Swan Estuary Marine Park and Adjacent Nature Reserves

Management Plan 1999–2009

MANAGEMENT PLAN N0 41

Department of Conservation and Land Management

National Parks and Nature Conservation Authority

MPRA Marine Parks & Reserves Authority

Marine Parks and Reserves Authority

MANAGEMENT PLAN

Swan Estuary Marine Park
and
Adjacent Nature Reserves

1999 - 2009

Department of Conservation and Land Management
for the
Marine Parks and Reserves Authority
and
National Parks and Nature Conservation Authority
Perth, Western Australia, 1999

PREFACE

Marine Parks and Nature Reserves are subject to the *Conservation and Land Management Act 1984* (CALM Act) and vested in the Marine Parks and Reserves Authority (MPRA) and the National Parks and Nature Conservation Authority (NPNCA), respectively. Marine Parks and Nature Reserves are managed on behalf of the relevant authority by the Department of Conservation and Land Management (CALM).

The NPNCA and MPRA are responsible for preparing management plans for all waters and lands that are vested in them. Plans are prepared by CALM and released as drafts for public comment. The draft of this management plan was prepared for the NPNCA by CALM and released for public comment prior to the transfer of vesting of the marine park to the MPRA on 29 August 1997. After consideration of public comment the NPNCA and MPRA submit plans to the Minister for the Environment for approval. In the case of management plans for marine parks, the plans are first submitted to the Minister for Fisheries with respect to fishing and related activities, and the Minister for Mines with respect to petroleum exploration and production and mining activities.

The Planning Team was established to prepare the management plan for the Swan Estuary Marine Park and adjacent Nature Reserves. It comprised representatives from CALM, Fisheries WA, Department of Transport, Swan River Trust and local government.

Any name included on maps or within the text does not necessarily imply approval of the name by the relevant nomenclature authority.

ACKNOWLEDGMENTS

This management plan was prepared for the NPNCA and MPRA by the Swan Estuary Marine Park and Adjacent Nature Reserves Planning Team including members of CALM (Chris Portlock - Plan Coordinator, Peter Dans, Lyndon Mutter, John Edwards, Rob Towers, Kevin Crane and Tania Jackson, as well as other members of key agencies including Laurie Caporn (Fisheries WA), John Brooker (Dept of Transport, Maritime Division) and Daryl Miller (Swan River Trust).

Local Government representatives also played an important role in the final plan including Mark Street (Melville), Megan Bartlett (Subiaco), Suzanne Fielding (Nedlands) and Mark Taylor (South Perth). Maps were prepared by Rod Properjohn from CALM's Geographical Information Services Section, and Alan Wicks formerly of CALM's Recreation, Planning and Site Design Section.

The Planning Team would like to acknowledge individuals past and present for their involvement and input while preparing this management plan and those who contributed submissions during the preparation of this plan.

KEY STRATEGIES

Marine parks and nature reserves are managed for conservation of marine habitats, recreation and nature conservation, scientific study and preservation of features of archaeological, historic or scientific interest. The key strategies for the Swan Estuary Marine Park and Adjacent Nature Reserves Management Plan are listed below. Page numbers refer to the location of the relevant section in the body of the Plan.

TENURE AND BOUNDARIES

- Identify and map areas of low lying vegetation such as samphire flats important for waders and waterbirds in the Marine Park, and seek MPRA and NPNCA endorsement to extend the three land-based reserves from high water mark to include these areas.

ZONING

- Survey and mark reserve boundaries and zone boundaries on the land and in the estuary and implement the zoning scheme.

FLORA, FAUNA AND HABITAT

- Monitor benthic fauna to assess any impact from trampling, particularly within the wildlife protection special purpose zone.

WADERS AND OTHER WATERBIRDS

- Minimise disturbance to principal wader resting sites.
- Prevent disturbance of waders and other waterbirds and their habitat by dogs and cats.

ESTUARINE PROCESSES AND WATER QUALITY

- Maintain only the minimal number of fully functional drainage lines to reduce the growth of freshwater-dependant weeds in land reserves.

REHABILITATION

- Develop a rehabilitation program for each of the three locations to remove weeds, excess landfill and introduced species in conjunction with the planting of local species.
- Adopt a staged approach to rehabilitation programs to protect and enhance local vegetation and landscape values.

PETS AND FERAL ANIMALS

- Inform visitors and neighbours living near the reserve system about the negative impacts of pets, emphasising that pets are not permitted in the reserve system.

PRAWNING AND CRABBING

- Evaluate the impact of prawn and crab fishing on the conservation values of the reserve system (particularly in relation to disturbance of waders, waterbirds and the impact on benthic fauna) and restrict fishing activities where unacceptable impacts are observed. Involve Fisheries WA and recreational fishing interest groups in the evaluation process.

BOATING AND SURFACE WATER SPORTS

- Gazette the majority of the Marine Park as an 8 knot speed limit area.

DAY-USE, ACCESS AND NATURE WALKS

- Provide an Information Shelter opposite Haig Road in the area of vegetation near the dual-use path as shown in Map 5B.
- Extend fencing of Alfred Cove to enclose Alfred Cove and Point Waylen. Provide for management access and install a self closing gate for boardwalk access.

COMMUNITY INVOLVEMENT

- Support and integrate programs that involve community organisations, educational groups and volunteers in managing and monitoring flora, fauna and water quality in the reserve system and in surrounding areas.

COMMERCIAL FISHING

- Ensure that commercial net fishing has a minimal impact on other park values.

COMMERCIAL CONCESSIONS

- Ensure that revenue to CALM from licensed commercial operations contributes to management of the reserve system.

STRUCTURES, FACILITIES AND DEVELOPMENTS

- Monitor the impact of current moorings on seagrass beds and prohibit the construction of new moorings.

GOVERNMENT LANDS AND WATERS

- Seek local government and State Government agencies' support for the complementary management of areas near or adjacent to the reserve system.

NATURE CONSERVATION

- Encourage and support research by government agencies, volunteer organisations and educational institutions.

PLAN MONITORING AND REVIEW

- Assist the MPRA and NPNCA to monitor the Plan's implementation.

CONTENTS

INTRODUCTION

1. OVERVIEW

The Swan Estuary Marine Park and Adjacent Nature Reserves is comprised of estuarine lands and waters within the Swan River at Alfred Cove, Milyu and Pelican Point (Map 1). The Marine Park and Pelican Point are vested in the MPRA and the two other land areas adjacent to the Marine Park are vested in the NPNCA. All lands and waters are managed by CALM.

These three areas provide important feeding habitats for transequatorial migratory wading birds protected by agreements Australia has with Japan and China. Waders and waterbirds move between Alfred Cove, Pelican Point and Milyu on a daily basis. The sand flats, mud flats and beaches at these three locations provide the only remaining significant feeding and resting areas (mainly during periods of high tide) in the Swan Estuary. The Park and adjacent reserves also provide habitat for a diverse assemblage of aquatic and terrestrial flora and fauna (See Section 10).

The high conservation value and diversity of the Marine Park has educational and interpretive value, particularly as it is located within the Perth metropolitan area.

Passive and active recreational activities in the Park cater for the local community as well as national and international visitors. Pressure in the Park is increasing and the need to protect important wader and waterbird habitats becoming more important.

Limited commercial and recreational fishing will continue in the Park and be regulated under the *Fish Resources Management Act 1994* and managed in consultation with Fisheries WA. The Park will be managed for the multiple purposes of conservation, recreation, education, scientific study and commercial and recreational fishing. Given the Marine Park's location and projected recreational and nature-based tourism demands for the City of Perth, management should emphasise the Park's conservation and education values.

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2. VALUES

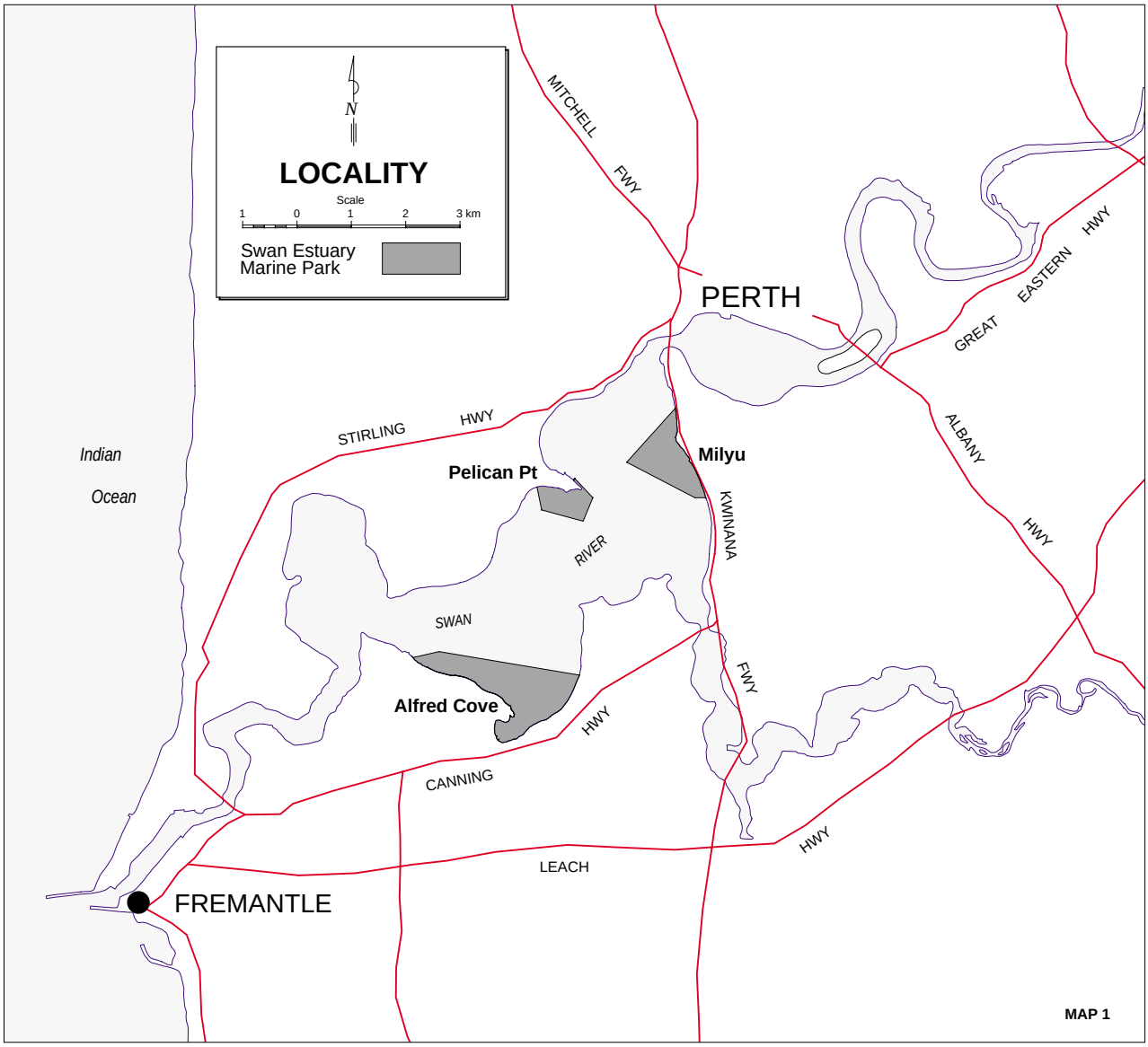
Conservation Values
- Important feeding habitats for internationally protected, transequatorial migratory wading birds.
- Rich and diverse estuarine and terrestrial communities and habitats.
- Feeding, resting and breeding habitat for fauna, such as fish species and waterbirds
- Relatively undisturbed native vegetation and geomorphology.
- Visual landscape values.
- Benthic fauna and seagrass beds that contribute to energy flows, primary production, species diversity and river floor stabilisation.

Recreational Values
- An aquatic and terrestrial environment that offers recreational activities, including bird watching, sightseeing, artistic pursuits, windsurfing and boating.
- An estuarine habitat that supports a resource for recreational fishing.
- An aquatic environment generally suitable for hire and instruction for aquatic sports.

Commercial Values
- An estuarine habitat that supports commercial net fishing.
- Commercial tour opportunities based on wildlife observation and natural and cultural history.

Educational and Historical Values
- School groups, tertiary institutions and outdoor organisations use the reserve system for educational purposes, such as intertidal biology and waterbird studies and history studies of the Swan River region.
- Display and interpretation opportunities for cultural and natural history.

Research Values
- Internationally important waterbird populations that are close to the city.
- Three relatively healthy ecosystems that serve as important reference areas for broader studies in the Swan and Canning River system.
- The diversity of terrestrial and estuarine habitats and the use of these areas by birds and juvenile fish make the reserve system well suited to continued research by tertiary institutions, government agencies, volunteer organisations and individuals.


N
LOCALITY
Scale
1 0 1 2 3 km
Swan Estuary
Marine Park
MITCHELL
FWY
PERTH
GREAT
EASTERN
HWY
STIRLING
HWY
Indian
Ocean
Pelican Pt
Milyu
KWINANA
FWY
ALBANY
HWY
RIVER
SWAN
Alfred Cove
HWY
CANNING
HWY
LEACH
FREMANTLE
MAP 1

3. COMMUNITY INVOLVEMENT IN THE DRAFT PLAN

Community Input

- Public submissions were invited through State and local newspapers during the Draft Plan's preparation.
- A survey in the Spring of 1993 identified the main issues, public perceptions and public expectations of park management (Table 1).
- Interested individuals and groups discussed their concerns with the Planning Team.
- Local, State and Commonwealth government officers were consulted.
- Written submissions as well as issue surveys were received from a number of groups and individuals before the Draft Plan was prepared.
- Submissions received in response to the published notice of intent to create the marine park were considered during the Draft Plan's preparation.
- The Draft Plan was released for a public comment period. All submissions were analysed and changes made where appropriate to produce this plan (see Analysis of Public Submissions)

All respondents who addressed issues related to dogs and cats, jet skiing and prawning felt that these activities should be excluded from the reserve system. The majority in other categories indicated that they would like to see more signs and public education, boating and moorings restricted and drainage rationalised. Views on commercial fishing and windsurfing in the Park were divided on allowing these activities to continue, allowing them in specific areas, or excluding them altogether.

Table 1.

ISSUE SURVEY RESULTS

Issue	No. of Responses on the Topic
Commercial Fishing	12
Jet Skiing	10
Cats and Dogs	10
Boating	10
Windsurfing	6
Drainage	6
Prawning	5
Information and Education	5
Other	9

PRINCIPAL MANAGEMENT DIRECTIONS

4. POLICIES AND GOALS

This Management Plan is based on MPRA, NPNCA, CALM and Fisheries WA policies derived principally from the CALM Act, the *Wildlife Conservation Act 1950* and the Fish Resources Management Act.

The management goals for this reserve system cover the major management issues and form the basis for the structure of this management plan with objectives in each of the sections of the plan.

MANAGEMENT GOALS

Conservation
Conserve biological, physical, cultural and scenic values.

Recreation
Facilitate public enjoyment of natural and cultural values in a manner compatible with conservation of the environment and in a manner that minimises conflict between users.

Community Relations
Promote awareness, appreciation and understanding of natural and cultural values and facilitate liaison with the community.

Commercial and Other Uses
Manage commercial and other uses in a manner that minimises impact on other values.

Interaction with Nearby Lands and Waters
Promote cooperation and minimise conflicts in matters associated with use of nearby lands and waters.

