

**DRAFT PLAN OF MANAGEMENT FOR THE  
PROPOSED MIABOOLYA BEACH  
FISH HABITAT PROTECTION AREA**

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Draft Plan of Management for the  
Proposed Miaboolya Beach  
Fish Habitat Protection Area

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## **WOULD YOU LIKE TO COMMENT?**

### **DRAFT PLAN OF MANAGEMENT**

### **PROPOSED MIABOOLYA BEACH FISH HABITAT PROTECTION AREA**

The Department of Fisheries seeks comment from members of the public and involved stakeholder groups on this Draft Plan of Management, in accordance with S118 of the *Fish Resources Management Act 1994*. Any comments will be taken into consideration prior to the preparation of a final Plan of Management.

Submissions should be sent to:

Manager, Marine Planning  
Fish and Fish Habitat Protection Program  
Fisheries WA  
3<sup>rd</sup> Floor, SGIO Atrium  
170 St Georges Terrace  
Perth WA 6000

The closing date for submissions is 30 April 2002.

If you require further information regarding the status or content of this document, please contact Ms Eve Bunbury, Manager, Marine Planning, Fish and Fish Habitat Protection Program on (08) 9482 7397

## CONTENTS

<b>WOULD YOU LIKE TO COMMENT? .....</b>	<b>2</b>
<b>1.0 INTRODUCTION.....</b>	<b>5</b>
<b>2.0 METHODOLOGY.....</b>	<b>7</b>
2.1 Identification of the site .....	7
2.2 Consultation.....	7
<b>3.0 DESCRIPTION OF SITE.....</b>	<b>9</b>
3.1 Miaboolya System .....	9
3.1.1 Mangroves .....	10
3.1.2 Salt Marshes .....	11
3.1.3 Dune Ridges.....	12
3.2 Importance of the Miaboolya Ecosystem.....	12
<b>4.0 DESCRIPTION OF USERS .....</b>	<b>15</b>
<b>5.0 VALUES OF THE AREA .....</b>	<b>17</b>
5.1 Environmental Values .....	17
5.2 Cultural Values .....	17
5.3 Research and Education Values .....	17
5.4 Recreational Values .....	18
<b>6.0 THREATS .....</b>	<b>19</b>
<b>7.0 MANAGEMENT PLAN .....</b>	<b>21</b>
7.1 Aim .....	21
7.2 Boundary .....	21
7.3 Purpose of Fish Habitat Protection Area .....	21
7.4 State and National Context .....	22
7.5 Selection Criteria Justification .....	23
<b>8.0 OBJECTIVES AND PROPOSED MANAGEMENT STRATEGIES... 25</b>	

<b>8.1</b>	<b>Education .....</b>	<b>25</b>
<b>8.1.1</b>	<b>Recommendations .....</b>	<b>25</b>
<b>8.2</b>	<b>Community Involvement.....</b>	<b>26</b>
<b>8.2.1</b>	<b>Recommendations .....</b>	<b>26</b>
<b>8.3</b>	<b>Recreational Fishing .....</b>	<b>26</b>
<b>8.3.1</b>	<b>Recommendations .....</b>	<b>27</b>
<b>8.4</b>	<b>Commercial Fishing.....</b>	<b>27</b>
<b>8.4.1</b>	<b>Recommendations .....</b>	<b>28</b>
<b>8.5</b>	<b>Gascoyne River Management .....</b>	<b>28</b>
<b>8.5.1</b>	<b>Recommendations .....</b>	<b>28</b>
<b>8.6</b>	<b>Land Use Planning .....</b>	<b>29</b>
<b>8.7</b>	<b>Nature-Based Tourism .....</b>	<b>29</b>
<b>8.7.1</b>	<b>Recommendations .....</b>	<b>29</b>
<b>8.8</b>	<b>Mining and Exploration .....</b>	<b>30</b>
<b>8.8.1</b>	<b>Recommendations .....</b>	<b>30</b>
<b>8.9</b>	<b>Resourcing, Surveillance and Enforcement .....</b>	<b>30</b>
<b>8.9.1</b>	<b>Recommendations .....</b>	<b>30</b>
<b>9.</b>	<b>IMPLEMENTATION PLAN .....</b>	<b>31</b>
<b>9.1</b>	<b>Reservation .....</b>	<b>31</b>
<b>9.2</b>	<b>General.....</b>	<b>31</b>
<b>10.</b>	<b>REFERENCES.....</b>	<b>33</b>
<b>11.</b>	<b>LIST OF GROUPS AND PEOPLE CONSULTED DURING THE PRE-PLANNING PROCESS.....</b>	<b>35</b>
	<b>FISHERIES MANAGEMENT PAPERS .....</b>	<b>42</b>
<b>FIGURES</b>		
<b>Figure 1</b>	<b>Location of proposed Miaboolya Beach FHPA .....</b>	<b>37</b>
<b>Figure 2</b>	<b>Mangrove ecosystem .....</b>	<b>38</b>
<b>Figure 3</b>	<b>Gascoyne River catchment.....</b>	<b>39</b>
<b>Figure 4</b>	<b>Aerial photograph of southern Miaboolya Beach and associated mangrove system .....</b>	<b>40</b>
<b>Figure 5</b>	<b>Model of Miaboolya ecosystem .....</b>	<b>41</b>

