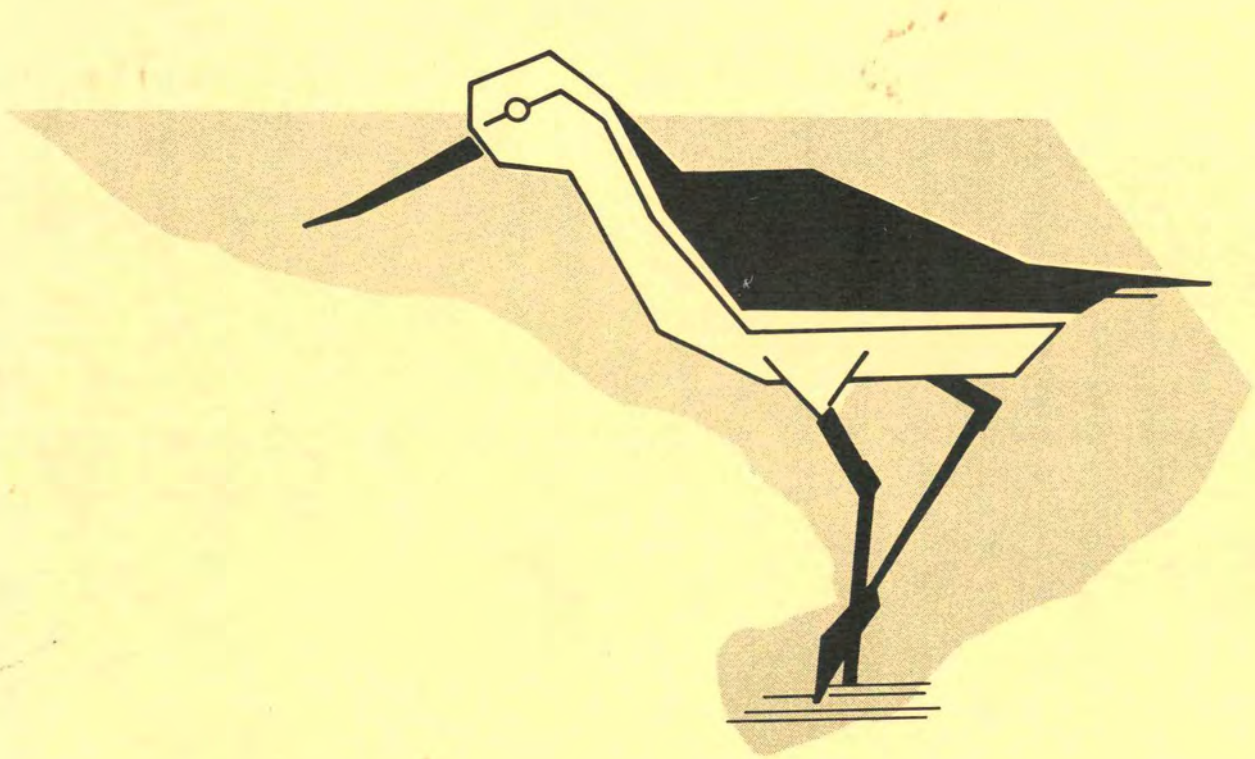
ALFRED COVE — A WILDLIFE HABITAT



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1. ALFRED COVE-POINT WAYLEN - A SUMMARY OF THE STUDY AREA

The area is remarkable in that it still offers such a diversity of bird species within the heart of metropolitan Perth. This is the last small pocket of marsh together with extensive mud flats available to wading birds on the lower Swan River Estuary. The mud flats are ornithologically the single most important feature of the area and yet they are currently unprotected.

In spite of the extraordinary value of the mud flats there is no protection of the tidal zone and the reserve itself is confined to a narrow strip along the riverbank. This is designated as a 'C' class reserve vested in the National Parks and Nature Conservation Authority. As a 'C' class reserve its security is limited.

The following points are noted:

1. The Cove retains the only relatively natural and extensive estuarine wetland saltmarsh on the lower Swan River Estuary.

2. Some 132 species of bird have been recorded - a figure which is exceptionally high (the total at Herdsman Lake was found to be 81 species[1]).

3. Following the RAOU-CALM study (1981-1985) of 250 wetlands[2], Alfred Cove is considered to be one of the most important waterbird habitats in the south-west.

4. The area forms a part of a network of wetlands including the chain of wetlands to the south and Rottnest Island salt lakes.

5. The mud flats are the main feeding area for waders on the lower estuary and are linked closely, as a resource, with Pelican Point and the Como foreshore.

6. Thirty bird species are covered by the Japan Australia and Peoples Republic of China Australia agreements for protection of species and habitat.

7. The area is used as a staging/holding area for intercontinental migratory wader species and has a very high seasonal recruitment.

8. The tree-covered areas of the Cove and Point may form a corridor for bush birds in their north-south migration and may also facilitate nomadic movements.

9. The river is a flight path for birds and also provides a route for species moving from inland areas to the coastal plain and Rottnest.

10. The area is used extensively by photographers, artists, schools, biologists, naturalists, ornithologists, birders, and local residents for recreation purposes. The WA Department for Tourism features the area in the publication *Birdwatching in Western Australia* and the area is of interest to interstate and overseas visitors. Of the sites covered by the annual RAOU 'Twitchathon', Alfred Cove is possibly the only area considered important enough for all teams to include in their itinerary - the highest species list is invariably recorded here.

11. A number of studies have been conducted in the area:

. Jaensch, R P (in preparation). Waterbirds in Nature Reserves of South-Western Australia, 1981-1985. RAOU-CALM.

. Keeling, S (in press). A Study of Birdlife, 1979-1986. WA Bird Notes.

. Several papers as part of Honours, Masters and PhD theses by students (eg Luke Penn, Hugo Bekle, Flora Stoner).

. The Wader Study Group of the RAOU has on occasion banded birds in the area as part of the ongoing study into wader movements.

12. The area is of interest to the WA Museum for the following:

. Significant shallow fossil deposits 6 100-4 000 years old[3]; and

. The mollusc *Coxiella striatula*.[3]

13. Owing to the proximity of housing there are many pressures on the area, the most critical being:

. intrusion by dogs onto the mud flats and into the Cove;

. drainage, which has introduced fresh and possibly contaminated waters to the Cove, and created levees which divide natural vegetation;

. trees are cut down/poisoned to give clear views of the river;

. prawners and bait diggers degrading the Cove; and

. spraying for insect control.

2. ALFRED COVE-POINT WAYLEN IN PERSPECTIVE

The lower estuary of the Swan River resembles a freshwater lake which has gained access to the ocean. This results in large quantities of fresh water being flushed down in the winter months while during summer months sea water fills the lower reaches. The lower estuary is wide and shallow with considerable alteration to the shoreline and river bed having taken place - notably by dredging, clearing and filling.

