper, Heron and Egret prefer the margins and pools of the samphire marsh.

Thus the rush and sedge community of Alfred Cove is an important habitat for crakes (*Porzana* sp.), rails (*Rallus* sp.) and the Little Grassbird (*Megalurus gramineus*). In fact, in the Alfred Cove situation, these species of waterbird are entirely restricted to the rush and sedge community.

#### THE FAUNA RESERVE AND THE LOT 36 SUBDIVISION PROPOSAL

Although the fauna reserve as presently proposed will incorporate all of the shallows, tidal flats and samphire - marsh of the Cove, a significant portion of the Cove's rush and sedge community will be excluded since it extends beyond the proposed reserve boundary and into Burke Drive Road Reserve and Lots 36 and 38. In fact, more than 85% of the Cove's Bullrush community lies within these lots and the road reserve.

Because this rush-sedge community is valuable, both in its own right and as Alfred Cove's only habitat for crakes, rails, Little Grassbirds, it is most important, from a conservation point of view, that it be preserved in its entirety. If this is done the Alfred Cove - Point Waylen Flora and Fauna Reserve will be the only wildlife sanctuary on the Swan and Canning Rivers which will include significant areas of all four of the above mentioned types of waterbird habitat.

cont'd...

RECOMMENDATIONS

1. It is therefore recommended that, in the event of subdivision of Lot 36 being approved, the rushbed area referred to above should be excised from the Burke Drive Road Reserve and from Lot 36 and incorporated in the adjoining Fauna and Flora Reserve. The approximate boundaries of the area to be excised are shown on the accompanying map.
2. It is also recommended that, in the event of subdivision, the service road to Lots 36 and 38 be sited within Lot 36 and not along the edge of the fauna reserve. This will help to minimise the disturbance level on the southern shore of the cove.
3. A narrow walking trail could perhaps be provided along the southern boundary of the reserve to provide nearby residents and other members of the public with opportunities to view the Cove. A low fence along the edge of the reserve would be necessary to protect the rushbed and its associated fauna from dogs and people who might otherwise be unaware of the area's significant conservation value.

J.A.K. LANE  
Research Officer.  
March 22, 1977.

ROB POWELL.

Attached is a species list for the Swan and Canning Rivers. I haven't had a chance to thoroughly check it yet however I am confident that any corrections which might be required would only be minor.

Any other details you might require for the System 6 recommendations will have to wait until I return I'm afraid.

J.A.K. LANE  
Research Officer.

May 10, 1976.