Research and Monitoring
Seek a better understanding of the natural and cultural environment and the impacts of visitor use and management activities.

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5. TENURE AND BOUNDARIES

The objectives are to:

- *Ensure that the gazetted purpose, vesting and tenure of the Park, adjacent CALM managed reserves and their surroundings protect the reserve system's values.*
- *Incorporate appropriate lands and waters within the reserve system where possible.*

The Swan Estuary Marine Park was reserved on 25 May 1990, as Class "A" Marine Reserve No 4, and vested in the NPNCA. On 29 August 1997 vesting of the Marine Park transferred to the MPRA. It is managed by CALM. The Marine Park is in three sections off the foreshores at South Perth, Alfred Cove and Pelican Point and comprises an area of 340 hectares (Map 2). The three adjacent CALM-managed reserves Alfred Cove (Reserve 35066), Milyu (Reserve 33803) and Pelican Point (Reserve 40891), are all 'A' Class reserves with respective areas of 8.7, 4.4 and 5.5 hectares. The total area covered by this Plan, including the Marine Park, is 358.6 hectares (Map 1).

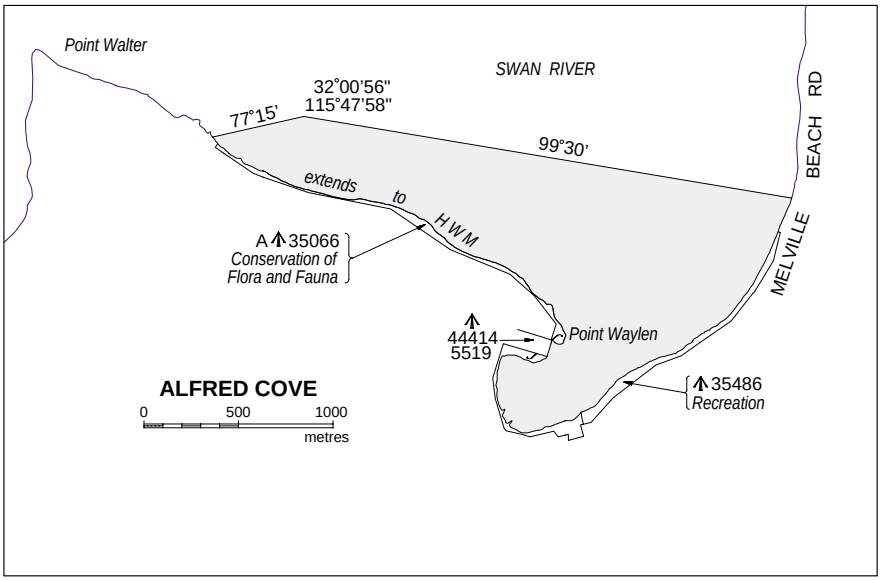
In the early 1970's, the Department of Fisheries and Wildlife identified these three areas as important feeding grounds for protected migratory waterbirds and local resident species. The areas complement each other, depending on tides and weather and are the only three remaining significant wading bird habitats on the Swan River identified in the System Six Report (DCE, 1983). Subsequent to this in 1988, the Swan River Management Strategy Task Force was established and produced the Swan River Management Strategy which recommended management plans be prepared for these three System 6 areas (SRMSTF, 1988).

A marine park is a multiple use area and is reserved 'for the purpose of allowing only that level of recreational and commercial activity which is consistent with the proper conservation and restoration of the natural environment, the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic or scientific interest'. marine parks provide for a range of compatible recreational and commercial uses (see Appendix A).

A nature reserve is established 'to maintain and restore the natural environment, and to protect, care for, and promote the study of, indigenous flora and fauna, and to preserve any feature of archaeological, historic or scientific interest'.

Important conservation areas adjacent to this 'A' class reserve should, wherever possible, be added to the reserve system or managed in a manner compatible with this system. The adjacent location to be investigated as an addition to Alfred Cove Nature Reserve is Reserve 35486 (City of Melville) which is part of the Burke Drive Road Reserve (Map 2). Swan Location 5519 at Point Waylen, currently used for communication purposes, includes a transmission tower and associated facilities, and is also reserved under section 5(g) of the CALM Act to include

TENURE


Point Walter
SWAN RIVER
32°00'56"
115°47'58"
77°15'
99°30'
BEACH RD
extends to HWM
A 35066
Conservation of Flora and Fauna
MELVILLE
44414
5519
Point Waylen
35486
Recreation
ALFRED COVE
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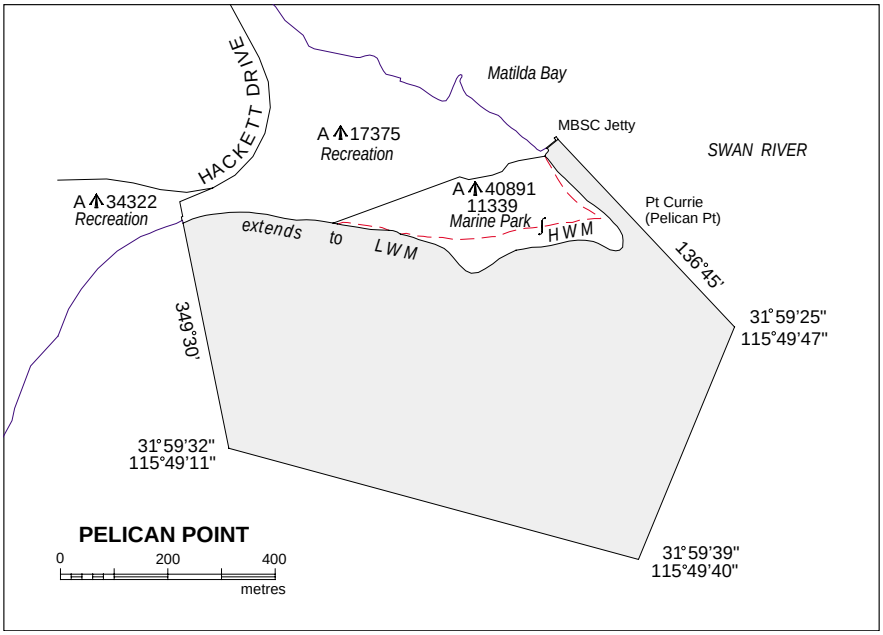
metres


HACKETT DRIVE
Matilda Bay
A 17375
Recreation
MBSC Jetty
SWAN RIVER
A 34322
Recreation
A 40891
11339
Marine Park
HWM
Pt Currie
(Pelican Pt)
extends to LWM
136°45'
349°30'
31°59'25"
115°49'47"
31°59'32"
115°49'11"
31°59'39"
115°49'40"
PELICAN POINT
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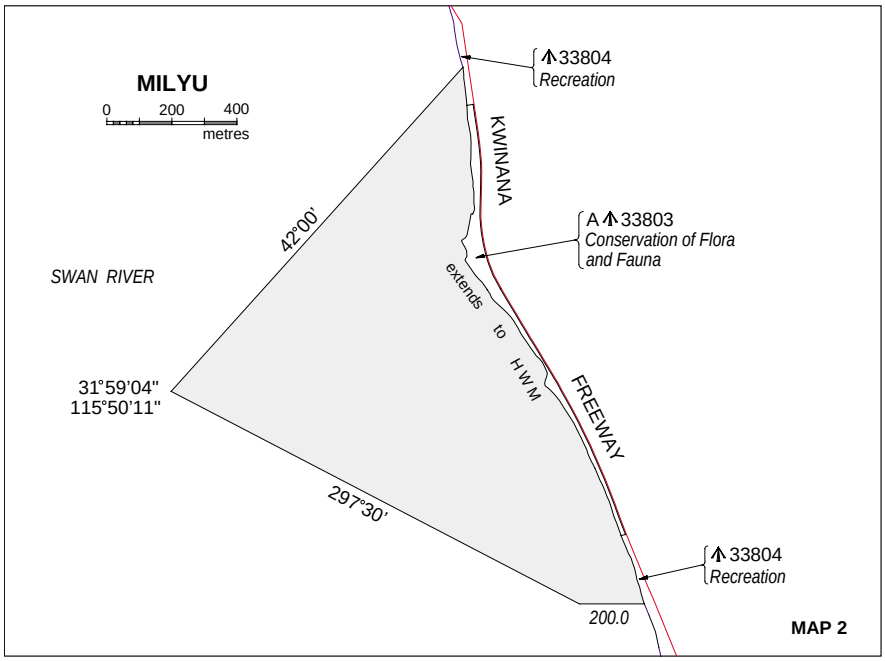
metres


33804
Recreation
MILYU
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metres
KWINANA
42°00'
A 33803
Conservation of Flora and Fauna
SWAN RIVER
extends to HWM
FREEWAY
31°59'04"
115°50'11"
297°30'
33804
Recreation
200.0
MAP 2

communication purposes as well as flora and fauna conservation. When the communications facility is no longer required all infrastructure will be removed, through use of funds acquired from rental of the facility and the area added to the Alfred Cove Nature Reserve. In Alfred Cove consideration should be given to amending the nature reserve boundary to exclude areas of grass and include adjacent areas of native vegetation. Consideration should also be given to restoring areas with native vegetation within the nature reserve that have been cleared, filled or grassed. The nature reserve boundary should be redefined by a fence just inside the dual use path for as much of the boundary as possible (see Section 26).

The Marine Park and adjacent nature reserves will be managed as one unit and the proposed zoning scheme will cover the marine and land area. Alfred Cove and Milyu are nature reserves which extend to high water mark. Pelican Point (previously a 'C' Class nature reserve) currently comprises land reserved as a marine park and extends to the low water mark. Due to the flora and fauna conservation values, all vegetated land within this reserve system is intended to be 'A' Class nature reserve. The intertidal areas adjacent to the land reserves are important feeding grounds for protected migratory waterbirds and local resident species.

It is proposed that Pelican Point become an 'A' Class nature reserve for flora and fauna conservation in keeping with its flora and fauna conservation values. The existing land-based nature reserves should be extended to include low lying vegetation such as samphire flats, important for waders and waterbirds. Other Swan estuarine intertidal areas important for waterbirds with high conservation and recreation value both adjacent to the Marine Park and adjacent to other important foreshore conservation areas should be considered as possible areas for future addition to the reserve system.

STRATEGIES

1. **Identify and map areas of low lying vegetation such as samphire flats important for waders and waterbirds in the Marine Park, and seek MPRA and NPNCA endorsement to extend the three land-based reserves from high water mark to include these areas.**

2. **Assess and document other areas important for waders and waterbirds of high conservation and recreation value and where appropriate add to the Swan Estuary Marine Park, particularly those areas adjacent to the Marine Park or adjacent to important foreshore conservation areas.**

3. **Change the tenure and purpose of the Pelican Point Reserve to 'A' Class nature reserve and extend the land based nature reserve to include any low lying vegetation.**

4. **Add Reserve 35486 and a portion of the Burke Drive Road Reserve to the Alfred Cove Nature Reserve.**

5. **Amend the Alfred Cove Nature Reserve boundaries between areas of grass and native vegetation to better align them with local and State Government management responsibilities.**

6. **Ensure all unnecessary infrastructure in the Point Waylen section 5(g) reserve is removed, using funds acquired from lease of the facility and that this area is incorporated into the Alfred Cove Nature Reserve when the communication facility is no longer required.**

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6. ZONING

The objective is to implement a management zoning system that will protect the reserve system's conservation values and provide for compatible recreation and commercial uses.

While some recreational and commercial uses are permitted in a marine park, it is necessary to ensure conservation values of the Swan Estuary Marine Park are maintained and ensure these uses do not conflict with one another. Recreational uses appear to have the greatest potential to impact on the environment and cause conflict between users in this reserve system.

Management zoning schemes are designed to meet the needs of all Park users in an equitable way, providing for the widest possible range of activities compatible with conservation values. Activities are defined and regulated within each zone. Equity of use is determined through evaluating socio-economic values against conservation requirements.

The zoning scheme has been developed after widespread consultation. Zones within marine parks (see Appendix A) are made classified areas under Section 62 of the CALM Act. Regulations may apply to each zone under the CALM Act or under other Acts such as the Wildlife Conservation Act and Fish Resources Management Act. Two special purpose zones, the Seagrass Habitat Protection and Wildlife Habitat Protection Zones, are prescribed and can be seen on Map 3. Table 2 shows the permitted uses in each zone. When these two zones are classified as special purpose areas under section 62 of the CALM Act, a declaration will be made about the

incompatibility of the uses not permitted with the conservation purpose of the zones.

Seagrass Habitat Protection Zone
The seagrass protection zone provides for commercial and recreational uses consistent with the need to conserve seagrass beds (see Table 2). Conservation implies fishing within the sustainable limits of natural resources.

Wildlife Habitat Protection Zone
Areas have been designated a wildlife habitat protection zone to protect important waterbird feeding and resting sites, including those used by protected transequatorial migratory waders. It will also include areas of habitat identified as fish nursery grounds. Wildlife protection (in particular waders and waterbirds) is a central conservation focus for the Marine Park and the primary reason for the Park being established. This wildlife habitat protection zone is mainly comprised of sand and mud flats. Therefore, only uses compatible with habitat protection will be allowed. The zone will exclude spearfishing for cobbler, motorised craft (including remote control), swimming or boat mooring. The location of the zone is shown on Map 3.

Limited commercial net fishing is allowed in this zone. Commercial activities permitted in the Park are closely monitored and controlled through a limited number of commercial licenses being issued and stringent operating conditions associated with the licenses (see Table 2).

Nature Reserves
The CALM managed terrestrial reserves at Alfred Cove, Pelican Point and Milyu have significant conservation value for flora and fauna and, in particular, for birds and their habitat. These land-based reserves will be managed as nature reserves from the landward boundary to the vegetation line. The reserves include important nesting sites for birds and complex wetland ecosystems important for scientific study and education. The shallows in these area are recognised as important feeding grounds for waterbirds, including migratory species protected under international treaties. Management of these reserves will include limited access arrangements at Pelican Point, which was formerly a 'C' Class nature reserve, is presently marine park and is now proposed as an 'A' Class nature reserve. Management will be consistent with management of other 'A' Class nature reserves using regulations already in place for this reserve category. Passive recreational uses such as nature appreciation, bird watching, scientific study and education are permitted. Pets, including cats and dogs, are excluded from the reserve system as they can have a devastating impact on conservation values. The low lying samphire vegetation in the Marine Park, adjacent to the land-based reserves, will become part of the nature reserves.

General
The majority of the Marine Park will be gazetted as an 8 knot speed restriction zone under the *Marine Act 1982* (Appendix B). Jet skis (personal watercraft) however are prohibited from all waters of the Swan Estuary Marine Park via a notice published in the Government Gazette on 12 May 1998. Signposting, community education and enforcement programs will be implemented to ensure compliance. The speed restriction aims to protect the conservation values of the park and to ensure safe and enjoyable recreational opportunities for all users.

Research is subject to permit and extractive or manipulative research techniques will be permitted only under strict conditions. Access may be prohibited or restricted for a specified time in the case of special natural events such as wildlife breeding, where protection is required or in the case of an event where access may be dangerous. Applications for commercial activities (other than fishing) such as tours and organised sporting events, will be assessed on a case by case basis.

The zoning scheme may be reviewed as more information becomes available.