Alfred Cove has the last remaining unchanged area of shoreline samphire and rush on the lower estuary. The Cove may be considered to be a shallow saline pool which has gained access to the river system and resembles the shallow saline lakes which lie inside the coastal dune system to the south of Perth.

The waters in the Cove are generally quite saline (having higher salinity than the river) and a current sweeps in an anticlockwise direction around the Cove. This current is responsible for erosion on the northern and western shore and deposition on the southern shore. This deposition of fine silts is important as it is creating new land which is subsequently being colonized by rushes. Additional land has been created by 'fill' to the west of the Department of Civil Aviation's antenna farm.

The changing nature of the substrate of the area has created problems of tenure in the past and much of the new land remains unmapped (see Figure 1). Division of the reserve by zones relating to tidal movements, substrate or vegetation would almost certainly lead to future management difficulties.

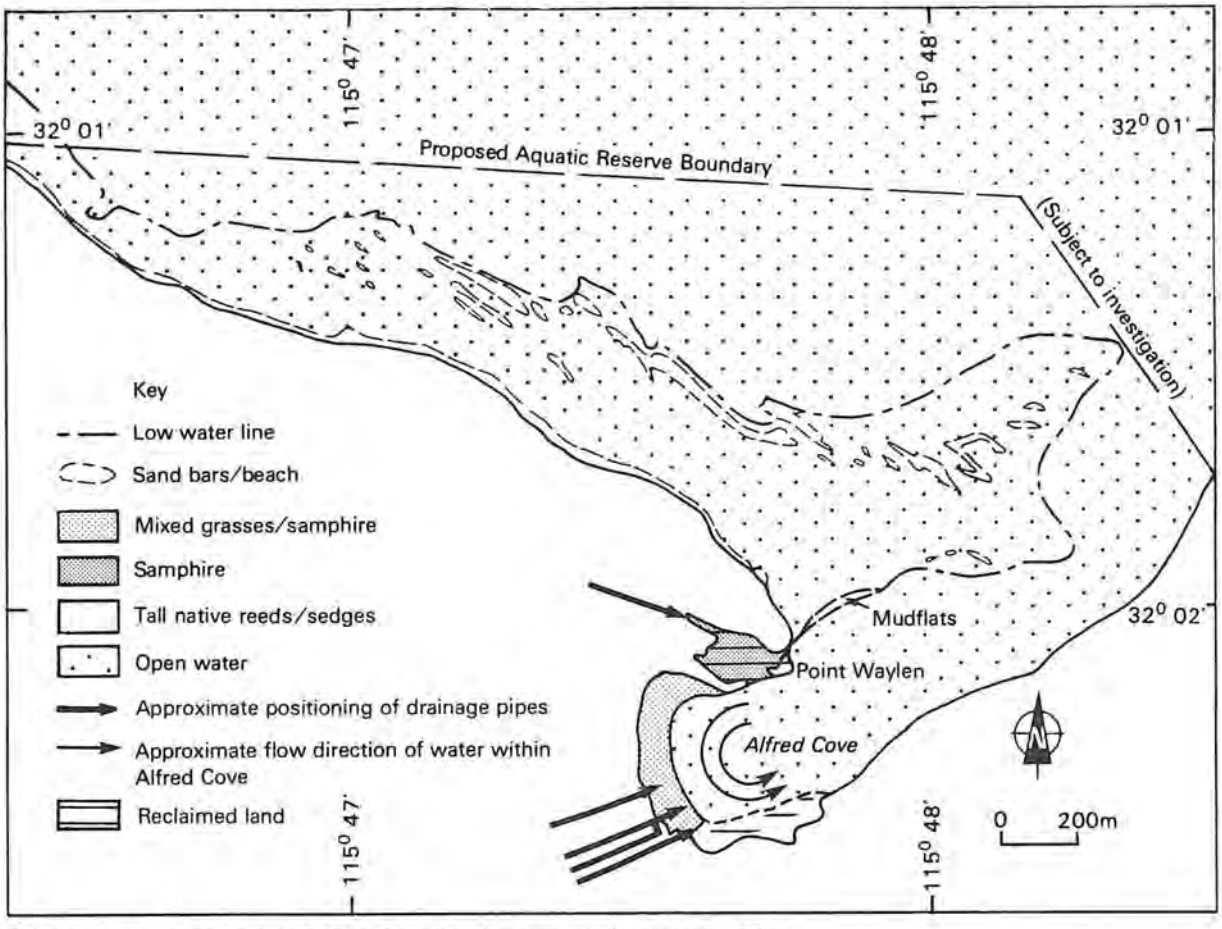

Figure 1. Reclaimed land, drainage and water flow.

3. FOSSIL DEPOSITS

The WA Museum has noted fossil deposits of some 6 100-4 000 years of age. The beds lie several feet (2 metres) beneath a soil cap and are considered secure from disturbance[3].

Middle Holocene (fossil) beds at Alfred Cove are, as far as is known, the last substantially undisturbed example on the Swan River Estuary, all others having been destroyed or buried by shore reclamation works (G W Kendrick, pers comm). A thorough explanation of the importance of the fossil beds may be found in:

> Yassini, I and Kendrick, G W (in press). Middle Holocene ostracodes, foraminifers and environments from beds of Point Waylen, Swan River Estuary, South-Western Australia. *Alcheringa*.

4. FRESHWATER GASTROPODS

The mollusc *Coxiella striatula* lives in profusion at Alfred Cove-Point Waylen. The WA Museum has noted that "It would seem that the Alfred Cove-Point Waylen population should be cared for so that its conservation is

ensured. Not only is it one of the few remaining populations left in this area, but its unusual ecology in contrast to that of the salt-lake populations at Rottnest, Green Head, etc would seem to merit investigation"[3].

5. BIRDS

5.1 INVENTORY

Some 132 species of birds have been recorded in the area (See Appendix 1). These may be placed within the following groups based on habitat utilization (see Figure 2):

. Trees and shrubs	37 species
. Open grasslands	11 species
. Reeds/sedges	10 species
. Samphire	31 species
. Mud flats/sand banks	48 species
. Open waters	18 species
. Aerial (above vegetation and water)	18 species
. Passerines	45 species
. Non-passerines	85 species
. Waterbirds	22 species
. Waders	43 species
. Birds of prey	11 species
. Terns	8 species