## 1.0 INTRODUCTION

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Miaboolya Beach is an area of the Gascoyne River delta near Carnarvon. The proposed Fish Habitat Protection Area (FHPA) covers the nearshore waters and extends north to South Bejaling and south to the northern side of the Gascoyne River mouth. In addition, it includes the adjoining mangrove system, associated seasonal creeks and salt marshes (see Figure 1).

The aims of the proposal outlined in this draft management plan is to protect and rehabilitate the aquatic habitat of Miaboolya Beach, the associated mangrove ecosystem, and involve the community in their management.

By setting the area aside as a FHPA, the Department of Fisheries will establish a framework to promote and actively conserve all the habitats within the Miaboolya system, as described in Section 3 of this document.

Currently, the area is mainly used for recreation, including fishing and mud crabbing. Other recreational uses include horse riding, tourism, camping and swimming. The Miaboolya area also holds significant cultural value for the local Aboriginal people.

Studies conducted by Carnarvon Senior High School and the Department of Fisheries indicate that the Miaboolya Beach area is a nursery for fish species of importance to recreational fishers, along with other aquatic life. It is the only identified tailor (*Pomatomus saltatrix*) nursery area in the Gascoyne Region.

There are concerns that recreational netting in the Miaboolya Beach area may be impacting on juvenile fish who use it as a nursery. The associated mangroves provide important mud crab habitat.

Carnarvon Senior High School first proposed the conservation of the Miaboolya area, in response to concerns about the environmental degradation of the mangrove system and the possibility that over-fishing and inappropriate fishing practices could lead to local depletions of finfish and mud crabs.

In 1998, the Department of Fisheries obtained a grant from Coastcare/Coastwest to produce a Management Plan for a proposed FHPA at Miaboolya Beach. The Management Plan is aimed at helping the management of human activities within the Miaboolya area, thus minimising their impacts.

This document is a draft produced for public comment. The Department of Fisheries seeks comments from the public for input into the resulting final Plan of Management. If you would like to discuss the content of this document or require further information, please contact Ms Eve Bunbury on (08) 9482 7397.



## **2.0 METHODOLOGY**

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### **2.1 Identification of the site**

With the assistance of a Fishcare WA grant, the Carnarvon Senior High School (CSHS) undertook a survey of the eastern shallows of Shark Bay to identify which areas are most utilised by fish. This work (see Section 3 of the document) quickly demonstrated the Miaboolya ecosystem is regionally the most important nursery area for a number of coastal finfish, including tailor, mullaway, threadfin salmon, kingfish, whiting, and bream.

A total of 130 species were identified within the Miaboolya ecosystem. In addition, it supports an important recreational mud crab fishery.

In an attempt to identify reasons for the importance of this area to fish, a conceptual model of the ecosystem (see Section 3) was developed by Department of Fisheries staff after a field investigation and consideration of research into the fish stocks undertaken by Murdoch University, Carnarvon Senior High School and the Department of Fisheries. Consideration was also given to current texts relating to mangrove systems in Western Australia.

### **2.2 Consultation**

The draft management plan for Miaboolya Beach was developed through a process of data gathering and consultation with the local community. The Carnarvon Senior High School had collected a large body of research data, which has been used in the draft plan.

There is limited published information on the specific environmental, social or cultural values of the area, so much use was made of anecdotal information from key individuals with good local knowledge. Discussions on these values were also carried out with staff from the Carnarvon Shire, Department of Land Administration, Conservation and Land Management and other key bodies and groups.

Initial community input to the Miaboolya Beach FHPA proposal was obtained through a series of public meetings, radio interviews and discussions with interest groups and individuals, as outlined in Appendix 1 of this document. A public meeting was held in Carnarvon on 2 May 2000, to inform people about the proposal to establish a FHPA. Details were advertised in the *Northern Guardian* newspaper and local radio stations Radio 6LN and ABC Radio. Main user group representatives were also approached to attend the meeting.