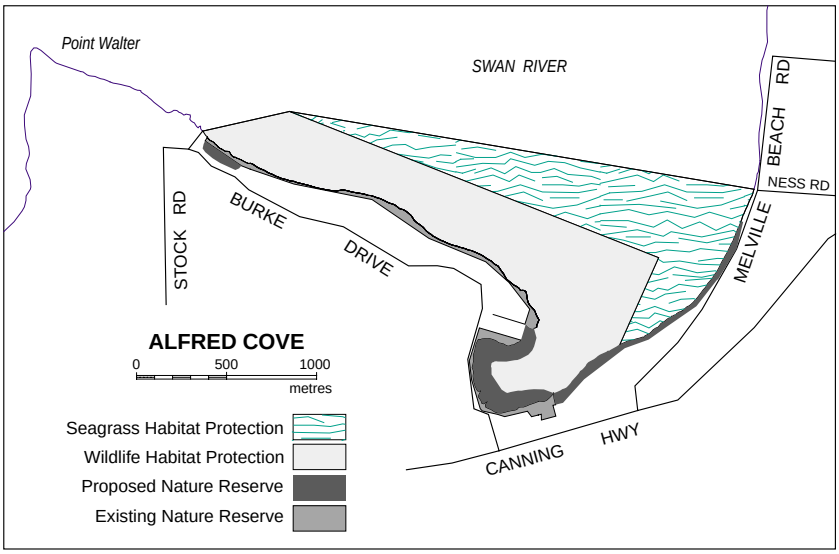
STRATEGIES

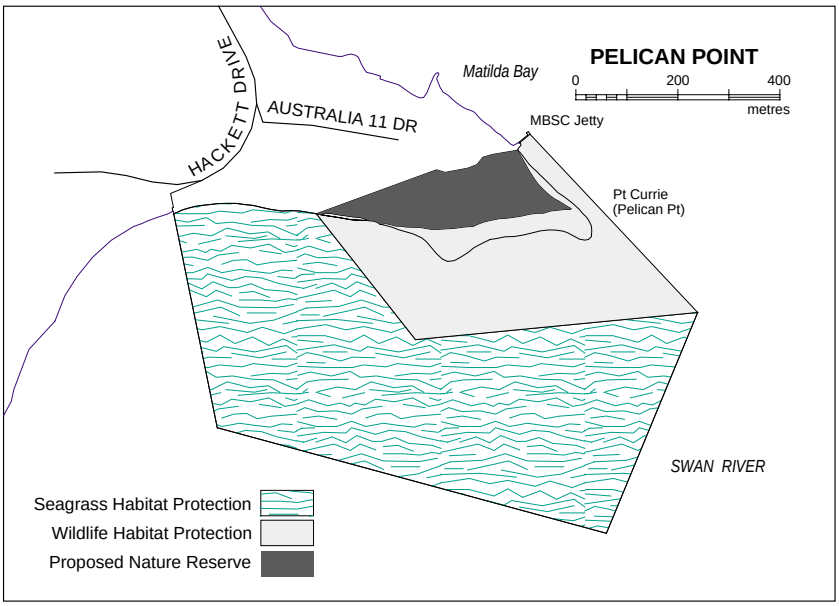
1. **Establish management zones as classified areas under Section 62 of the CALM Act.**

2. **Survey and mark reserve boundaries and zone boundaries on the land and in the estuary and implement the zoning scheme.**

3. **Review the zoning scheme as more information on the reserve system's values, uses and the impacts of various activities becomes available and amend it as appropriate.**

ZONING


Point Walter
SWAN RIVER
BEACH RD
NESS RD
STOCK RD
BURKE
DRIVE
MELVILLE
ALFRED COVE
0 500 1000
metres
Seagrass Habitat Protection
Wildlife Habitat Protection
Proposed Nature Reserve
Existing Nature Reserve
CANNING
HWY


HACKETT DRIVE
AUSTRALIA 11 DR
Matilda Bay
PELICAN POINT
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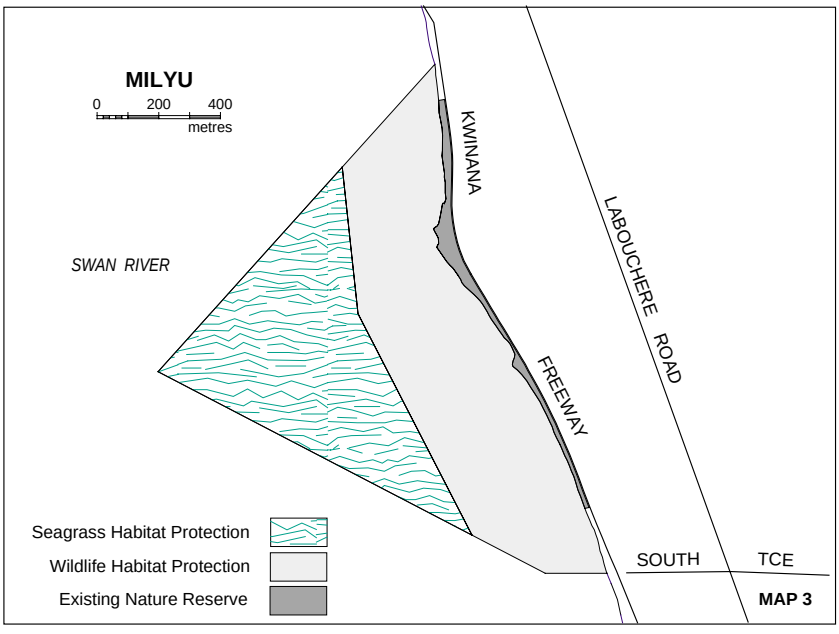
metres
MBSC Jetty
Pt Currie
(Pelican Pt)
SWAN RIVER
Seagrass Habitat Protection
Wildlife Habitat Protection
Proposed Nature Reserve


MILYU
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metres
SWAN RIVER
KWINANA
FREEWAY
LABOUCHERE ROAD
SOUTH
TCE
Seagrass Habitat Protection
Wildlife Habitat Protection
Existing Nature Reserve
MAP 3

Table 2.

PERMITTED USES IN NATURE RESERVES AND SPECIAL PURPOSE ZONES WITHIN THE MARINE PARK

	TERRESTRIAL NATURE RESERVES	WILDLIFE * HABITAT PROTECTION	SEAGRASS * HABITAT PROTECTION
Commercial			
Netting	No	Yes(a)	Yes(a)
Aquaculture	No	No	No
Windsurfing/Sailing	No	Yes(b)	Yes(b)
Commercial Tour Operators	Yes(b)	Yes(b)	Yes(b)
Recreational			
Line Fishing	No	Yes(a)	Yes(a)
Spearfishing	No	No	No
Prawning/Crabbing (taking)	No	Yes(a)	Yes(a)
Prawning/Crabbing (associated activities)	Yes(e)	N/A	N/A
Recreational Netting	No	No	No
Collecting	No	No	No
Windsurfing/Sailing	No	Yes	Yes
Jet ski (personal watercraft)	No	No	No
Other motorised craft (inc remote control)	No	No	Yes(d)
Non-motorised Boating	No	Yes	Yes
Pets	No	No	No
Structures and Development			
Moorings	No	No	Being Phased Out
Boat Ramps, Jetties or Dredging	No	No	No
Resource Development/Exploration	No	No	No
Placement of markers	Yes(c)	No	Yes(c)
Research			
Research (fish)	N/A	Yes(a/c)	Yes(a/c)
Research (other)	Yes(c)	Yes(c)	Yes(c)

* marine park special purpose zone to be classified as a special purpose area under the CALM Act.

(a) Regulated under the Fish Resources Management Act.

(b) License under the CALM Act.

(c) Permit required from CALM.

(d) Subject to an 8 knot speed limit under Section 67 of the WA Marine Act.

(e) On areas of sandy shoreline only.

7. INTERAGENCY RESPONSIBILITIES AND INTEGRATED OPERATIONS

The objective is to integrate management programs between CALM and other agencies with management responsibilities in and adjacent to the Marine Park.

Marine parks are vested in the MPRA and nature reserves are vested in the NPNCA. The following agencies have management roles and responsibilities within this Marine Park, its adjacent Nature Reserves and in nearby areas.

CALM is responsible for managing the CALM reserve system under the CALM Act 1984 on behalf of the vested bodies for the reserves (MPRA and NPNCA). The CALM Act provides for the reservation, vesting and management of marine parks. CALM is also responsible for the conservation of flora and fauna throughout the State in accordance with the Wildlife Conservation Act.

The **Swan River Trust** is responsible for managing the Swan River Trust Management Area described under the *Swan River Trust Act 1988*. The Swan River Management Strategy is in place to manage this area. The Marine Park and adjacent CALM managed reserves fall within this area. The Swan River Trust's roles and responsibilities include aspects of day-to-day management, liaison with local government, establishing facilities, advising on the impact of structures, commercial proposals and developments and making and enforcing by-laws and powers delegated by the Department of Environmental Protection (DEP), such as the licensing of industrial discharges.

Local Governments are responsible for managing areas adjacent to the reserve system under local laws (by-laws).

Fisheries WA is responsible for managing commercial and recreational fishing under the Fish Resources Management Act. The Act and Regulations apply in marine parks subject to the permissible and exclusion management zoning scheme described for certain classified areas under Section 13B of the CALM Act. Regulations under the Fish Resources Management Act are enforced by Fisheries WA in collaboration with CALM.

Department of Transport is responsible for regulating boating activities within the Park, including encouraging safe navigation and establishing and maintaining navigational aids.

Development proposals that may have a significant effect on the environment are subject to the assessment process of the *Environmental Protection Act 1986*, administered by the DEP and Environmental Protection Authority.

River pollution prevention or clean-up efforts are coordinated through a State Combat Committee, chaired by the Department of Transport with technical advisory representation from the Swan River Trust, CALM and other relevant agencies. CALM advises on conservation and recreation values. Wildlife rescues are coordinated by CALM with assistance from other agencies and volunteers.

STRATEGIES

1. **Develop a Memorandum of Understanding between the Swan River Trust and CALM that sets down guidelines and procedures for management responsibilities in the Marine Park area.**

2. **Liaise with all other relevant agencies, authorities and committees to ensure integrated management of the Park and its surrounding areas.**

3. **Prevent, or if they occur clean-up, spills of polluting substances in the Marine Park through the State Combat Committee.**

4. **Coordinate efforts with government agencies and volunteers to rescue wildlife as required.**

CONSERVATION

8. CONSERVATION OVERVIEW

The conservation focus for this 'A' Class reserve system is to protect and maintain important habitats and ecological diversity. The intertidal zone is an important feeding area for protected migratory species from the northern hemisphere. The wetland vegetation is important habitat for fauna and a resting area for waterbirds. Sand and mud flats and seagrass beds provide important feeding grounds and shelter for juvenile fish.

These important habitats can be degraded by disturbance from activities and by introducing exotic species, disease or pollutants. The conservation focus is, therefore, on minimising adverse impacts on habitats and sensitive native species and their numbers through managing, reducing and excluding activity, particularly in susceptible areas. This can be achieved with education, zoning or through controlling activities using regulations and licenses, or all three.

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9. GEOLOGY, GEOMORPHOLOGY AND SOILS

The objective is to protect and conserve geological and geomorphological features and soil substrate.

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. The geology, geomorphology and soils of the Swan Coastal Plain have been described by Seddon (1972) and by Curtin University (1987).

This CALM-managed reserve system encompasses mud and sand flats and shallows consisting primarily of alluvial sand, silts and clay deposits.

A thin film of dark clay often forms an impermeable layer in the drier areas of the wetlands allowing shallow pools of water to exist following flooding of the flats. Sand banks form features along much of the shoreline. The land components of these wetlands are composed of relatively recently deposited sediment colonised by intertidal vegetation such as sedges and salt marsh. All these areas are prone to additional sediment build-up which is deposited through wave and tidal action.

Alfred Cove, in particular, is prone to sediment build up which can also bring nutrient enrichment or toxins. Pelican Point, as a spit formation, is prone to erosion resulting from wind driven waves and wakes from passing vessels.

The sand and mud flats and the soil substrate in the intertidal zone are valued components of these wetlands. The soil substrate is habitat for benthic flora and fauna that are important as food for waterbirds and fish. If disturbed through trampling, the benthic fauna of this soil substrate is very likely to be affected (Rose, 1994).

Fossil deposits are often found in shallow tidal flats and are particularly well defined in the Point Waylen area (Swan Location 5519) adjacent to the Marine Park and Alfred Cove Nature Reserve (Map 2). These fossils occur in sediments of Holocene age and are of palaeontological and geological importance in understanding the evolution of fauna and the estuary over the last 6,000 years (Yassini and Kendrick, 1986).

STRATEGIES

1. **Identify important geomorphological features within or near the reserve system that are valuable and vulnerable to damage, including the sand and mud flats in each of the three areas and the fossil sites at Point Waylen and Alfred Cove.**

2. **Protect fossil sites on the reserve system, and inform relevant authorities of the significance of the fossil sites near the reserve system and encourage suitable management.**

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10. FLORA, FAUNA AND HABITAT

The objectives are to:
- *Protect and conserve habitats with an emphasis on important and threatened communities.*
- *Protect and conserve indigenous flora and fauna with an emphasis on threatened or priority species including migratory waders.*

Flora

Plant species recorded number 178 at Alfred Cove, 111 at Pelican Point and 73 at Milyu in a recent CALM survey (G. Keighery, unpublished data). No threatened or priority species have been found in any of the three areas. Restricted and geographically interesting flora such as *Burchardia bairdiae*, *Gyrostemon ramulosus* and *Tribonanthes violacea* occur in Alfred Cove as well as *Schoenus subfascicularis* which is considered particularly vulnerable.

Seagrass meadows provide an important food source and habitat for hundreds of marine animals and help stabilise the sea floor. The seagrass *Halophilia ovalis* is a vital component in the ecology of the Swan/Canning Estuary. Extensive meadows of this species occur in shallow areas, establishing it as the most abundant plant in the estuary (Hillman, 1987).

Few fish graze directly on *Halophilia*, but microscopic aquatic organisms thrive on dead and decaying parts of seagrasses. Since many fish and other animals (especially prawns) eat these organisms, the seagrass meadows are favoured feeding sites for most estuarine fish. In addition, the seagrass meadows offer a relatively protected environment, which leads a large number of fish and crustacea to utilise them as breeding and nursery grounds. Other benefits of seagrasses include their dense growth and well developed root systems, which allow them to stabilise bottom sediments, even in areas of strong current or high wave energy (Hillman, 1987).

Light is the most important factor controlling the growth of seagrasses in the Swan Estuary. Maximum growth rates are achieved in summer when light intensity is highest and days are longest. The turbidity of the water however controls how much light penetrates the water column. Over 90% of the seagrasses in the Swan/Canning Estuary is found in water less than two metres deep. Particular care needs to be taken when considering activities or changes to the estuary that might affect the amount of light reaching these plants (Hillman, 1987).

Fauna

The fauna in these areas has not been extensively surveyed. The southern brown bandicoot (*Isoodon obesulus*) and the common brushtail possum (*Trichosurus vulpecula*) which was observed at Pelican Point in 1985, may still be present. Foxes and rabbits are present in these areas and may have contributed to the demise of these species. In 1987, 132 bird species were recorded at Alfred Cove (Keeling, 1987). Waterbirds and birds associated with wetlands make up 63% of the total number. These will be discussed in detail in Section 11. Bushbirds recorded in the reserves reflect the importance of the fringe woodland vegetation. A small population of the varied sittella (*Daphoenositta chrysoptera*) was present at Alfred Cove in the mid 1980's and may still be present. Birds seen include the red-capped robin, white fronted chat, pallid cuckoo, sacred kingfisher and osprey. There is a small population of variegated fairy wren (*Malurus lamberti,*) at Pelican Point, which is the southern most record of this species on the coastal plain.