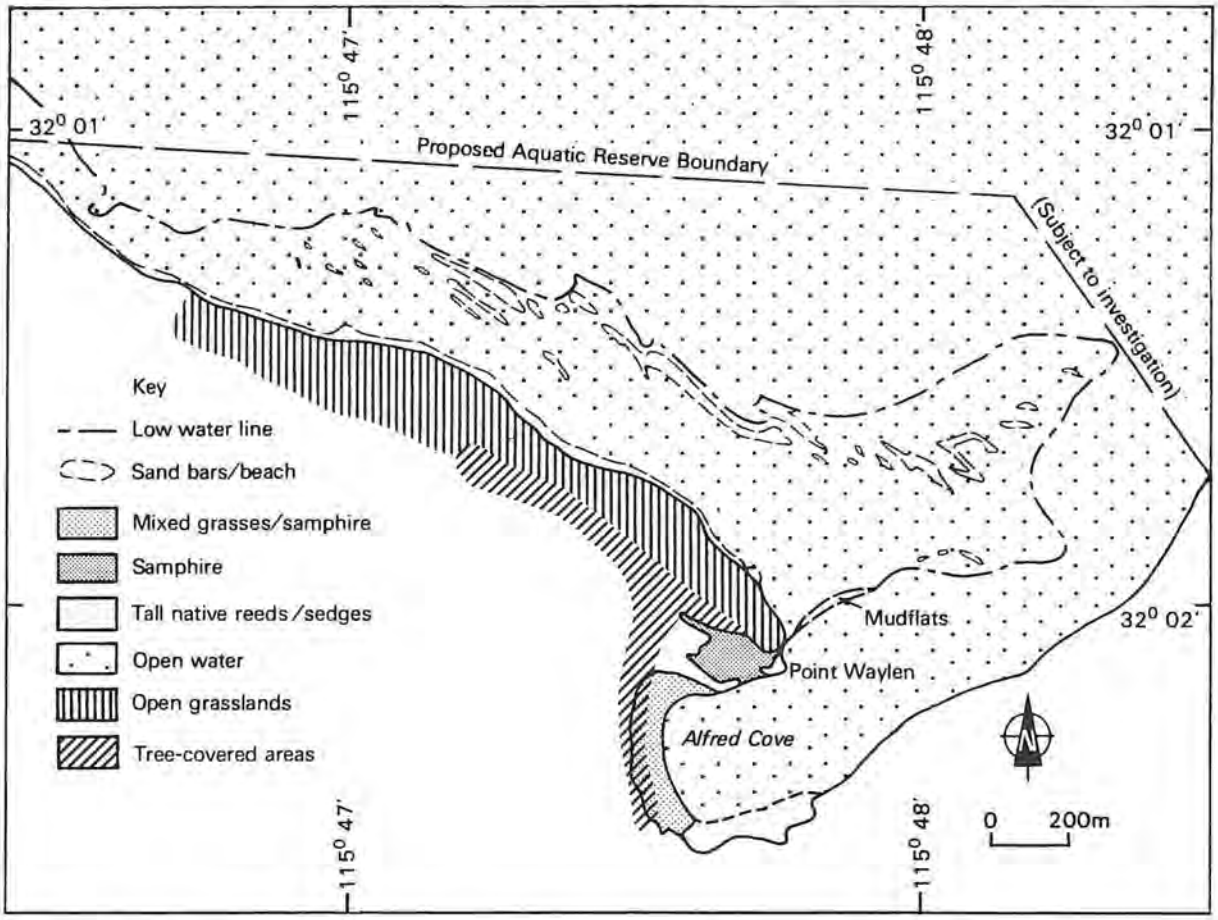

Figure 2. Habitats.

5.2 BREEDING

Thirty species are thought to have bred in the area (see Appendix 3). Of these the Musk Lorikeet is now extinct. It is important to note that, of the thirty species which are thought to have bred at Alfred Cove, over twenty species are bush birds. This emphasises the importance of the Flooded Gums and Paperbarks at Alfred Cove.

Nesting areas for waders and ducks are shown on Figure 3. The area is important for breeding Spotless Crakes and Black-winged Stilts. These species rely on a stable and protected area of samphire and rush for nesting. The area is possibly the only site on the lower estuary where Little Grassbird, Spotless Crake and Buff-banded Rails still breed (see Figure 4).

Photograph 1. Black-winged Stilt nesting at Alfred Cove (P Howden).

5.3 WATERBIRD USAGE

The study by R P Jaensch, Waterbirds in Nature Reserves of South-Western Australia, 1981-1985, recorded surveys of 250 wetlands, principally wetland Nature Reserves. Alfred Cove-Point Waylen statistics show that the area is considered important for nineteen species, that four species are rare but appear regularly, that ten species had the highest count during the survey, that six species were recorded in the greatest numbers and one species was important for its breeding. The study also showed that the area had the highest number of species recorded, was ranked tenth for maximum number of individuals counted, ninth in terms of the number of individuals that used the reserve over the four year period, fourth for number of species for which the reserve was judged to be important, and was the fifth most important reserve by overall comparison of rankings.

Of those species surveyed the area recorded the highest numbers of Buff-banded Rail, Grey Plover, Bar-tailed Godwit, Great Knot, Red-necked Stint and Fairy Tern. It was also the only reserve where the Lesser Golden Plover and Terek Sandpiper were recorded regularly each season. The highest regular numbers of Greenshank on the Swan River (twenty birds recorded in October 1982 by the author) were found in the area. The Waterbird Study also showed the following species to be important for their numbers: Australian Pelican, Pied Cormorant, Red Knot, Silver Gull and Caspian Tern.

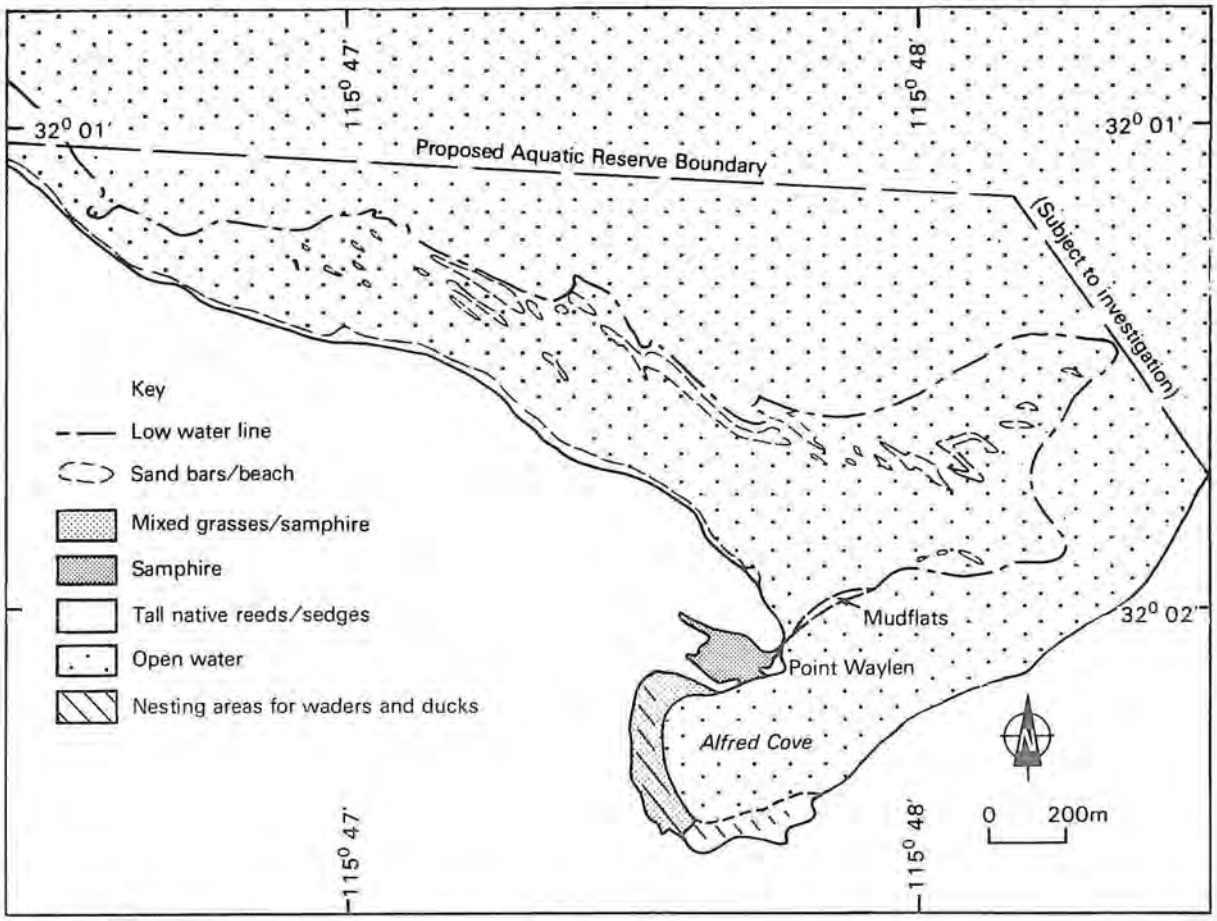

Figure 3. Nesting areas for waders and ducks.

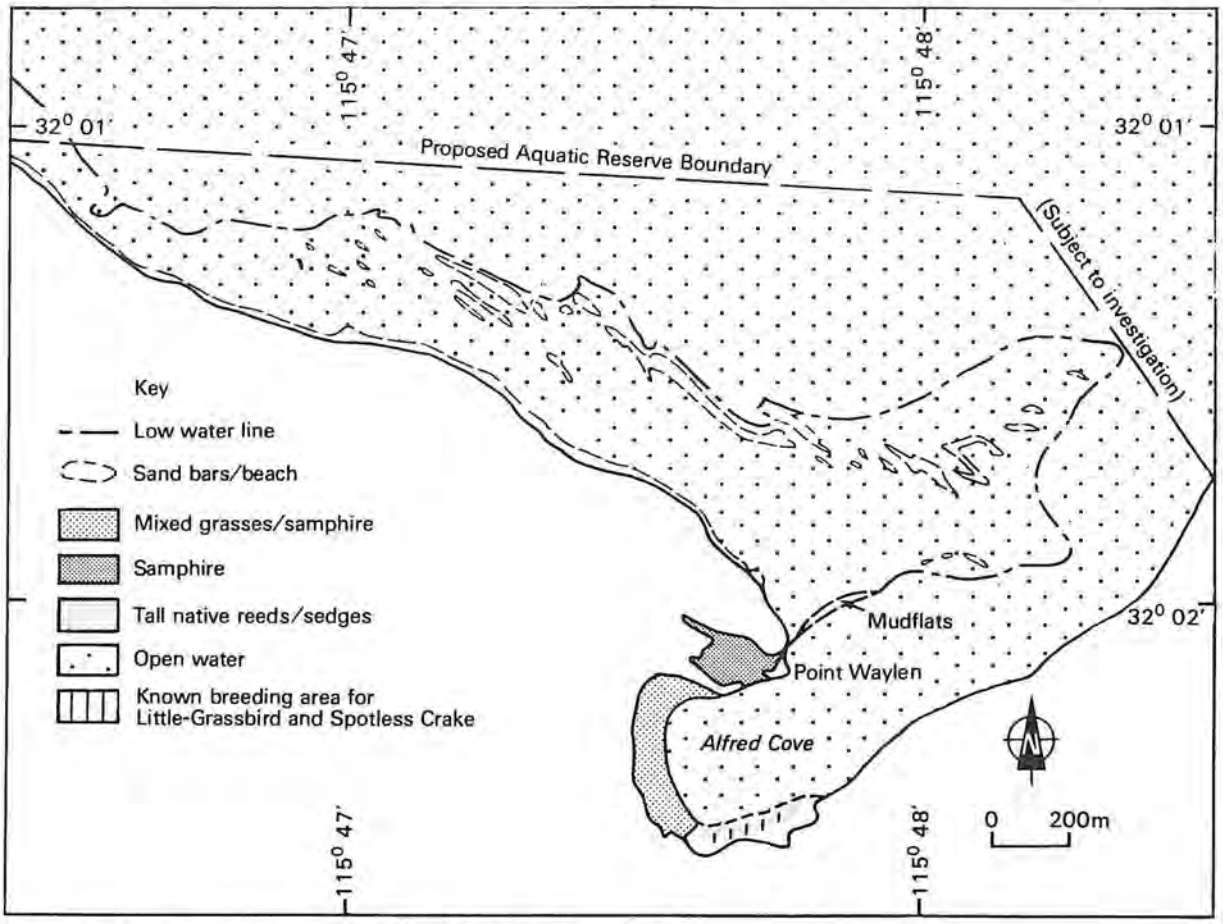

Figure 4. Breeding area for Little Grassbird and Spotless Crake.

5.4 ROOSTING

Principal roosting and loafing areas are marked on Figure 5. The migratory waders also rely on suitable roosting sites being available at Pelican Point and the Como foreshore. Waders move onto roosting areas at times of high tide. Ducks roost along the banks of the Cove - see Figure 6.