Mosquitoes and midges are not a major problem in most of the reserve areas partly due to a lack of ditches created by human and vehicle disturbance, which otherwise would favour breeding. The large biomass and diversity of the salt marsh also tend to keep midges and mosquitoes at an acceptable level. A program to control mosquitoes in the pools at the end of Pelican Point has been ongoing and discussions have occurred concerning physically modifying these pools by connecting them to the river to allow greater flushing. Any mosquito and midge control programs or modifications to increase water exchange with the Swan River should be referred to CALM's Director of Nature Conservation for approval as the overall impact on nature conservation values will have to be carefully assessed (NPNCA Policy Statement A3, Mosquito Control).

Aquatic fauna includes a diverse and rich population of polychaetes (e.g. *Capitela capitata*), molluscs (eg. *Arthritica semen*, *Sanqumolaria biradiata*) and crustaceans (e.g. *Penaeus latisulacatus, Melita* sp.). The majority of the species found in the mud flats, are detritus/filter feeders and would form an integral part of the fish and wading birds diet. The benthic fauna 'purify' the water, removing the detrital material and any dead matter which might pollute the water (Chalmers *et al.*, 1976). The larger polychaetes and molluscs are an important food source and susceptible to trampling. The mollusc, *Coxiella striatula,* although well represented in the Alfred Cove-Point Waylen area, is one of the few remaining populations of this species left in the region. This freshwater gastropod and its habitat are regionally unique and its conservation should be ensured (Slack-Smith, pers. comm.). The rakali or water rat, *Hydromys chrysogaster* has also been identified at Alfred Cove.

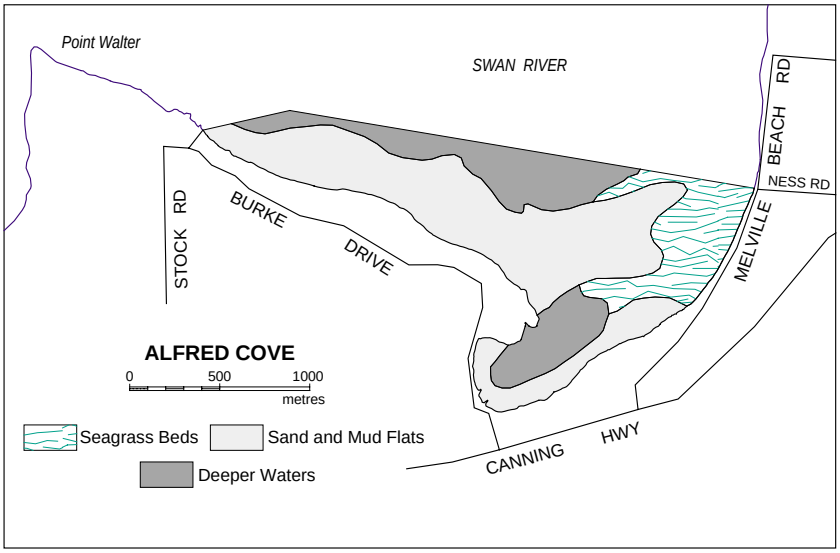
Common species of fish in the Swan River include the yellow-eye mullet (*Aldrichella forsteri*), the sea mullet (*Mugil cephalus*), the Perth herring (*Nematalosa vlaminghi*) and the cobbler (*Cnidoglanis macrocephalus*). Prawns include both the king prawn (*Penaeus latisulcatus*) and the school prawn (*Metapenaeus dalli*). The shallows provide both a feeding ground and a nursery area for juvenile fish and prawns.

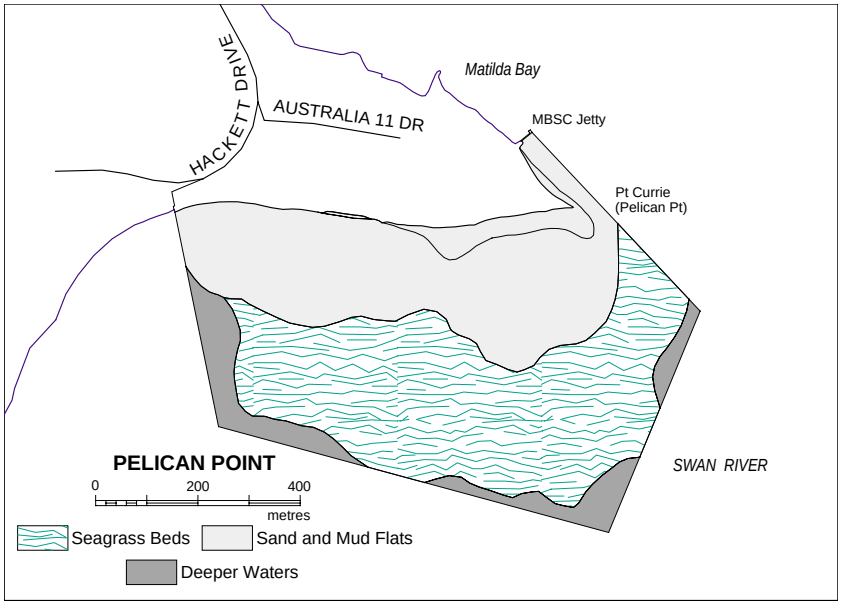
Habitat

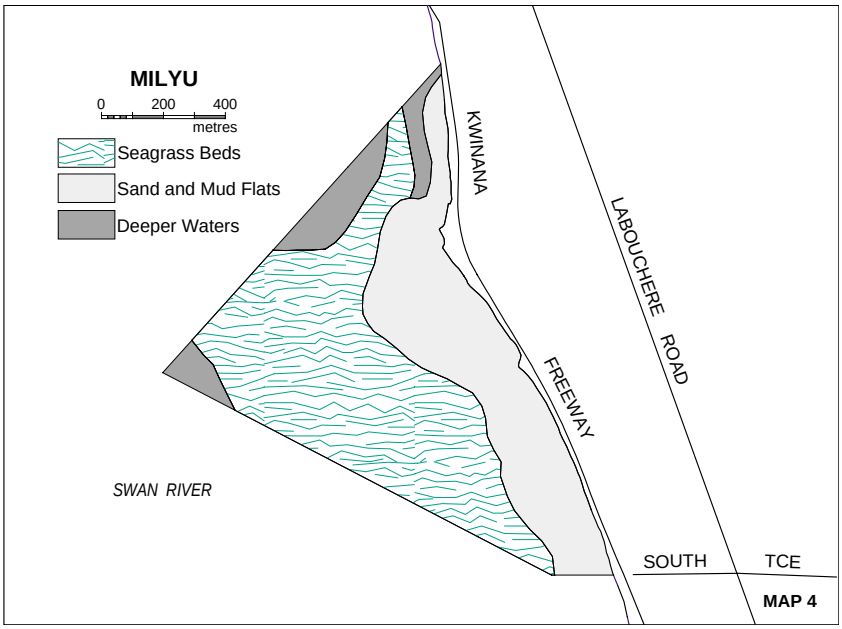
Aquatic habitats in the reserve system include areas of relatively deep water, shallow areas containing seagrass beds, sand and mud flats (Map 4), and seasonal ponds of water that vary from fresh to extremely salty, depending on the season. It is this range of aquatic habitats that supports the migratory waders and waterbirds and the diversity of species contained within the reserve system.

The vegetation communities at Alfred Cove, Pelican Point and Milyu include salt marsh, samphire and fringing low forests or dense tree and shrub areas that

HABITAT


Point Walter
SWAN RIVER
BEACH RD
NESS RD
STOCK RD
BURKE
DRIVE
MELVILLE
ALFRED COVE
0 500 1000
metres
Seagrass Beds
Sand and Mud Flats
Deeper Waters
CANNING HWY


HACKETT DRIVE
AUSTRALIA 11 DR
Matilda Bay
MBSC Jetty
Pt Currie
(Pelican Pt)
PELICAN POINT
0 200 400
metres
SWAN RIVER
Seagrass Beds
Sand and Mud Flats
Deeper Waters


MILYU
0 200 400
metres
Seagrass Beds
Sand and Mud Flats
Deeper Waters
KWINANA
LABOUCHERE ROAD
FREEWAY
SWAN RIVER
SOUTH TCE
MAP 4

are important in maintaining the estuarine ecosystem. Estuarine samphire flats are proposed for assessment as threatened ecological communities (English and Blyth, 1997).

Samphire forms a low shrub community that includes species such as *Sarcocornia blackiana*, sedge-like *Triglochin striata* and succulent *Suaeda australis*. Further from the river other samphire species such as *Halosarcia indica bidens* and *Halosarcia halocnemoides* occur, and above this low shrub community less salt-tolerant species such as *Juncus kraussi* and *Melaleuca* species

Fringing woodland species include *Eucalyptus rudis, Melaleuca cuticularis, Melaleuca rhaphiophylla* and occasionally *Melaleuca hamulosa*. Remnant isolated trees of *Casuarina obesa* are also present. The *Melaleuca-Juncus* and *Eucalyptus-Melaleuca* complexes increasingly dominate where freshwater flushing from drains is occurring. Freshwater flushing from drains also increases weed and introduced species problems (see Introduced Plants, Weeds and Disease)

STRATEGIES

1. **Minimise or prevent native vegetation being removed or damaged by reserve maintenance or visitor facility developments.**

2. **Protect and enhance areas with native species, particularly those vegetation communities and species important to the overall health and vitality of the ecosystem (see Rehabilitation).**

3. **Locate important flora and fauna habitats, priority species and fire sensitive species, and develop management recommendations for their conservation, particularly preceding any new recreational site development or burning operation.**

4. **Provide visitors with opportunities to observe and increase their knowledge of the Park's flora, fauna and habitats.**

5. **Protect flora, fauna and habitats from pets, weeds, disease, wildfires or any other physical disturbance.**

6. **Seek the approval of CALM's Director of Nature Conservation by virtue of the authority delegated to him by the NPNCA before any mosquito and midge control programs or modifications to increase water exchange are carried out.**

7. **Liaise with Fisheries WA and tertiary institutions to ensure monitoring of fish populations in the Marine Park.**

8. **Monitor benthic fauna to assess any impact from trampling, particularly within the wildlife protection special purpose zone.**

9. **Discourage anchoring in the seagrass protection zones of the Marine Park.**

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11. WADERS AND OTHER WATERBIRDS

The objective is to protect and conserve waders and waterbirds, their habitat and associated communities.

The reserve system's sand flats, mud flats and beaches provide the only remaining substantial feeding and resting areas for waders and other waterbirds in the Swan Estuary. Migratory waders are known to frequent the Marine Park annually. Waders and waterbirds move daily between Alfred Cove/Point Waylen, Pelican Point and Milyu. A large number of the waders using these areas are transequatorial migratory species protected by agreements Australia has with Japan and China.

The Swan Estuary forms a part of a network of wetlands that includes a chain of wetlands to the north and south as well as the Rottnest Island salt lakes to the west. Transequatorial migratory waders use the Swan Estuary Marine Park as a staging area before moving on to other areas.

Long-term observations and wader waterbird counts have been carried out by ornithologists from CALM and members of Birds Australia (formerly the Royal Australasian Ornithologists Union) and WA Naturalists Club. In the early 1980's, a total of 11,443 waders and other waterbirds were counted in Alfred Cove (Jaensch, 1988). During the 1980's the number of migratory waders counted on the Swan Estuary occasionally approached or exceeded 10,000, while numbers counted more recently seldom exceed 2000 (pers comm Mike Bamford). Counts of over 100 birds are now rare and recently fewer than 500 waders have been present on all three reserves. The decline of red-necked stints and curlew sandpipers has accelerated since the early 1980's and the buff-banded rail is now absent altogether in all of the estuary reserves.

Mud flats at Point Waylen and Alfred Cove are the primary foraging areas with Milyu and neighbouring freeway foreshore areas also very important. Transequatorial migratory waders observed in the Swan Estuary Marine Park are declining in total numbers for some species, in particular bar-tailed

godwit, sharptail sandpipers, curlew sandpipers and red-necked stint. The reasons for this decline are not known, however disturbance from dogs is suspected to have contributed. Prawning parties may have also contributed to this decline, particularly at Pelican Point since the 1980s (pers comm Mike Bamford). This decline has been documented for Pelican Point (Bailey and Creed, 1989).

Damage to the larger benthic fauna in the mud and sand flats may be occurring as a result of trampling, particularly from large groups of people such as prawning parties (Rose, 1994). The larger benthic fauna are the most valuable food for migratory waders, as less time and energy is required to forage. Restricting the numbers of people walking through the waterbird feeding areas may therefore be an important strategy to protect and maintain the productivity of these important waterbird feeding habitats.

Important waterbird resting areas are provided in the reserve system. Milyu is used by migratory waders mainly during the day and Pelican Point is used extensively during the night. The freeway foreshores, including Milyu and neighbouring beaches, face into the sea breeze making flight take off easier. These freeway foreshore areas are particularly important during the day when tides are too high to permit feeding and resting at Point Waylen and Alfred Cove.

Breeding in the three areas is greatest in Alfred Cove where 30 species have been recorded breeding. Over two-thirds of the species thought to have bred in Alfred Cove are bush birds that reflect the importance of the fringing woodlands. Rushlands are also important for duck, rail, plover and stilt breeding. Of particular importance is the breeding by the Buff-banded Rail, the Little Grassbird, the Spotless Crake and the Black-winged Stilt. The Red-capped Plover was recorded breeding at Milyu and Australian Shelducks were seen with young there in September 1984. The Buff-banded Rail breeds in sedges along the river and used to be particularly common in these three areas.

STRATEGIES

1. **Minimise disturbance to principal wader resting sites.**

2. **Prevent disturbance of waders and other waterbirds and their habitat by dogs and cats.**

3. **Reduce disturbance of waders and other waterbirds and their feeding ground by visitors to acceptable levels.**

4. **Minimise disturbance of principal wader resting sites.**

5. **Monitor wader and waterbird numbers feeding or breeding in the reserve system.**

6. **Provide visitors with opportunities to view and increase their awareness, appreciation and understanding of the Park's waders, waterbirds and their habitat.**

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12. ESTUARINE PROCESSES AND WATER QUALITY

The objective is to protect and maintain estuarine processes and water quality.

Water and Sediment Dynamics

Erosion and deposition is a dynamic on-going process in the Swan River. The natural flow of water within Alfred Cove is anti-clockwise and erosion is strongest on the northern and western banks and deposition greatest on the southern bank. Erosion on the northern and western banks is exacerbated by activities such as bait digging, which contributes to breaking down the banks and destroying samphire root systems. Pelican Point, being an exposed sandy spit, is also subject to erosion and deposition, with the wake and wash from large boats contributing to the erosion rate. Sediment is continuously being transported down the Avon River, the greatest contributor of water to the Swan River. The finer material is being deposited in the Swan River as it widens and the water flow slows down. Past developments in the Swan River system included dredging and reclamation projects that increased sediment and its transport. Recent developments have concentrated more on stabilising the river banks either with meshing rocks and concrete or native vegetation, such as has occurred in the Milyu Nature Reserve.