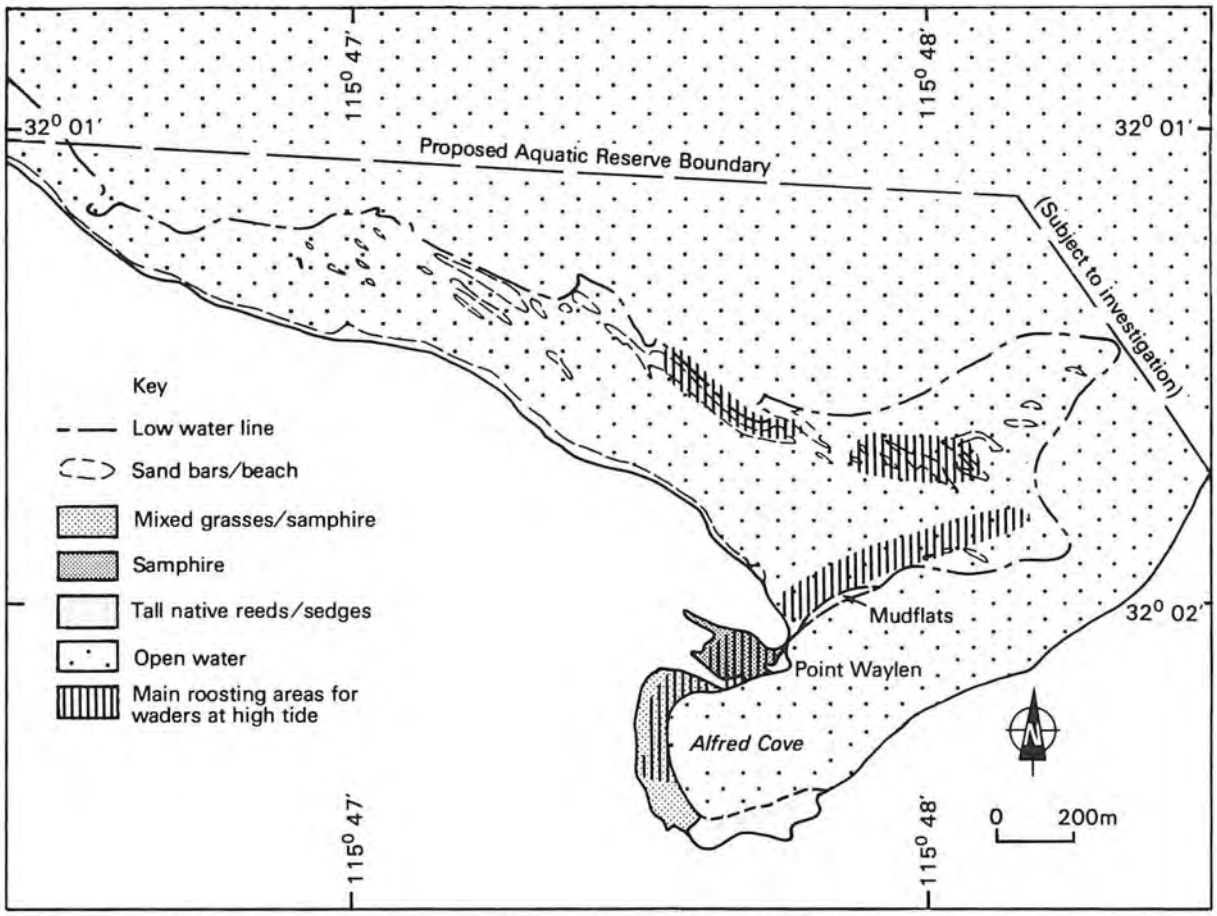

Figure 5. Main roosting areas for waders at high tide.

Photograph 2. Waders resting on the mud flats - Bar-tailed Godwit, Great Knot, Grey Plover (P Howden).

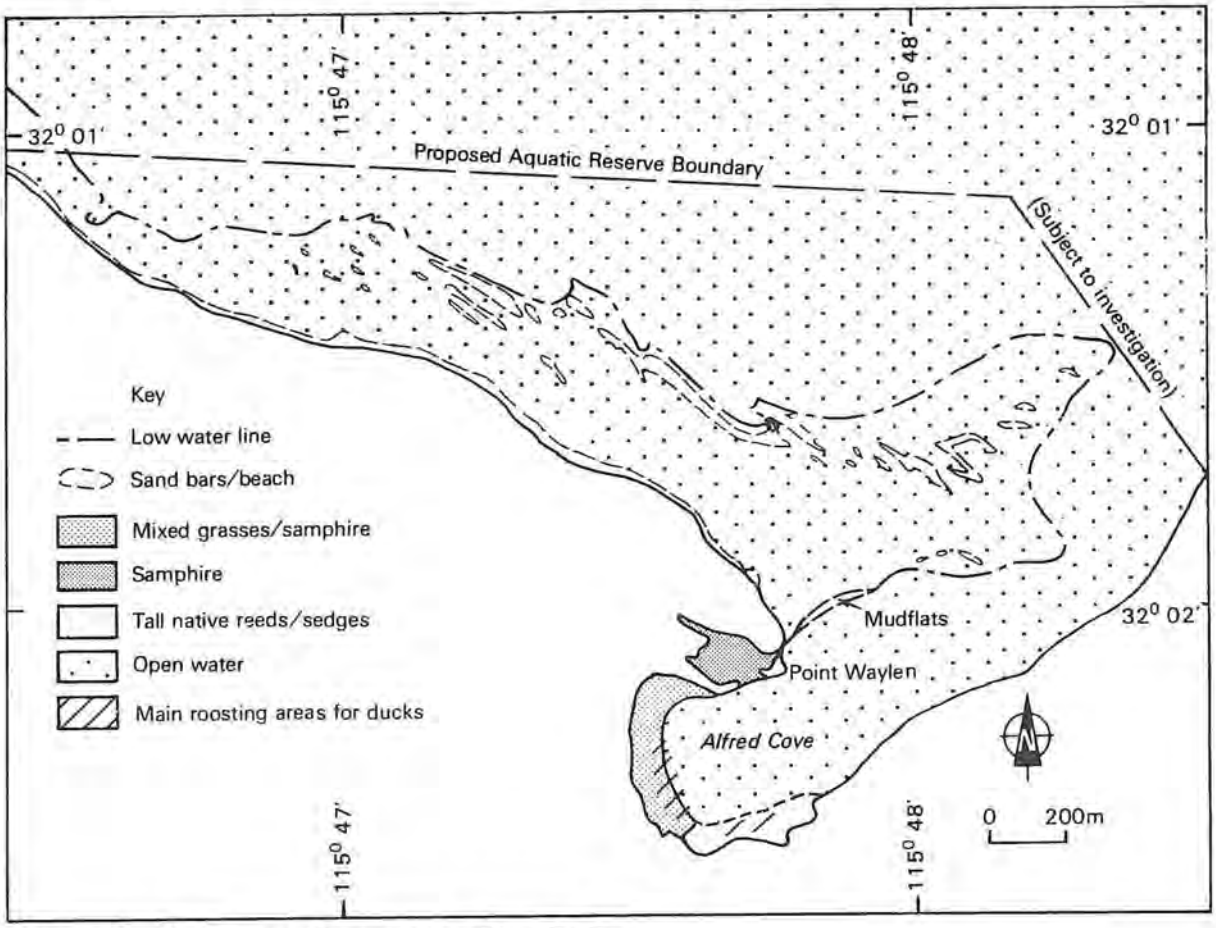

Figure 6. Main roosting areas for ducks.

5.5 FEEDING ZONES

The diversity of birdlife reflects the diversity of habitat. The combination of large trees, shrubs, marsh, grasslands, mud flats and open water provides optimum feeding, roosting and breeding opportunities for many species. Nevertheless it is the extensive mud flats which are the most important facet of the area.

The Point Waylen mud flats provide feed for the highest number of birds and the greatest diversity of species on the whole of the Swan River. Thousands of birds (1 000-10 000) regularly feed on the exposed mud flats. Feeding also takes place within the samphire areas of Alfred Cove and on the open waters (see Figure 7).

The mud flats of the Point and Cove provide high counts of macrobenthic invertebrate fauna - essential prey for migratory waders. Of thirteen transects sampled by Wallace[4], it was found that Alfred Cove showed the highest density recorded for a single species - 36 500 per square metre of the small polychaete, *Capitella capitata*. The area also had the highest density for total individuals for all species - 79 000 (±6 500) per square metre. Other areas surveyed were the Como foreshore and Pelican Point.

Alfred Cove is known to be the last significant refuge on the Swan River of the Greenshank and studies of the similar species Redshank showed that this bird required some 40 000 *Corophium* a day[5]. Alfred Cove produces 20 000 per square metre of this animal alone[4]. The high density of prey available over a wide expanse of tidal flats is conducive to a variety of species and these are able to feed at different depths, using their own highly developed techniques, and so avoiding competition.

Photograph 3. Buff-banded Rail crossing to a feeding area at Alfred Cove (P Howden).

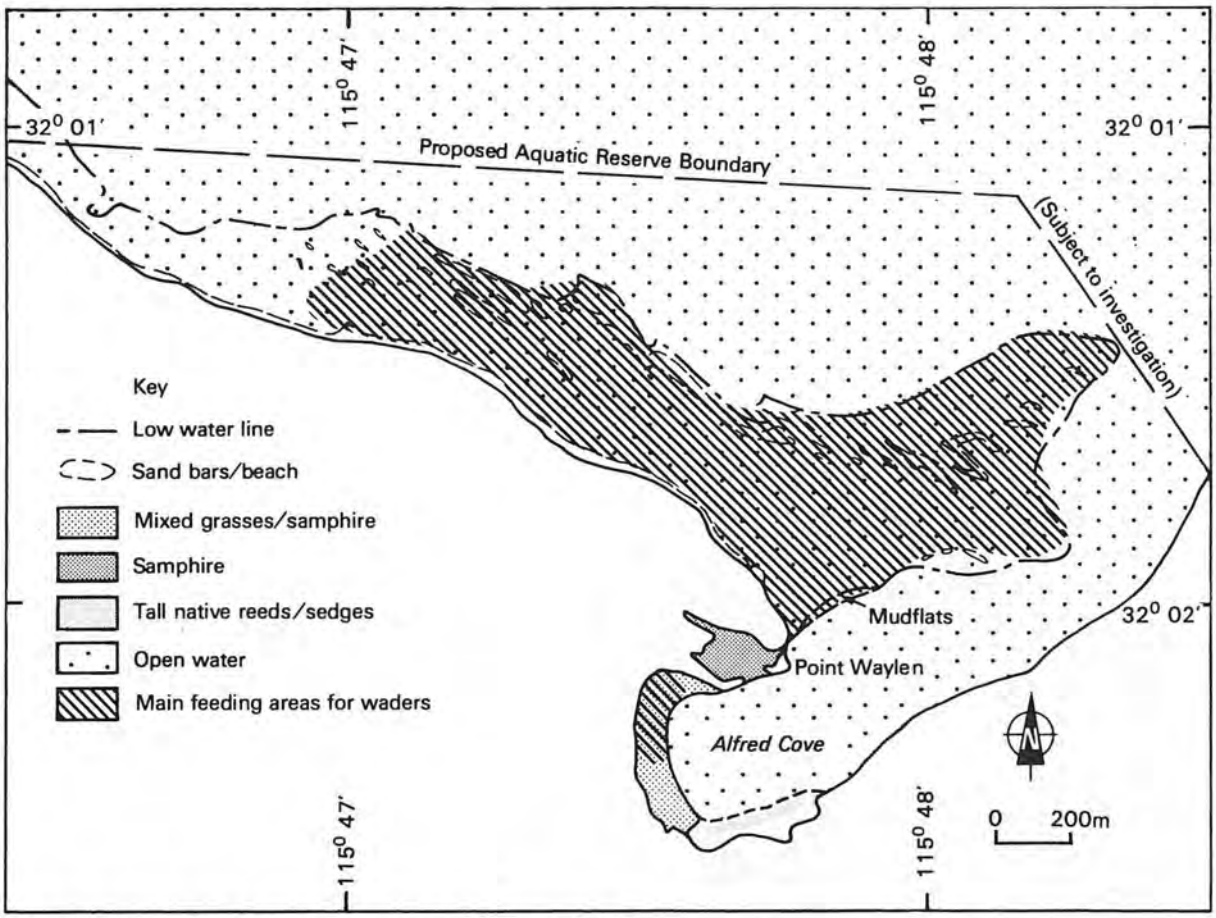

Figure 7. Main feeding areas for waders.

Waders utilize the area extensively on their southern passage when the lakes to the south of the Swan River are full, and again prior to the northern passage when the lakes have dried out. It is vital that migratory species find high concentrations of prey on arrival so as to restore body fats lost on their long passage. This enables them to start moulting - a process they

Photograph 4. Red-necked Stints feeding at Pt Waylen (P Howden).

must complete before their northbound passage takes them out of the southern hemisphere. In addition large amounts of body fat need to be accumulated for the northward passage to provide the required energy levels. It is during the months of August to November that birds need to put on fat the most, and require extensive and productive feeding grounds and secure, undisturbed roosting sites. Such sites are rapidly diminishing in the south-west.

Migratory waders may be found to gather in numbers in the area between September and March. A few first year birds generally remain through the winter months. The largest numbers of waders are usually recorded between December and February. It is known that waders occurring at Alfred Cove also frequent Pelican Point, Milyu Nature Reserve, Point Dundas, Forrestdale Lake and Rottnest Island.

Photograph 5. Sacred Ibis feeding on sand bar at Pt Waylen (P Howden).

5.6 PASSAGE

Birds in the area may be considered to be:

. international migratory,
. migratory,
. nomadic, or
. sedentary (ie no movement).

The large numbers of species seen and their rapid turnover suggests that the area is a staging site. Much is now known about the intercontinental migratory waders and the other wetland birds, but little is known about the passage of migrating and nomadic passerines or about the dispersal of young birds.

Nevertheless, a reasonable hypothesis may be established to show that passerines utilise the riverbank vegetation in their migrations north-south and in seasonal dispersion/nomadism. Sightings of the Red-capped Robin, White-fronted Chat, Pallid Cuckoo, Sacred Kingfisher and Osprey may indicate movements of birds along the river to and from Rottnest Island. However it is stressed that such sightings are in no way conclusive and are merely the considered thoughts of the author. Movements up and down the river of Silver Gull, cormorant species and tern species are regularly observed.