Salinity and Drainage

The Swan River has a low tidal range with the likelihood of flooding reduced because of the dams constructed on upstream tributaries and certain parts of the river being dredged. Flooding and flushing of the Swan Estuary occurs when a strong predominantly winter fresh water flow to the sea is coupled with a strong sea breeze, high sea levels and winter storms.

The low elevation of the surrounding land and the superficial nature of the shallow, fresh groundwater aquifer can result in groundwater infiltrating during winter months. The use of groundwater for private or public reticulation can result in deeper salt water layers being dragged up and a salt water wedge moving towards the surface and further inland (salt water intrusion). This has the potential not only to salinate bore water but also adversely affect the composition of floral communities within the reserve system.

During summer the waters within the wetlands, particularly at Pelican Point and Alfred Cove, are extremely saline and create a distinctive ecosystem and feeding habitats. Drainage systems introducing fresh water into the ecosystem can create localised pockets of fresh water where weed species can persist and spread. A drainage rationalisation strategy has been developed with relevant State and local government agencies to minimise the numbers of drains into these wetland areas thereby reducing the areas where weeds can become established and spread. In Alfred Cove, the number of drains discharging into the Cove has been reduced, weeds have been removed, and the impact of existing drains lessened by allowing better exchange between the river water and the drain water.

Pollutants and Nutrification

Stormwater drains can also be the source of pollutants into the wetland system and into the Swan River. Drains can potentially deliver into the river faecal coliforms, pesticides, fertilisers, heavy metals, oil and petrol residues as well as a range of chemicals that could come from an accidental spill on a major road nearby.

Water quality parameters recording the physio-chemical status of the Swan River have been measured since 1981 by the Swan River Trust and indications are that in areas near the Marine Park, waters are healthy in terms of temperature, pH, turbidity, dissolved oxygen, biochemical oxygen demand, ammonia, lead, pesticides, sediment and nitrogen. Phosphorus levels measured indicate that eutrophication is a potential problem in the Swan River and algal blooms have occurred in recent years. Algal blooms can emit a putrid odour, reducing the amenity of an area and kill local fish because of reduced oxygen content in the water.

Neighbours to the Park can minimise phosphorus and pollutant inputs into the river through using water wisely, protecting local vegetation, replanting and reducing run-off which includes nutrients and chemical pollutants (see Sections 37 and 38). Industrial discharges to the Swan River are strictly controlled by the Water and Rivers Commission under powers delegated by the DEP. Licenses for industrial discharges are being phased out over time.

Rubbish such as plastics, bottles, wire, food scraps and fishing gear can also pollute the river and entangle aquatic life. Rubbish along the foreshore not only reduces the amenity of an area but also can result in loss of bird life by attracting cats to the area (see Section 16).

STRATEGIES

1. **Maintain liaison between local government and CALM to protect and conserve natural processes and water quality.**

2. **Ensure the existing water quality monitoring program is adequate for the Marine Park's management requirements.**

3. **Support monitoring and research programs being undertaken by other government agencies and educational institutions.**

4. **Maintain only the minimal number of fully functional drainage lines to reduce the growth of freshwater-dependent weeds in land reserves.**

5. **Discourage practices that rubbish and pollute the land and water of these reserves. Encourage clean-up initiatives.**

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13. CULTURAL HISTORY

The objective is to protect and promote the historical and cultural values of the reserve system.

Aboriginal History

Aboriginal people frequented the Swan Estuary for estuarine and terrestrial food resources. Accounts by explorers and settlers recorded Aborigines in the lower Swan Estuary in the 1600's, 1700's and 1800's (Curtin University, 1987). Major campsites that are registered sites of importance to Aboriginal people in the Swan-Canning Estuary include Pelican Point and an area along the South Perth foreshore.

Nyoongar Aborigines, who camped along the Swan River, were particularly drawn to areas which combined freshwater, terrestrial and estuarine environments. Pelican Point was a popular camping, fishing and hunting area for this reason. Fish, shellfish, reptiles and birds were all easily accessible at Pelican Point. The Mooro Tribe, led by Yellagonga, used the Pelican Point area. The Alfred Cove area was used regularly by the Beeliar Tribe who migrated through the area mainly in the summer months. The Milyu area, also abundant with plants and animals including fish and waterbirds, was also used for food resources. Milyu is part of a traditional Aboriginal hunting and fishing area used by Nyoongar people of the Ballaruk Tribe (City of South Perth, 1993). Milyu is Aboriginal for samphire which is the low-lying succulent vegetation indicative of these estuarine wetlands. Aboriginal impact on these areas would have been minimal as Aborigines were nomadic within

set territorial areas and took only what was necessary for their subsistence (Berndt and Berndt, 1980).

European History
The Swan River was first sighted by Europeans on 5 January, 1697, when a party lead by Willem de Vlamingh landed in the Cottesloe area. In 1801 the French led by Ensign Francois Heirrison carried out a scientific and exploratory voyage of the Swan River in the French ship Naturaliste. James Stirling led the first British exploration of the Swan River in 1827. Stirling's exploratory party found the numbers of swans, pelicans and ducks in Pelican Point area to be "truly astonishing" (Seddon, 1972). Captain M. J. Currie, first Harbourmaster of Fremantle, first took up land at Crawley, and Pelican Point at that time was officially given the name Point Currie.

Alfred Cove and Point Waylen were named after Alfred Waylen who took up land at Alfred Cove in 1830. Earlier the bay had been known as Frenchman's Bay from 1801 when the French ship Naturaliste landed there during its scientific and exploratory voyage.

Alfred Waylen, and subsequent owners of this property in the Alfred Cove area ran cattle and a dairy of about 100 cows was established in 1919. The original Atwell House is still standing and is sub-leased to the local community by the City of Melville. In the 1930's the majority of land surrounding Alfred Cove was subdivided for suburban development and 53 acres of land was set aside along the foreshore from Attadale jetty to Alfred Cove for recreational purposes. Between 1952 and 1964 the foreshore area from Tompkins Park to Cunningham Street was used as a public refuse landfill site. Between 1965 and 1969 the tip site was transferred to the Attadale foreshore. A dredging and landfill program was also initiated at this time resulting in some minor changes in the foreshore boundaries and the sandbank distribution.

In 1958, a radio transmitter facility for Perth Airport was constructed at Point Waylen, Location 5519 (see Map 2). This facility was managed by the Civil Aviation Authority as an integral component of Perth airport's navigational guidance system.

STRATEGIES

1. **Liaise with local Aboriginal and community groups and relevant agencies concerning the protection of significant heritage sites in the reserves.**

2. **Liaise with local historical societies and establish an archive of visual and written cultural history, and make this information available for interpretive displays.**

3. **Where appropriate, incorporate information on cultural history of the reserve system into interpretive material.**

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14. LANDSCAPES

The objective is to protect and enhance the reserve system's visual aesthetic values.

The reserve system is located on the lower reaches of the Swan River and the landscape character type is Swan Coastal Plain. The reserve areas represent some of the least disturbed estuarine and wetland vegetation associations combining salt marshes, samphire, freshwater pools and estuarine woodlands and shrublands. The diversity of colour, height, species and waterbird habitats in relatively small areas makes for very high scenic quality experiences in very centrally located areas within the Perth metropolitan area.

Scenic views are available from vehicles, boats and on foot in locations within or on adjacent foreshores. The surrounds to the three reserve system areas are extremely important and adjacent land development should be sensitive to form, line, colour, texture and scale found within the reserve system.

Landscapes and can be described as high, medium or low visual quality and mapped using the Visual Management System (CALM, 1994). Proposed modifications within the Park or in adjacent areas can be assessed according to visual quality ratings and the ability of the landscape to incorporate the proposed modification. Modifications can contribute either negatively or positively to visual quality. Examples of modifications to and landscapes either proposed or approved which warrant close scrutiny include any clearing of native vegetation within or adjacent to the reserve system, communication towers, rubbish or pruning disposal sites, residential housing developments particularly multi-storey buildings and markers, jetties or structures on the water which are not necessary.

STRATEGIES

1. **Consider CALM's Visual Landscape Management Policy Statement No. 34 and seek specialist advice when implementing this Plan.**

2. **Classify visual resource features in the reserve system according to CALM's Visual Management System (CALM, 1994).**

3. **Ensure that any modifications to the natural environment be subtle and remain subordinate to natural elements by borrowing extensively from form, line, colour, texture and scale found commonly in the surrounding land and.**

4. **Continue staged rehabilitation programs to protect and enhance native vegetation and landscape values (See Rehabilitation).**

5. **Use interpretive and explanatory signs before and during operations that affect visual qualities.**

6. **Encourage local governments, other government agencies and private landholders to use visual resource management skills when siting facilities and signs, selecting site-compatible materials and colours, planning planting programs and planning for utilities, roads and building envelopes.**

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15. REHABILITATION

The objective is to restore vegetation communities to a condition resembling the natural environment as closely as possible.

Rehabilitation works in the reserve system should use local native plants from locally collected seed. Introduced plants, including plants whose seed source is not locally collected, are not likely to support the same number of invertebrate fauna, in particular arthropods, the most numerous and diverse fauna group in terrestrial ecosystems. Arthropods are of enormous importance as food for other animals (such as birds), as pollinators of plants and as recyclers of nutrients. In some cases an unhealthy balance of species of arthropods can be associated with introduced plants as these have not co-evolved with the local arthropod species.

Introduced plants in a number of cases support fewer plant-eating arthropods and also fewer parasites such as rust-fungi and mistletoe. Introduced plants can outcompete local plants, grow faster and larger and reproduce freely. By growing faster and larger than the equivalent local plants and by being largely unblemished, and, therefore, more brightly coloured than the local species, introduced plants tend to be visually dominant. These plants disrupt the visual harmony of conservation reserves, whose visual character is based on natural associations of local plants.

Examples of introduced species include the river gum *Eucalyptus camaldulensis* and swamp oak *Casuarina glauca*. These introduced species have been established at Pelican Point and Alfred Cove. The local species, salt sheoak, *Casuarina obesa.* readily supports two species of mistletoe, *Amyema linophylum* and *Lysiana casuarinae*. Mistletoe foliage is habitat for the larvae of the wood-white butterfly *Delias aganippe* and the brilliant blue amaryllis azure *Ogyris amaryllis* and possibly the silky azure *Ogyris oroetes*. Also the mistletoe bird and species of honeyeaters eat the berries of the mistletoe.

Both the introduced species, being close relatives of local species, may be able to hybridise with their counterparts and further reduce the flora and fauna values of the nature reserves. Re-establishing native local species, including flooded gum, *Eucalyptus rudis* and salt sheoak in these areas where they formerly occurred, and encouraging regeneration will restore the natural environment as close as possible to its former condition.

A rehabilitation program to remove weeds, excess landfill and introduced species in association with the planting of local species should be produced for each of the three locations. Special care will need to be taken not to affect the populations of fauna species. For example, the variegated fairy-wren (*Malurus lamberti assimilis*) can be affected by extensive removal of introduced shrub species.

The rehabilitation programs should adopt a staged approach with a replacement strategy to maintain a similar structure in the understorey and overstorey where possible, unless views are being obstructed. Priorities for areas to rehabilitate first could consider the degree to which introduced species are outcompeting local species or affecting habitat diversity or reproductive rates.

The seedlings of river gum and flooded gum can be readily distinguished by their different juvenile leaves. CALM staff and others involved in vegetation rehabilitation programs can be trained to make distinctions between local and introduced species. Historical photographs can also be used to recreate original landscape and vegetation associations. In recreating the former vegetation structure and condition, any impact on views and any cultural, historical or aesthetic value of particular species may also need to be considered.

STRATEGIES

1. **Develop a rehabilitation program for each of the three locations to remove weeds, excess landfill and introduced species in conjunction with the planting of local species.**

2. **Adopt a staged approach to rehabilitation programs to protect and enhance local vegetation and landscape values.**

3. **Develop and implement a monitoring strategy to determine the success of the rehabilitation program.**

4. **Take special care not to affect any other flora or fauna conservation values, such as populations of the variegated fairy-wren.**

5. **Maintain and restore local vegetation to its former structure and condition where possible or plant in clusters in order to allow consideration of the need to retain views and cultural or aesthetic values of particular species.**

6. **Train staff and others involved in vegetation rehabilitation programs to distinguish between introduced and local species (e.g. river gum from flooded gum and swamp oak from salt sheoak).**

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16. INTRODUCED PLANTS, WEEDS AND DISEASE

The objective is to minimise the impact introduced plants and weeds and their control have on reserve system's values.

Introduced species include the tree species river gum (*Eucalyptus camaldulensis*) and swamp oak (*Casuarina glauca*), both of which in some cases are outcompeting native species and need to be removed (see Rehabilitation). Fauna habitat modification, particularly for birdlife by the removal of introduced species, should be considered in determining species control program strategies and priorities. All possible control techniques should be investigated, including mechanical, chemical and biological techniques.

Most of the weed species could be removed selectively and replaced with local species propagated from nearby seed sources. Weeds generally become a problem in disturbed areas. Most of the weeds are fresh water species and associated with either fresh water discharge around drains, or garden refuse dumping on the edge of the reserves.

Weed and introduced plants in the reserve system include kikuyu grass (*Pennisetum clandestinum*), couch grass (*Cynodon dactylon*), buffalo grass (*Stenotaphrum secundatum*), bulrush (*Typha orientalis*), Italian poplar (*Poplus italica*), *Casuarina glauca*, *Canna generalis*, *Cyperus haspan*, *Vitis vinifera*, *Acacia longifolia*, *Schinus terebinthifoliua* and pigface (*Carpobrotus edulis*).

Weed control through herbicide use on Swan River foreshores is being trialed to ensure the river and foreshore conservation values are not affected. Disturbance caused by urban water drainage causes much of the weed problem. This can be solved by rationalising the drainage system as well as community education to reduce the influx of fresh water and dumping of garden refuse.

Public access into the reserve system is restricted to boat access or by foot. Disease and weed introduction is not an immediate threat. However, every effort should be made to minimise the possible introduction of weed seed or disease while carrying out any necessary management activity.

STRATEGIES

1. **Identify, map and maintain records of all known weeds and introduced species.**

2. **Develop a program to control and eradicate weeds and introduced species on a priority basis and in stages, while considering the effect the program has on native species.**

3. **Monitor any effects a control program has on the reserve system's conservation values and make changes to procedures if required.**

4. **Avoid any unnecessary disturbance to soil and minimise the possibility of introducing weeds, seed or disease while carrying out management activities.**

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17. PETS AND FERAL ANIMALS

The objectives are to:
- *Protect the reserve system's conservation values from the negative impacts of pets.*
- *Minimise the impact feral animals and their control have on the reserve system's conservation values.*

Pets, in particular dogs and cats, can disturb wildlife and Park visitors and can impede native fauna activity because of their presence and smell. They can also introduce weeds and disease and foul recreation sites. Dogs are often seen interfering with waders and waterbirds within the reserve system. Pets are not permitted in the reserve system and enforcing this will be very important to maintain the reserve system's conservation values. Waders and waterbirds, as a key conservation value, are threatened by both cats and dogs entering the reserve system. Under the Dog Act

local laws (by-laws) can be used by local government to require that dogs remain on a leash in nearby local government reserves. Further fencing at Alfred Cove will also be important to exclude dogs from the Nature Reserve (See Day Use, Access and Nature Walks).

Feral animals such as the house mouse (*Mus musculus*), the black rat (*Rattus rattus*), feral cat (*Felis catus*), rabbit (*Oryctolagus cuniculus*) and fox (*Vulpes vulpes*) may occur within the reserve system. For example rabbits and foxes are present at Pelican Point and the brown rat (*Rattus norvegicus*) occurs in the limestone groynes at Milyu. The fox and feral cat are a major threat to wildlife and will need to be controlled. A variety of control techniques can be used depending on the area and its neighbouring locations. Any control measures involving poisoning house mice and black rats need to consider the risk to those native birds that feed extensively on rodents.

Rabbits can affect efforts to revegetate areas as they feed on fresh new plant growth. Rabbits can also be controlled through baiting if they are causing problems. The house mouse and black rats living on Swan River foreshores have been on the increase and their numbers should be assessed and a control program considered as they can be a health threat to humans.

STRATEGIES

1. **Inform visitors and neighbours living near the reserve system about the negative impacts of pets, emphasising that pets are not permitted in the reserve system.**

2. **Monitor feral animal populations and regularly assess the effectiveness of control programs as well as any possible threat from the control programs to non-target species.**

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18. FIRE

The objective is to protect people, property and conservation values in and near the reserves by appropriate fire management and suppression techniques.

Wildfire threat in and around Alfred Cove, Pelican Point and Milyu has been analysed and a strategy that considers values at risk, chance of ignition, fire behaviour and suppression response capability has been adopted. Suppression is the responsibility of the WA Fire and Rescue Service. However, an interactive capability between the WA Fire and Rescue Service and CALM has been developed. The WA Fire and Rescue Service is better located than CALM to respond quickly to a wildfire on these locations.

Values at risk include neighbouring reserves and facilities and infrastructure within them, such as Matilda Bay and the Point Waylen communication facilities. Other reserves and private properties are more isolated by sealed roads or areas of lawn. However, people and property could be threatened, particularly in windy conditions. Peak use of the reserve system and adjoining areas by people also coincides with the high fire risk summer period.

Conservation values at risk include fauna, vegetation, flora and wildlife habitat. The reserve areas are small enough not to need internal fire breaks or a strategy to prescribe burn within the reserves to regenerate specific species or create habitats for specific fauna. Fuel reduced buffers can be created by slashing or could combine slashing and burning if appropriate, however, a no burn policy would apply in the case of the Alfred Cove and Milyu areas.

A cooperative approach with local WA Fire and Rescue Service, local government and neighbouring landholders is encouraged so that responsibility for wildfire control is shared. Mutual aid arrangements with the WA Fire and Rescue Service will be encouraged to ensure an effective fire fighting force is in place.

STRATEGIES

1. **Develop and adopt a fire suppression strategy in consultation with the WA Fire and Rescue Service.**

2. **Continue to develop an interactive capability with the WA Fire and Rescue Service to ensure an effective fire suppression force.**

3. **Maintain strategically placed fuel reduction areas where appropriate.**

4. **Contain all fires in or threatening the reserves, considering values at risk, fire behaviour, suppression response and ignition potential as well as disease risk, and ecological values**

5. **Locate important flora and fauna habitats, priority species and fire sensitive species and protect these areas from fire.**

6. **Apply appropriate burn regimes to areas that require fire to restore, or enhance fauna habitats and flora communities.**

7. **Develop a range of methods for early detection of unplanned fires.**

RECREATION

19. RECREATION OVERVIEW

The Swan River is a major recreation resource used extensively by the community and tourists. Pressure on the reserve system's conservation values is likely to increase as the population and numbers of Park users increase. Low impact recreation activities and those that increase awareness, appreciation and understanding of the estuarine environment will be favoured and encouraged within the Park. Providing better information and emphasising educational programs will be an important part of increasing this awareness, appreciation and understanding.

20. LINE FISHING

The objective is to manage line fishing and associated activities to maintain fish populations and species and protect the environment.

Recreational fishing is a popular activity on the Swan River. Management aims to maintain and protect fish stocks and species that are restricted in abundance or distribution. The fishery resource depends on suitable water quality and habitats for all stages of fish life to be maintained. Recreational fishing is managed by Fisheries WA under the Fish Resources Management Act and Statewide bag limits apply within the Park. Common species include the yellow-eyed mullet, sea mullet, Perth herring, tailor, cobbler and black bream. The use of unattended lines and set nets by recreational fishers is not permitted in Swan-Canning Estuary waters under the Fish Resources Management Act.

STRATEGIES

1. **Continue to allow recreational line fishing in the Park in accordance with the Fish Resources Management Act.**

2. **Monitor the impact of and manage the Park's recreational line fishery to sustain numbers and species.**

3. **Provide information to recreational fishers detailing the hazards to wildlife associated with discarded lines.**

21. COLLECTING

The objective is to protect the conservation values of the Park by managing and controlling the collecting of invertebrate species.

Collecting of worms, molluscs or other estuarine invertebrate species, unless otherwise provided for in this plan, is not permitted in the marine park. Collecting of live animals may have a considerable impact on and consequently detract from, the conservation, recreational and educational values of the Park. A permit may be given to collect invertebrate species for genuine educational and scientific research purposes.

STRATEGIES

1. **Prohibit collection of invertebrate species within the reserve system unless otherwise provided for in this Plan.**

2. **Provide for limited collection of invertebrates for educational and scientific research purposes by permit, in accordance with the Wildlife Conservation Act.**

22. PRAWNING AND CRABBING

The objectives are to:
- *Minimise the impact of prawning and crabbing on waders and waterbirds.*
- *Minimise the impact of prawning and crabbing on important wildlife habitats and other conservation values of the reserve system.*

The Swan River is popular for king prawns (*Penaeus latisulcatus*), school prawns (*Metapenaeus dalli*) and blue manna crabs (*Portunus pelagicus*) particularly during summer. Prawning and crabbing will not be permitted in the nature reserve areas and excluding these activities from the wildlife protection zone, which generally encompasses the shallow mud flats close to shore, will be considered if research reveals adverse impacts. Prawning and crabbing in the mud flats may reduce the abundance and biomass of foraging gastropods, remove floating algae and its associated epifauna, remove or expose previously buried shells and disturb wader and waterbird resting at night (see Waders and other Waterbirds).

The impact from walking in the mud flats and shallows may be detrimental to the ongoing production of invertebrate fauna affecting the viability of these

areas to support the diverse range of aquatic fauna and waterbirds (Rose, 1994). The results of a preliminary study on the impact of recreational prawning in the Alfred Cove, Point Waylen area were not conclusive, however, a more elaborate study may show conclusively that the impact on the benthos is significant (Rose pers. comm.). If further scientific investigations demonstrate that this is the case CALM may seek to classify the special purpose (wildlife protection) zone a prohibited or limited access area under Section 62 of the CALM Act in an effort to minimise disturbance to waders and waterbirds and their habitat. Any action of this type would require the concurrence of the Minister for Fisheries.

Prawning and crabbing have contributed to other detrimental impacts on the reserve system. Fishing parties have left by-catch and refuse on foreshore areas which have attracted feral animals. Feral animals may cause considerable impact on waders and other native fauna. Returning the waste to the water (below the low water mark) and the use of refuse bins will aid in reducing the impact of prawn and crab fishing activities on the conservation values of the reserve system. Public education is required in order to reduce the impact of these activities on conservation values. Using the CALM nature reserves for boat landing or as a base for these recreational fisheries will be restricted to certain areas on the shore where impacts on conservation values can be minimised. By-catch has the potential to include species with high conservation value such as the gastropod *Coxiella striatula.*

No recreational fishing license is currently required to take prawns or crabs although bag and size limits and gear restrictions and seasons apply under the Fish Resource Management Act.

STRATEGIES

1. **Evaluate the impact of prawn and crab fishing on the conservation values of the reserve system (particularly in relation to disturbance of waders, waterbirds and the impact on benthic fauna) and restrict fishing activities where unacceptable impacts are observed. Involve Fisheries WA and recreational fishing interest groups in the evaluation process.**

2. **Educate recreational prawn and crab fishers about the correct disposal of by-catch waste in conjunction with Fisheries WA and recreational fishing interest groups.**

3. **Restrict land-based aspects of recreational prawn and crab fishing to areas of sandy shoreline to avoid undesirable impacts on native vegetation and areas where access is restricted by fencing or other barriers.**

23. SPEARFISHING

The objective is to protect wildlife and their habitat from the impact of spearfishing activities.

Spearfishing activities have the potential to be environmentally damaging to the habitats of fish and waterbirds and may cause disturbance to fish and bird communities. Spearfishing can also rapidly deplete fish stocks in accessible areas. Spearfishing will not be permitted in the nature reserves or the Marine Park.

STRATEGY

1. **Ensure the use of gidgees, spearguns or any form of spear (as defined under the Fish Resources Management Act) is prohibited in the reserve system.**

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24. BOATING AND SURFACE WATER SPORTS

The objective is to provide for boating and surface water sports in specific areas as long as the activities are compatible with maintaining conservation values.

Boats can be launched from a number of locations on the Swan River adjacent to the Marine Park. The location of launching access largely governs the type of boating use which may occur and determines the level of impact that recreational boaters may have on the estuarine environment.

The types of impacts from recreational boating relevant to management include:

- possible disturbance of important or specially protected species or their habitat; and
- the safety of and disturbance to other recreational users.

The zoning scheme (Section 6) manages particular uses in the Marine Park to minimise conflicts between surface water sports and other activities. Jet skis (personal watercraft) are prohibited from all waters of the Swan Estuary Marine Park via a notice published in the Government Gazette on 12 May 1998. Other forms of motorised boating will be restricted to a vessel speed of 8 knots to preclude the noise and bow waves associated with travelling at high speed (Appendix B). Concern has been raised about the use of other noisy watercraft such as hovercraft. These craft emit a similar level of noise regardless of speed. CALM and Department of Transport will review the appropriateness of the use of hovercraft and other noisy watercraft on an annual basis.

An 8 knot speed limit for vessels will be enforced by CALM and Department of Transport officers and signposting and other public education techniques will be employed. Where further protection of wildlife from boating activity is required, the issue may be considered in respect of the powers provided in the Wildlife Conservation Act or the CALM Act.

STRATEGIES

1. **Gazette the majority of the Marine Park as an 8 knot speed limit area.**

2. **Provide signs and brochures to educate boat users about the statutory 8 knot speed limit.**

3. **Integrate the regulatory and enforcement roles of CALM and the Department of Transport within the Swan Estuary Marine Park.**

4. **Establish (where possible) a buffer zone, outside the Park boundary, adequate for protection against adjacent recreation and commercial activities (Map 3).**

5. **Review the appropriateness of hovercraft and other noisy water craft within the marine park on an annual basis.**

6. **Ensure compliance with the provisions of the notice published in the Government Gazette on 12 May 1998 prohibiting jet skis from the marine park.**

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25. WILDLIFE OBSERVATION AND INTERACTION

The objective is to provide and promote safe wildlife observation while minimising disturbance to wildlife and their habitat.

Within this plan wildlife interaction refers to any activity where people and wildlife interact without physical contact. This does not include recreational or commercial capture and removal of a species.

The diverse range of waders and waterbirds, which include transequatorial migratory species, can be easily observed from footpaths and cycleways adjacent to the Marine Park. Breeding in the three areas is greatest in Alfred Cove where 30 species have been recorded.

A lookout platform near the western boundary of the Pelican Point Nature Reserve is used extensively for observing birdlife in the reserve. A similar facility could be developed at Alfred Cove with appropriate interpretation and education opportunities, and its use encouraged through public information.

STRATEGIES

1. **Ensure wildlife and waterbird observation and interaction activities comply with the Wildlife Conservation Act and develop appropriate guidelines as required.**

2. **Provide information to the public about opportunities and guidelines for observing wildlife in the reserve system.**

3. **Monitor the impact that observation and interaction activities have on wildlife and take action where adverse impacts are occurring.**

4. **Discourage feeding of wildlife by any visitors to the reserve system via signs and community education programs.**

5. **Provide wildlife observation facilities and interpretive information in appropriate locations throughout the reserve system (see Section 24).**

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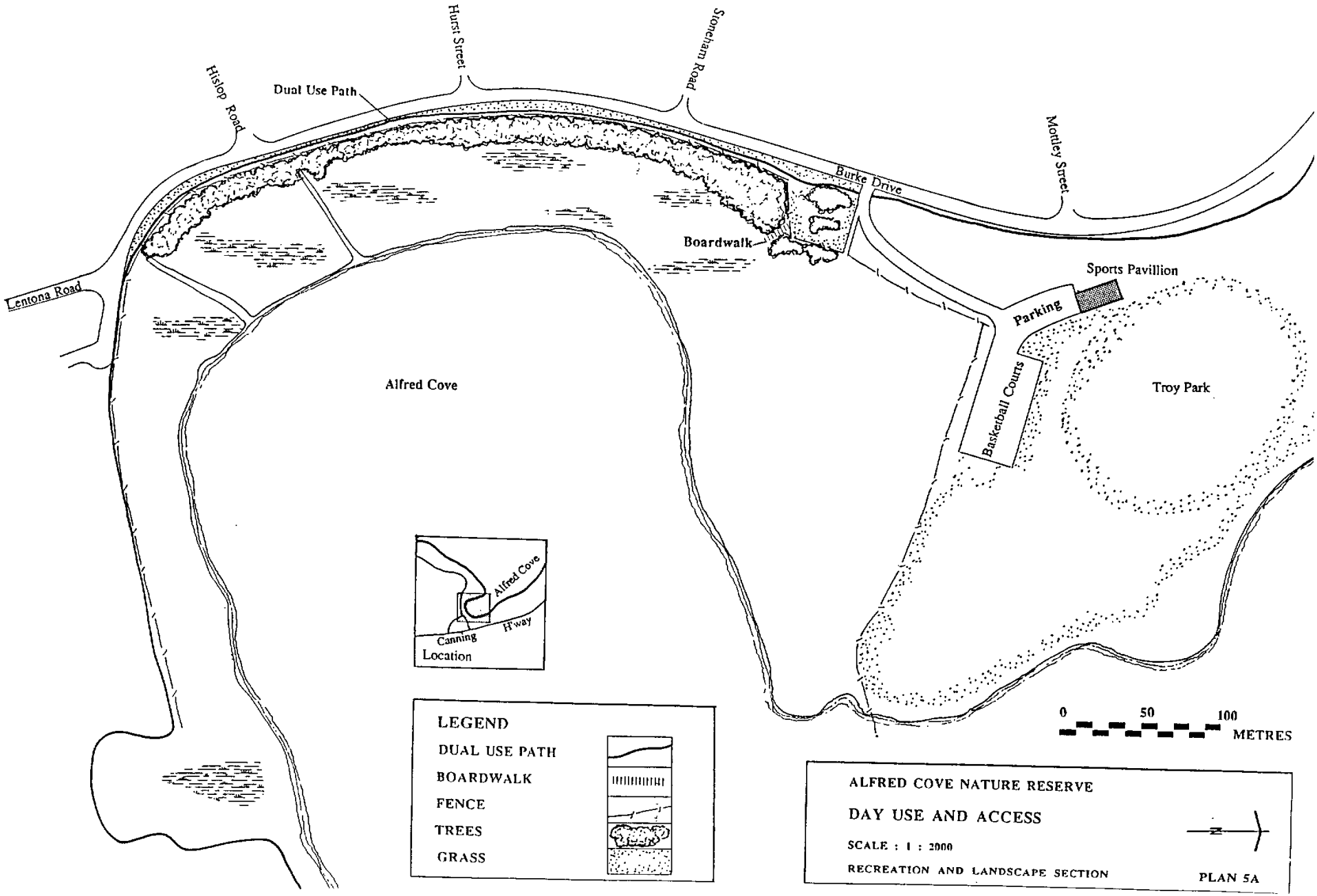
26. DAY-USE, ACCESS AND NATURE WALKS

The objective is to provide walks, information, observation points and day-use facilities appropriate to the environmental setting that encourage visitor enjoyment and understanding of the reserve system's values.