5.7 INTERNATIONAL PROTECTION AGREEMENTS

International protection agreements have been established between Australian and Japan and China to protect migratory birds and their habitats:

. agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (signed 6 February 1974); and

. agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment.

These agreements essentially cover the same points. Thirty species detailed by the agreements and recorded at Alfred Cove-Point Waylen are listed in Appendix 2.

6. HABITAT

For such a small area there is a wonderful diversity of habitat which is reflected in the extensive species list (see Appendix 4). The habitat broadly consists of open waters, marsh, mud flats, grasslands and treed areas (see Figure 2). Pertinent factors influencing the marshes and mud flats are salinity and drainage, and soil (waterflow-erosion and deposition).

6.1 TREED AREAS

A detailed survey of all the trees in the area has not been conducted. However the wide variety of bush birds recorded reflects the importance of the treeline in particular. It may be that the treeline forms a corridor for those species which are nomadic. Particularly attractive to bush birds are

Photograph 6. Greenshank - protected under international agreements (P Howden).

the Flooded Gums. Many trees are threatened by soil drainage and by having been cut or poisoned to provide a clear view of the river for local residents.

6.2 MARSH

The Cove has enjoyed a significant increase in the samphire cover. Similarly the rush *Juncus kraussii* has increased on the southern bank and along the drainage ditch to the north of the DCA antenna farm. However the four drains which flow into the marsh are highly detrimental to the area. Drains are dividing the marsh. The encroaching banks, which are the result of dredging, are forming barriers to the native rushes and are being colonized by introduced *Typha*, bamboo species and grasses.

6.3 INTRODUCED PLANTS

There are many introduced species within the Cove. Several partially successful attempts have been made to clear introduced species but the problem remains.

6.4 GRASSLAND

The dominant grasslands are the public open space, between the treeline and the Swan River, known as Troy Park.

6.5 MUD FLATS

The flats are most extensive during low tides in the summer months. At high tide there are only small pockets of exposed silt during summer and usually no exposure in winter. The flats off Point Waylen are typical river silts and sand. Several banks have been created by dredging. Within the Cove deposition has created a layer of fine silt. The flats in the Cove which are covered by samphire show salt encrustation through the summer months.

Photograph 7. Paperbarks fringe the wetland (CALM).

6.6 OPEN WATER

Birds use the open waters off the point as well as those within the Cove itself. During winter storms birds often shelter within the protected Cove.

6.7 FACTORS INFLUENCING THE MARSHES AND MUD FLATS

. SALINITY AND DRAINAGE

The influence of freshwater recruitment rates and salinity from sea water[7] on the Swan River have been studied extensively. J Gentilli describes the interaction of sea water and fresh water[6]. The Swan River has a low tidal range but water levels may occasionally flood the samphire in the Cove. When strong sea breezes force water into the system and there is a strong freshwater flow to the sea, a resultant flooding may ensue. At such times the Cove is flushed with relatively fresh

waters. Conversely, the summer months experience increasing easterly winds and low freshwater recruitment rates. At such times the mud flats are exposed and provide suitable feeding grounds for waders.

In summer months the waters within the samphire areas of the Cove are extremely saline[7]. Salinity of water at this time is higher than in the Swan River and also higher than that of coastal waters.

The high salinity may be an important factor in the balance of plants and animals which require such habitat and therefore any influences which might alter the salinity should be assessed carefully. Drainage systems introducing fresh water into the system should be assessed for their potential to destabilize the area. At present there are four drains into the area (see Figure 1).

. SOIL - WATERFLOW EROSION AND DEPOSITION

The natural flow of water within the Cove is anticlockwise (see Figure 1) and erosion is therefore strongest on the western bank and deposition greatest on the southern bank. Erosion has been evident for several years along the western and northern banks with the additional influence of bait diggers breaking down the banks and destroying samphire root systems. Digging is often very obvious and certainly a destabilizer.

7. PEOPLE INFLUENCE

The proximity to housing inevitably results in considerable interaction between people, their dogs and recreational equipment, and the area. The area is affected to varying degrees by domestic pets, despoliation of trees and shrubs, rubbish, garden refuse, bait diggers and prawners, commercial fishermen, cars and bikes, boating, noise, artificial lighting, cycleways, drainage systems and spraying.

Photograph 8. Adjacent residential areas influence Alfred Cove (CALM).

Of these, dogs (which are allowed or encouraged to harass birdlife), prawners and bait diggers, garden refuse, clearing of trees and bushes, and the drainage systems have the most detrimental influence on the area.

It is not thought that the cycle path or noise pollution are particularly detrimental to the area. The effects of artificial lighting are not known.

Actual intrusion rates by dogs and people into the area are not known and it is strongly recommended that such data be obtained (with similar data for the Pelican Point roost) to aid management strategies for this and other reserves.

Photograph 9. Cyclist enjoys the Alfred Cove foreshore (CALM).

8. REFERENCES

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SPECIES LIST FOR ALFRED COVE-POINT WAYLEN

Rare Few sightings, ie 1-6 birds or seen on very few occasions (eg Fork-tailed Swift - 200+ birds seen once)

Common The species may be easily observed in its regularly observed season

Uncommon May be seen occasionally

Dispersal Term confined in this report to passerines - indicates that birds were thought to be passing through (seasonal dispersion)

Regular Seen most years

Breeds? Breeding unrecorded but further investigation may possibly show breeding takes place

Breeds/ Breeding Breeding known to have taken place

Great Crested Grebe	rare
Hoary-headed Grebe	common
Australian Grebe	rare
Australian Pelican	common
Darter	uncommon
Pied Cormorant	common
Little Pied Cormorant	common
Great Cormorant	common
Little Black Cormorant	common
Pacific Heron	rare
White-faced Heron	common
Great Egret	common
Cattle Egret	rare
Rufous Night Heron	rare
Sacred Ibis	common
Straw-necked Ibis	rare
Yellow-billed Spoonbill	rare/regular
Black Swan	common
Australian Shelduck	common - breeding
Pacific Black Duck	common - breeding
Grey Teal	common
Chestnut Teal	rare/regular
Blue-billed Duck	rare
Australasian Shoveler	uncommon
Hardhead	uncommon
Maned Duck	rare
Musk Duck	uncommon
Osprey	uncommon/regular
Black-shouldered Kite	common
Whistling Kite	rare
Brown Goshawk	uncommon
Collared Sparrowhawk	uncommon
White-bellied Sea-Eagle	rare
Little Eagle	rare
Marsh Harrier	rare

SPECIES LIST FOR ALFRED COVE-POINT WAYLEN (contd)