Dual use pathways for bikes and pedestrians are present along the outside edge of Alfred Cove and Milyu. An elevated gazebo with information on waterbirds is located at Pelican Point and an information shelter is provided at Milyu.

Access to the Milyu information shelter is via a dual use path and Kwinana Freeway overpasses. One overpass connects to one end of the Nature Reserve and another connects to the Como Reserve adjacent to Milyu. The Como Reserve, which is under the control of the City of South Perth, has recreational facilities including a children's play area, picnic tables and a barbecue. The South Perth Heritage Trail is also located near the Como Beach Recreation Area. Further waterbird observation facilities are not needed at Milyu because birds can be sighted along the length of the foreshore.

At Alfred Cove, the dual use path provides a number of locations for nature observation into the Nature


Hislop Road
Dual Use Path
Hurst Street
Stoneham Road
Burke Drive
Mottley Street
Lentona Road
Boardwalk
Sports Pavillion
Parking
Basketball Courts
Troy Park
Alfred Cove
Alfred Cove
Canning
H'way
Location
LEGEND
DUAL USE PATH
BOARDWALK
FENCE
TREES
GRASS
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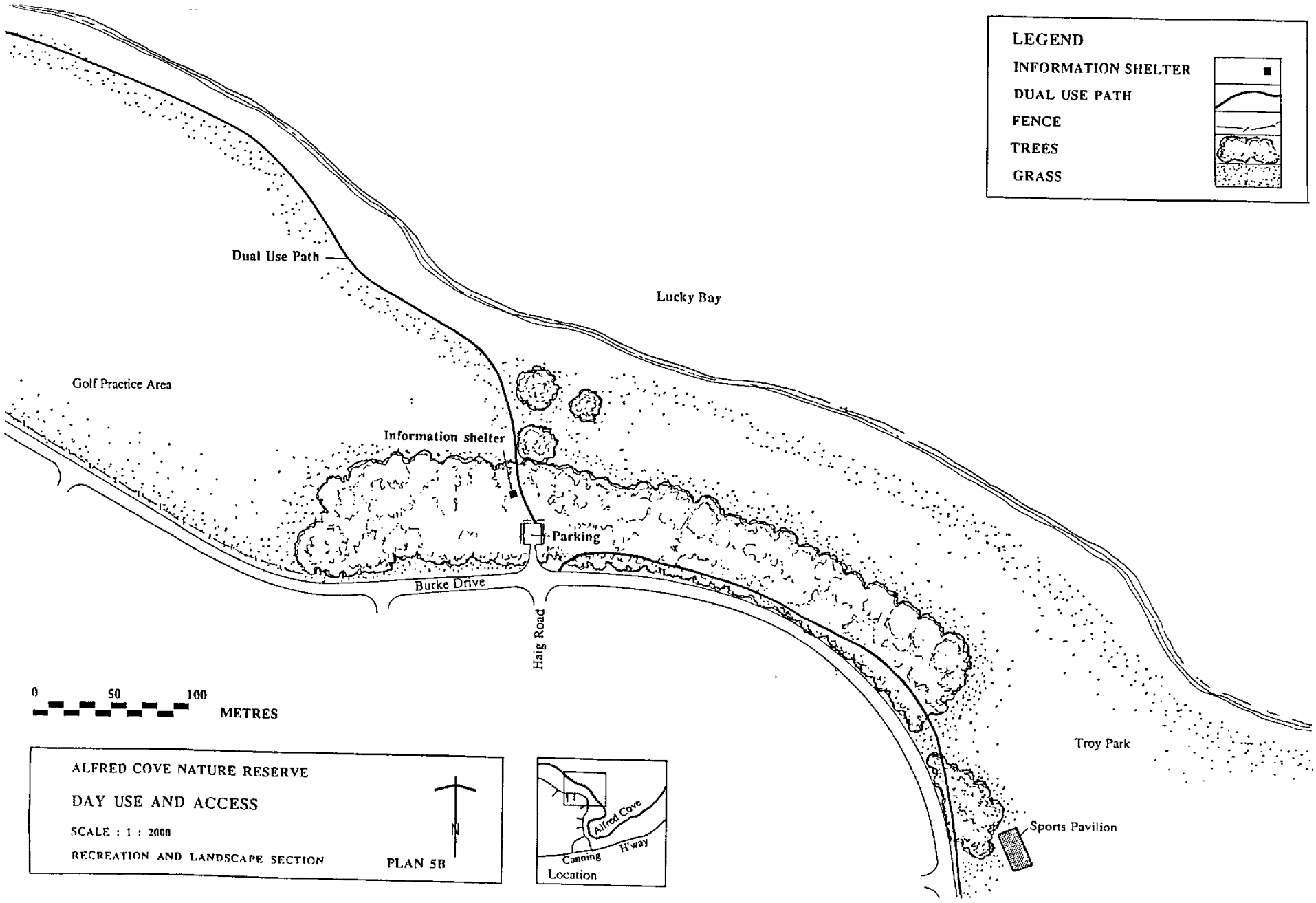
METRES
ALFRED COVE NATURE RESERVE
DAY USE AND ACCESS
SCALE : 1 : 2000
RECREATION AND LANDSCAPE SECTION
PLAN 5A


LEGEND
INFORMATION SHELTER
DUAL USE PATH
FENCE
TREES
GRASS
Dual Use Path
Lucky Bay
Golf Practice Area
Information shelter
Parking
Burke Drive
Haig Road
0
50
100
METRES
Troy Park
Sports Pavilion
ALFRED COVE NATURE RESERVE
DAY USE AND ACCESS
SCALE : 1 : 2000
RECREATION AND LANDSCAPE SECTION
PLAN 5B
N
Alfred Cove
Canning
H'way
Location

Reserve and Marine Park. Neighbouring reserves under the control of the City of Melville provide space for more active recreational pursuits. The Melville Historical Cultural Trail is available for long nature walks in this area and consideration may be given to interpretive facilities adjacent to the Atwell House area. Alfred Cove has further need for more information displays on waterbirds. A boardwalk is proposed for wildlife observation near Point Waylen looking back into Alfred Cove with views of important waterbird feeding and resting areas (see Map 5A). The construction of the boardwalk and access to it will be subject to satisfying design criteria that are sympathetic to existing conservation values as well as secure in relation to inappropriate access and vandalism. An information shelter is proposed for the Alfred Cove Nature Reserve opposite Haig Road in an area of native vegetation near the dual use path (see Map 5B). The fencing from the eastern section of Alfred Cove should be extended to enclose the Point Waylen area, with management access and a self closing gate provided for boardwalk access.

STRATEGIES

1. **Design and develop recreational facilities in accordance with the Department's Policy Statement No. 18 Recreation, Tourism and Visitor Services.**

2. **Design and construct a boardwalk and information shelter near Point Waylen that provides for waterbird observation and includes interpretive information as shown in Map 5A.**

3. **Provide an Information Shelter opposite Haig Road in the area of native vegetation near the dual-use path as shown in Map 5B.**

4. **Extend fencing of Alfred Cove to enclose Alfred Cove and Point Waylen. Provide for management access and install a self closing gate for boardwalk access.**

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27. ORGANISED EVENTS

The objective is to protect the reserve system's conservation values from the negative impacts of organised events in the area.

Organised events such as fishing competitions, the annual Sky Show and other sporting events, can affect the reserve system. Management problems can occur that either adversely affect the environment or result in conflicts with other users. Organised events involve close liaison with other organisations such as local government, the Department of Transport and the Swan River Trust.

STRATEGIES

1. **Seek the support of organisers, competitors and spectators of events to protect the reserve system's values.**

2. **Charge fees or obtain bonds from the organisers of special events (if required) to cover management costs that may be incurred by CALM.**

COMMUNITY RELATIONS

28. INFORMATION, PROMOTION AND INTERPRETATION

The objective is to increase awareness, appreciation and understanding of the reserve system and the concept of managing river, estuarine, wetland and marine systems.

Information about the reserve system, its wildlife and habitats should be provided to the local and broader communities through a range of means. Signs should be provided that inform the public where zones within the reserve system are located as well as interpretive information on conservation values. Ongoing liaison should occur between local government, Fisheries WA, Swan River Trust, Department of Transport, interest groups, other relevant organisations, groups and individuals and CALM. An information interpretation shelter, similar to that provided at Milyu, is proposed for Alfred Cove. There may also be some merit in investigating developing an interpretive centre at Atwell House which is the original farm house in Alfred Cove or at Wireless Hill which overlooks Alfred Cove (see Section 13).

Interpretation will be provided at Alfred Cove and Point Waylen in association with the proposed boardwalk.

Important features of the reserve system should be incorporated in a larger strategy that complements and supplements planned and existing interpretive facilities and activities in other related areas. The migratory wader, waterbird theme, for example, will be related to other wetlands in the State important to migratory species as well as those countries in the northern hemisphere where they reside. Scientific study groups and organisations, such as Birds Australia and CALM's Science and Information Division, have a wealth of information on these three areas and interpretive programs could be tied in with ongoing monitoring. Interpretation can also tie in other related river systems such as the neighbouring Canning River, other similar estuarine systems and other marine parks within the State.

STRATEGIES

1. **Develop and implement an interpretive plan that incorporates information, education, promotion and interpretation programs and strategies.**

2. **Liaise with scientific study groups and organisations to develop an information base.**

3. **Provide interpretive information on the geology, geomorphology, soils and vegetation of the reserve system.**

4. **Investigate the potential of scientific study activities in interpretation programs.**

5. **Continue to provide information to the local and broader communities through a range of means, including distributing CALM brochures and releasing media articles.**

6. **Develop interpretive signs associated with proposed boardwalks.**

7. **Develop further interpretive information for information shelters including zone locations within the reserve system.**

8. **Investigate developing an interpretive centre at Atwell House.**

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29. EDUCATION

The objective is to encourage educational and other groups to use the reserve system in ways that minimise their impacts while maximising educational benefits.

The Swan Estuary Marine Park and its adjacent reserves are both easily accessible to educational groups and a valuable educational resource. All three areas have been used extensively for school group excursions. The Perth Zoo, South Perth Primary School and the City of South Perth have been involved in a revegetation program at Milyu that has been going for a number of years and was awarded a Greening Australia (WA) prize in recent years. All three areas have been the subject of studies by tertiary institutions culminating in the production of valuable information that has been useful in preparing this plan.

Student projects and interpretive excursions have great educational value as well as a great deal of potential to add to the accumulated knowledge about the areas with the added advantage of being able to contribute to the development of management strategies. Close liaison between CALM and school groups can be beneficial to both parties particularly if a long-term approach to monitoring is planned and students can feel part of an important management initiative.

STRATEGIES

1. **Assist and encourage educational programs and group activities.**

2. **Review and combine educational and monitoring programs where practical to maximise benefits to both CALM managers and the students and teachers involved.**

3. **Modify any educational activities that are not compatible with other values and uses within the reserve system.**

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30. COMMUNITY INVOLVEMENT

The objective is to liaise with the community and encourage and facilitate its involvement in management.

The community, be it individuals, organisations or special interest groups, can become involved in managing the reserve system. Students, local residents and State and local government agencies can become involved in educational, research and rehabilitation programs.

It is proposed that CALM establish a Metropolitan Marine Parks Consultative Committee to coordinate and integrate management and to report on the implementation of management plan strategies. This committee would deal with the Marmion and Shoalwater Islands Marine Parks as well as the Swan Estuary Marine Park.

The South Perth Primary School, the Perth Zoo, the City of South Perth and Birds Australia have contributed to both on-going management and data collection which have influenced management strategies. A Friends group has recently been formed to encourage individuals to continue a rehabilitation project at Milyu Nature Reserve that started over 15 years ago (City of South Perth, 1993).

STRATEGIES

1. **Maintain and foster close communications with organisations and groups actively involved in the reserve system.**

2. **Identify recommendations within this Plan that can be implemented by community involvement.**

3. **Support and integrate programs that involve community organisations, educational groups and volunteers in managing and monitoring flora, fauna and water quality in the reserve system and in surrounding areas.**

4. **Establish a Metropolitan Marine Parks Consultative Committee to facilitate community consultation and interagency management.**

COMMERCIAL AND OTHER USES

31. COMMERCIAL USE OVERVIEW

The commercial directions for this reserve system will focus on developing nature-based tourism programs that highlight the area's conservation values, particularly as a feeding ground for migratory waders and other waterbirds.

Fisheries activities in marine parks are regulated under the Fish Resources Management Act and managed by Fisheries WA in consultation with CALM. The only licensed commercial fishing activity in the Marine Park is net fishing, a traditional use involving only a small number of operators. Recreational fishing pressures are expected to increase but should not affect the viability of the commercial fishing industry. Commercial wind surfing equipment hire and instruction operations are permitted to a limited extent (see Section 33).

Other commercial uses of the reserve system are not likely to play a major role (see Section 35). Licenses with conditions for any commercial recreational uses will be necessary to ensure impacts on other reserve system values are minimised and manageable.

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32. COMMERCIAL FISHING

The objective is to maintain long-term sustainability of fish populations, their habitat and the commercial fishing industry.

Currently 10 commercial fishermen operate in the Swan-Canning River system using techniques that have changed very little over the last 50 years. Small narrow boats with haul and set nets are used. Motors are used only to get the boat near the area to be fished and the best fishing occurs during the quiet of early morning and late at night.

The shallow areas within the Marine Park are productive fishing grounds. This traditional way of fishing has a minimal impact because the gear used is selective in terms of size of fish caught, the net length and mesh size required. The majority of fish species caught, such as sea mullet, can only be taken with a net. Some species are caught both by recreational anglers and commercial net fishermen but there is little conflict. The only species which has been declining significantly in the last few years is cobbler. This popular eating species is targeted both by recreational and commercial fishers.

Out of the 10 commercial fishermen operating in the Swan Canning River System, only six are making a full time living from the profession. No new estuarine fishing licenses are being issued within this 'restricted entry fishery' and licenses can only be transferred to a close member of the licensee's family or a trainee after approval of the Minister for Fisheries. The number of commercial fishermen has been reduced from over 60 to 10 in the last 50 years.

Commercial net fishing within the Swan Estuary Marine Park is considered to be a closely managed and minimal impact activity with a traditional, historical value, which will continue to be permitted subject to a limited number of licensed operators to sustain the estuarine fishery. The operating times early in the morning and late at night also minimise the impact on waterbird and recreational activities. The sight of this traditional activity occurring during these times of the day also has some visual aesthetic appeal.

STRATEGIES

1. **Permit commercial net fishing as regulated and managed under the Fish Resources Management Act, to continue in the Marine Park waters up to the vegetation line.**

2. **Ensure that commercial net fishing has a minimal impact on other Park values.**

3. **Liaise with Fisheries WA to ensure that the sustainability of the take of cobbler and other fish species in the Marine Park is monitored.**

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33. COMMERCIAL CONCESSIONS

The objective is to encourage commercial concessions in and near the reserve system particularly those that are environmentally sensitive and are of educative or interpretive value to visitors.

A commercial concession is a right granted by way of license for occupation or use of an area of land or water managed by CALM. Each proposal for a concession by way of license will require approval of the Minister. All compatible commercial operations operating within the reserve system are to conform to the management plan and be licensed under the provisions of the Conservation and Land Management Regulations 1992.

The potential exists to establish nature-based tourism activities to observe waders and waterbirds. Whilst community based organisation have expressed interest in establishing these types of activities, expressions of interest may need to be called prior to licenses being issued.

Lease arrangements have been made in relation to the Point Waylen communications facility in the CALM Act section 5(g) reserve. Existing commercial operations occurring within the Park will be licensed. Revenue acquired from license or lease fees would be used for management of the reserve system.

STRATEGIES

1. **License commercial concession operations that are consistent with CALM policy and the objectives of this Plan.**

2. **Ensure that revenue to CALM from licensed commercial operations contributes to management of the reserve system.**

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34. WATER TRANSPORT SERVICES

The objective is to ensure water transport services operating in or near the Park are environmentally and socially sensitive and, where possible, provide educative or interpretive value to visitors.

Water transport services in the Swan River which go near Marine Park waters are valuable for promoting Park values both in terms of written material such as posters and brochures, and also through ferry boat operators speaking to their passengers during the trip.

Water transport services can also have an adverse impact on the reserve system's values if they travel too close to the shoreline. Backwash from boats can cause wakes that accelerates erosion rates, particularly at Pelican Point. Educating transport service operators of this impact could reduce it significantly.

STRATEGIES

1. **Liaise with the Department of Transport, Swan River Trust and water transport services to promote and disperse information on the Swan Estuary Marine Park and adjacent CALM reserves.**

2. **Encourage water transport service operators to be sensitive to the Swan Estuary and foreshore values and to minimise their impact on the values in the reserve system.**

35. STRUCTURES, FACILITIES AND DEVELOPMENTS

The objective is to approve and establish only those structures, facilities and developments that are compatible with other Park values and management objectives.

Markers for assisting boat navigation within marine parks are installed and maintained by the Department of Transport in consultation with CALM. Approval for moorings, launching ramps, platforms or any other structures in the reserve system is required from the Department of Transport in consultation with CALM, Swan River Trust and local government. Design, location, licensing and installation are the responsibility of the Department of Transport. The installation of moorings is considered to be inconsistent with the conservation objectives for this marine park due to the impact on seagrass beds. Further structures, facilities and developments including moorings are not likely unless they are designed to enable greater appreciation of the nature conservation values of the reserve system or help to demarcate management zones to protect conservation values.

Mineral or petroleum resource exploration and development are unlikely to occur anywhere within or near the marine park as this area is considered, from available geological evidence, to be non-prospective. Access to marine park areas to explore or develop resources is subject to legislation, State Government policy and interdepartmental procedures between the Departments of Minerals and Energy, CALM, Swan River Trust and the Department of Environmental Protection.

STRATEGIES

1. **Liaise with the Swan River Trust, Department of Transport, local government and other relevant government departments on matters involving structures, facilities and development.**

2. **Ensure removal of the existing Point Waylen communications tower and associated facilities, through use of the funds acquired from leasing of the facility and include the land in the reserve system when the facility has been decommissioned.**

3. **Monitor the impact of current moorings on seagrass beds and prohibit the construction of new moorings.**

INTERACTION WITH NEARBY LANDS AND WATERS

36. PRIVATE PROPERTY

The objective is to encourage complementary management of nearby private property with the reserve system.

Private property owners near the reserve system should be encouraged to become familiar with the management plan's objectives. The social and environmental sensitivity of any proposed development is assessed through the local government process with State consultation, advice or impact assessment if required. Residential density and infrastructure can influence drainage quantity and quality. Residential groundwater extraction and domestic water pollution inputs are concerns that can be addressed through educational programs and controls and regulations. Private property owners near the reserve system can be encouraged to use water wisely, to protect and replant local native species and to reduce nutrient run-off and pollution. Private property owners near the reserve system should also be informed of the importance of keeping pets from straying onto the reserve system (see Section 17).

STRATEGIES

1. **Inform near or adjoining private property owners of the reserve system's values and sensitivities and the various ways that they can participate in the planning process and in ongoing management programs.**

2. **Encourage private property owners to manage their properties in sympathy with the management objectives of this Plan.**

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37. GOVERNMENT LANDS AND WATERS

The objective is to encourage complementary management of Government lands and waters that are adjacent to the reserve system.

Local government land adjacent to and close to the reserve system includes that held by the Cities of South Perth, Melville, Subiaco and Nedlands.

Foreshore reserves under local government control require complementary management with the CALM conservation reserve system to ensure management plan objectives can be met.

Management plans for these local government foreshore reserves are important particularly where conservation values are at risk or where conflict with activities is occurring.

State Government departments with land or water management responsibilities in the reserve system or nearby include the Swan River Trust, the Department of Transport, Fisheries WA, the Water Corporation and the Department of Land Administration. The Point Waylen area held by the Department of Land Administration includes vacant Crown land and an area leased for communication purposes. This area, which is almost an enclave in the reserve system, is an important wader and waterbird feeding area and contains significant fossil sites giving the area a high conservation value.

Main Roads WA manages roads and their drainage near Milyu and Alfred Cove. Road design, drainage and foreshore stabilisation developments in areas near these nature reserves need to be planned in collaboration with CALM, the Swan River Trust and other relevant government agencies.

STRATEGIES

1. **Seek local government and State Government agencies' support for the complementary management of areas near or adjacent to the reserve system.**

2. **Encourage and assist local or State Government agencies to assess impacts, plan sympathetically and prepare management plans where conservation values of the reserve system or nearby areas are at risk.**

3. **Refer to CALM any development proposal that is likely to have a negative impact on the reserve system's values or which is not consistent with the management objectives of this plan.**

4. **Investigate the impact of the lights at Troy and Tompkins Parks in order to protect the waterbird populations frequenting these areas.**

RESEARCH AND MONITORING

38. OVERVIEW

Nature conservation and social research have been carried out and data collected by local government, educational institutions and a number of State and Commonwealth Government agencies, including CALM, the Swan River Trust, Fisheries WA, CSIRO and tertiary institutions. There are also cooperative research programs by organisations and institutions proposed or being undertaken by the Western Australian Estuarine Research Foundation. A large number of books, publications and reports are available on the Swan Estuary and its natural and social history and biology.

The Swan River Trust is responsible for planning and managing the Swan River Trust Management area. The Swan Estuary Marine Park and adjacent CALM reserves are within this management area. The Swan River Trust is, therefore, a regional focus and logical central organisation for Swan River research information. All research information specific to the CALM reserve system should be held with CALM's Marine and Coastal District, and its Perth District Office. State Government organisations should liaise closely to ensure easy access to all research information.

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39. NATURE CONSERVATION

The objectives are to:

- *Identify and increase knowledge of the reserve system's estuarine and terrestrial biota.*
- *Identify and increase knowledge and understanding of the reserve system's natural processes.*
- *Assess and evaluate the environmental impact of activities in the reserve system.*

Research and monitoring in the Swan Estuary Marine Park and the adjacent CALM-managed reserves has included wader and waterbird studies by members of Birds Australia and CALM research scientists, and fish population studies by Fisheries WA. CALM has also carried out flora assessments and the former Waterways Commission, through the Swan River Trust, has monitored water quality and activity impacts in neighbouring foreshores. Staff and students from Western Australian tertiary institutions have also gathered important information and presented management strategies for areas of the reserve system.

Future studies by a number of State Government agencies will be focussing on water quality of the Swan River. Activity impact studies will be equally important to develop regulations and area restrictions in the Swan River. Of particular importance in the Swan Estuary Marine Park will be evaluating any impact in the special purpose zone for wildlife protection.

STRATEGIES

1. **Collate and store research information on the Swan River and its foreshores with the Swan River Trust, CALM's Marine and Coastal District and the CALM Perth District Office.**

2. **Coordinate research efforts and exchange of information between research agencies on an annual basis, and undertake, commission or encourage projects that assess and evaluate environmental impacts of activities within the reserve system.**

3. **Encourage and support research by government agencies, volunteer organisations and educational institutions.**

4. **Develop and coordinate a monitoring program to assess waterbird population dynamics and identify management strategies to enhance waterbird use of the reserve system.**

5. **Liaise with conservation groups, such as the Wetlands Conservation Society in managing and monitoring the reserve system.**

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40. SOCIAL RESEARCH

The objectives are to:

- *Monitor use and forecast future recreational demands.*
- *Monitor the impact of visitor use and management activities.*
- *Increase knowledge of cultural values.*

Social research in the reserve system in the past has concentrated in the Alfred Cove area with a number of visitor and neighbour surveys having been carried out. The issue survey carried out during the preparation of the draft plan illustrates the public's concerns about certain activities in the reserve system (see Section 3). Social research at Alfred Cove carried out by Murdoch University Environmental Management students indicated that most visitors were only walking or cycling through the area. People who used the Cove

were for the most part a small group of birdwatchers. However, the survey indicated that many more people would use the Cove if bird observation points, a boardwalk or a nature trail were provided. It will be important to encourage social research that can assess visitor expectations and perceptions of reserve management.

STRATEGIES

1. **Monitor use of the reserve system by assessing patterns and preferences of use. From this information forecast future recreational demands.**

2. **Monitor local property owner and visitor expectations and perceptions of reserve management and equity of use.**

3. **Encourage volunteers, educational institutions and other agencies to participate in social research projects.**

PLAN IMPLEMENTATION

41. STAFFING AND MANAGEMENT

The objective is to ensure that staffing levels are sufficient to manage the reserve system.

The reserve system is within CALM's Swan Region. The Marine and Coastal District is responsible for managing the Swan Estuary Marine Park and the Perth District is responsible for terrestrial reserve management.

CALM provides coordination for an integrated interagency management approach that includes the Swan River Trust, Fisheries WA, Department of Transport and local government authorities.

STRATEGIES

1. **Ensure regular interagency liaison between CALM and agencies involved in managing the reserve system and surrounding areas.**

2. **Ensure sufficient staff and resources to implement the strategies of this plan.**

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42. FUNDING

The objective is to provide sufficient funds to implement this Plan from available resources and through alternative sources.

Implementing the recommendations in this Plan will require some increase in funding particularly to provide the recreational facilities proposed. In addition to the usual budgetary sources, alternative funding could come from special grants, sponsorship or future possible commercial concession operations.

STRATEGY

1. **Pursue additional funding to implement this Plan from external sources as well as from lease and licensing revenue.**

43. PLAN MONITORING AND REVIEW

The objective is to periodically monitor the progress made in implementing this Plan and review the Plan as required.

In the light of new information, the plan may be revised. Implementation should be reviewed periodically and priorities revised. The MPRA and NPNCA have monitoring procedures that guide the review of progress, priority and relevance of strategies, and enable management deficiencies, should they be present, to be addressed. If reviews indicate it is necessary, the CALM Act provides for the plan to be amended or a new plan produced. The term of this plan will be 10 years. Any proposed revision is subject to approval by the relevant authority, and if approved will be released for public comment.

STRATEGIES

1. **Assist the MPRA and NPNCA to monitor the Plan's implementation.**

2. **Review or amend the Plan, if necessary, in the light of new information.**

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44. PRIORITY IMPLEMENTATION

The objective is to assign priorities to the strategies in this plan and to implement the plan in accordance with assigned priorities.

The special purpose wildlife protection zone in the intertidal area is important for waders and waterbirds and juvenile fish and is a focus for protection and conservation measures. Recommendations that are specific to this area will be given a high priority. Conserving the wetland and surrounding vegetation will also be as high a priority as protecting and conserving the wildlife habitat, particularly for avifauna.

The scientific study and educational values of this reserve system will also be developed and promoted to enhance the conservation values and heighten community awareness and support for protecting and conserving values. It will be a high priority to inform the community of the zoning scheme area restrictions and activity regulations.

Key Strategies are listed at the beginning of this management plan and indicated throughout the plan

where any new initiatives or prescriptions for actions are required. Priorities for implementation of the full complement of strategies will be reviewed on an annual basis or as circumstances change and a need for changing of priorities becomes apparent.

The MPRA and the NPNCA will be kept advised of implementation priorities and the achievement of strategies prescribed by this management plan. The MPRA will be provided with advice with regard to the performance criteria it may set for the evaluation of implementation of the Plan.

STRATEGY

1. **In consultation with the MPRA and the NPNCA develop and periodically revise an Implementation Program that includes priorities for the implementation of strategies and performance criteria for evaluating Plan implementation.**

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APPENDICES

APPENDIX A

Marine Park Zoning

Development of management zoning schemes is a fundamental aspect of reserve and marine park planning that allows spatial and temporal separation of incompatible activities, provided the permitted activities are consistent with the purpose of reservation. The marine reserves legislation establishes a management zoning scheme that provides for exclusion and permissible zones in marine parks in respect of exploratory drilling and production of oil and gas, aquaculture, commercial and recreational fishing and pearling and hatchery activity. Amendments to the Mining Act also take into account the standing of exclusion zones in marine parks. This management zoning scheme clarifies the extent of access to marine parks for important commercial and recreational interests while at the same time providing a management framework complementary to the conservation purposes of these reserves.

There are four management zones that can be established in a marine park:

- **Sanctuary Zones** are "look but don't take' areas managed solely for nature conservation and low impact recreation and tourism.
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- **Recreation zones** provide for conservation and recreation including recreational fishing (subject to bag limits and pother conservation measures).
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- **General Use Zones** are areas of marine parks not included in sanctuary, recreation or special purpose zones. Conservation of natural resources in general use zones is the priority, however activities such as sustainable commercial fishing, aquaculture, pearling and petroleum exploration and production are permissible provided they do not compromise conservation values.
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- **Special Purpose Zones** are managed for a particular priority use or issue. This could be the protection of habitat, a seasonal event (such as wildlife breeding or whale watching), or a particular type of commercial fishing. Uses compatible with the priority use or seasonal event are allowed in these zones.

Unlike reserve boundaries, zone boundaries may be amended as management requirements change and in that respect zoning is a flexible management tool. If a management plan does not provide for zone amendments then a proposal to amend zones is subject to public scrutiny in the same manner as a draft management plan.

In Marine Park sanctuary zones, recreation zones and certain special purpose zones, drilling for exploration and production of oil and gas, commercial fishing, aquaculture as well as pearling and hatchery activities will not be permitted. In general use zones and other special purpose zones they may occur subject to the Acts under which these activities are administered. The special purpose zones, where these activities will not be permitted, are those where it has been declared by notice that these activities would be incompatible with a conservation purpose specified in the classification notice.

Recreational fishing will be precluded from;
- sanctuary zones
- the special purpose zones where it has been declared by notice that this activity would be incompatible with a conservation purpose specified in the classification notice; and
- recreation zones where it has been declared by notice that this activity would be incompatible with another recreational purpose specified in the classification notice.

Management zones are formally established by being gazetted areas under Section 62 of the Conservation and Land Management Act 1984.

Appendix B

PROPOSED 8 KNOT SPEED LIMIT AREAS