Peregrine Falcon	rare
Australian Hobby	uncommon/regular
Australian Kestrel	common
Quail species	? - several sightings
Buff-banded Rail	common - breeds?
Spotless Crake	common - breeds?
Purple Swamphen	rare - increasing?
Australian Crake	rare
Eurasian Coot	rare
Banded Lapwing	rare
Pied Oystercatcher	uncommon
Grey Plover	common
Lesser Golden Plover	uncommon/regular
Red-kneed Dotterel	uncommon
Hooded Plover	rare
Large Sand Plover	rare/regular
Red-capped Plover	common - breeding
Black-fronted Plover	rare
Black-winged Stilt	common - breeds
Banded Stilt	uncommon/regular
Red-necked Avocet	common
Ruddy Turnstone	rare
Eastern Curlew	rare
Whimbrel	rare
Wood Sandpiper	rare
Grey-tailed Tattler	uncommon/regular
Common Sandpiper	common
Greenshank	common
Marsh Sandpiper	rare
Terek Sandpiper	rare/regular
Black-tailed Godwit	rare/regular
Bar-tailed Godwit	common
Red Knot	common
Great Knot	common
Sharp-tailed Sandpiper	common
Pectoral Sandpiper	rare/regular
Red-necked Stint	common
Long-toed Stint	rare
Curlew Sandpiper	common
Sanderling	rare/regular
Broad-billed Sandpiper	rare
Ruff	rare
Silver Gull	common
Whiskered Tern	rare/regular
White-winged Tern	rare
Arctic Tern	rare
Gull-billed Tern	rare
Caspian Tern	common
Roseate Tern	rare
Fairy Tern	common - attempted breeding?
Crested Tern	common
Domestic Pigeon	common - breeds
Spotted Turtle-Dove	uncommon
Laughing Dove	common - breeds
Musk Lorikeet	extinct? - has bred

SPECIES LIST FOR ALFRED COVE-POINT WAYLEN (contd)

White-tailed Black Cockatoo	uncommon
Galah	common - breeds
Rainbow Lorikeet	rare
Red-capped Parrot	uncommon
Port Lincoln Parrot	common - breeds
Budgerigar	(escapee?)
Pallid Cuckoo	uncommon - dispersal?
Fan-tailed Cuckoo	rare - dispersal?
Fork-tailed Swift	rare
Sacred Kingfisher	uncommon - dispersal?
Laughing Kookaburra	uncommon/regular
Rainbow Bee-eater	common - breeds
White-backed Swallow	rare
Welcome Swallow	common - breeds
Tree Martin	common - breeds
Richard's Pipit	common - breeds
Black-faced Cuckoo-Shrike	uncommon - regular/breeds
White-winged Triller	rare - dispersal?
Clamorous Reed Warbler	rare - has bred?
Little Grassbird	uncommon - has bred
Rufous Songlark	rare - dispersal?
Brown Songlark	rare - dispersal?
Western Thornbill	rare
Yellow-rumped Thornbill	common - breeds
Weebill	rare
Red-capped Robin	rare - dispersal
Grey Fantail	common
Willy Wagtail	uncommon/regular
Rufous Whistler	common - breeds
Varied Sittella	common - breeds
Rufous Treecreeper	rare - dispersal?
Striated Pardalote	common - breeds?
Mistletoe Bird	uncommon
Silvereye	common - breeds?
Brown Honeyeater	common - breeds?
Singing Honeyeater	common - breeds
Red Wattlebird	common - breeds
White-fronted Chat	uncommon - regular/dispersal?
Magpie-Lark	uncommon/regular - breeds?
Grey Butcherbird	rare
Australian Magpie	common - breeds
Australian Raven	common - breeds

TOTAL SPECIES LIST = 132

SPECIES FOR ALFRED COVE-POINT WAYLEN ON JAMBA AND CAMBA LIST

Great Egret
Cattle Egret
Grey Plover
Lesser Golden Plover
Large Sand Plover
Ruddy Turnstone
Eastern Curlew
Whimbrel
Wood Sandpiper
Grey-tailed Tattler
Common Sandpiper
Greenshank
Marsh Sandpiper
Terek Sandpiper
Black-tailed Godwit
Bar-tailed Godwit
Red Knot
Great Knot
Sharp-tailed Sandpiper
Pectoral Sandpiper
Red-necked Stint
Long-toed Stint
Curlew Sandpiper
Sanderling
Broad-billed Sandpiper
Ruff
White-winged Tern
Arctic Tern
Caspian Tern
Fork-tailed Swift

TOTAL SPECIES LIST = 30

SPECIES BREEDING LIST FOR ALFRED COVE-POINT WAYLEN

Species which have been observed conducting breeding activities (eg mating, nest material gathering, young runners) for which no actual nest have been observed are noted as:

Australian Shelduck	breeds
Pacific Black Duck	breeds
Buff-banded Rail	breeds
Spotless Crake	breeds?
Red-capped Plover	breeds
Black-winged Stilt	breeds
Fairy Tern	breeding?
Domestic Pigeon	breeds
Laughing Dove	breeds
Musk Lorikeet	extinct? - has bred
Galah	breeds
Port Lincoln Parrot	breeds
Rainbow Bee-eater	breeds
Welcome Swallow	breeds
Tree Martin	breeds
Richard's Pipit	breeds
Black-faced Cuckoo-Shrike	breeds
Clamorous Reed Warbler	has bred?
Little Grass-bird	breeds
Yellow-rumped Thornbill	breeds
Rufous Whistler	breeds?
Varied Sittella	breeds
Striated Pardalote	breeds?
Silvereye	breeds?
Brown Honeyeater	breeds?
Singing Honeyeater	breeds
Red Wattlebird	breeds
Magpie-Lark	breeds?
Western Magpie	breeds
Australian Raven	breeds

TOTAL SPECIES LIST 30

ALFRED COVE - PRINCIPAL VEGETATION FORMS

Samphires and succulents - see Figures 2 and 3

Large succulent	*Halosarcia indica* to 0.8 m
Medium succulent	*Halosarcia halocnemoides* to 0.4 m
Prostrate Samphire	*Sarcocornia quinqueflora* - forms a low closed heath to 0.2 m
Red Samphire	*Suaeda australis* (succulent) - found in low closed heath of *Sarcocornia*
Pigface	*Carpobrotus edulis*

Rushes

Shore Rush	*Juncus kraussii* - Black Grass
Bulrush	*Typha orientalis*
Bulboschoenus Rush	*Bulboschoenus caldwellii*

Trees

Flooded Gum	*Eucalyptus rudis* (this is the dominant species)
Swamp Paperbark	*Melaleuca raphiophylla* (important second growth)
Sheoak	*Casuarina obesa* (tree/bushes forms lower story)

Introduced species

Grasses	Several types of lawn grasses
Bamboo	
Castor Oil Plants	Through the back of the Cove
Pampas Grass	Some eradication of larger clumps has been successful
Pepper Trees	Spreading through the back of the Cove
Lily species	Garden flowers of this type are most likely the result of locals disposing of garden waste in the Cove

Attempts at re-afforestation have been made using introduced species of eucalypt.

Field identification made by S Keeling and L Pen.