The initial meeting was used to determine the issues and concerns that the public had regarding Miaboolya Beach. It also provided a gauge of the attitude of the community towards conservation of the area. The meeting was well attended, by the

general public and representatives of special interest groups, such as angling clubs and conservation groups.

Following the initial meeting, the local radio stations were further utilised to obtain feedback and additional comments from the community. Several media releases were placed in the *Northern Guardian* as the plan progressed, to keep user groups informed as to the progress of the proposal.

Individual interviews were also conducted with some of the interest groups. A variety of opinions was provided by local clubs, individuals, government and non-government organisations, as outlined in Appendix 1.



### **3.0 DESCRIPTION OF SITE**

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#### **3.1 Miaboolya System**

Miaboolya Creek is unusual in that it is the only creek system in the Gascoyne that is separated periodically from the open ocean by a sandbar for several months at a time. This process creates an unusual estuarine ecosystem that at times is a coastal lagoon.

The fish and crab stocks use this environment for breeding, growth and development. Some community members have indicated that they believe breeding cycles are stimulated when there is flooding in the Gascoyne River system.

The Miaboolya area sits between the exposed rocky shoreline, with coral reefs surrounding Quobba, and the wide tidal flats and offshore sand banks of the Shark Bay region, as shown on Figure 1.

The Miaboolya ecosystem can be described as consisting of five major components - namely nearshore waters, mangroves, salt marshes algal mats and dune ridges, as described in Section 3 of this document. These components can be seen in Figure 4.

The nearshore waters environment at Miaboolya Beach consists of a number of gutters, separated by shallow sandbars, running parallel to the shore. The gutters vary between 30cm and 1.5m deep.

The sandbars are formed when the heavy silt load in the water flowing from the nearby Gascoyne River is carried north by ocean currents. The silt settles out of the water column and is deposited into these mobile sand bars, which are maintained by the wave action. The gutters shift seasonally and bars are usually formed across the mouths of Miaboolya Creek. High tides or run-off from rainfall in the catchment causes the creek to only open periodically.

Miaboolya Beach is fully exposed to the ocean, which has a maximum tidal range of 1.5 metres. Salinity in the estuary fluctuates, in response to river flow, rainfall and evaporation. Data suggests that it can vary from almost fresh to a very saline 42 parts per thousand (ppt) - note that normal seawater is 33 ppt.

Water conditions at the beach are often turbid and it is common for the water to be muddy-brown. Turbidity increases when the Gascoyne River and Miaboolya Creek are flowing.

The offshore gutters support a variety of juvenile fish species including tailor (*Pomatomus saltatrix*), mullet (*Argyrosomus spp.*), sand whiting (*Sillago ciliata*), dart (*Trachinotus bailloni*), northern threadfin salmon (*Polydactylus spp.*), tarwhine (*Rhabdosargus sarba*), and various species of crabs, such as blue swimmer and green mud crabs (family Portunidae).

Mangroves dominate the inshore environment. The mangrove system surrounds the mouth of Miaboolya Creek and extends along the entrance road to the car park. The

mangrove creeks support adults and juveniles of the species outlined above. It also provides the mud crab population with an ideal habitat, supplying food and shelter. Turtles also occur in the creek system. (Stewart *et al* 1998).

### 3.1.1 Mangroves

Mangroves usually grow in the area between where high spring tides reach and mean sea level. The term 'mangrove' refers to individual tree or bush species, while a community of mangrove plants is called a mangal.

Mangroves belong to a variety of plant families having common features such as pneumatophores, which are root outgrowths that assist in aeration, and seeds that germinate while attached to the parent plant. These features are adaptations that assist the plants to survive in a harsh environment. (Semeniuk *et al* 1978).

Mangroves grow best in areas with warm climates, salt water along protected shorelines, muddy substrates and a high tidal range. All of these attributes are found around the mouth of the Gascoyne River.

Mangroves are typically 'zoned' (i.e. different species occur in various locations, determined by the frequency of flooding by tidal waters, soil type, soil salinity, drainage, slope, plant interactions and animal interactions). However, at Miaboolya there are only stands of white mangrove (*Avicennia marina*).

There is now a considerable body of evidence that mangroves play an important role in supporting a wide range of marine life in near-shore waters, and in sustaining coastal fisheries (see Figure 2).

Life in the mangrove community involves interaction between plants, marine animals and terrestrial fauna. Mangroves provide the basis for food chains involving various marine and terrestrial organisms (in the form of leaf litter and other plant detritus on the ground), and for insect, bird and bat populations (in the form of leaves, flowers and fruits).

Mangroves also provide the habitat for many other organisms such as algae and diatoms, which are primary links in food chains as shown in Figure 2 (Semeniuk *et al.* 1978).

The animals that are associated with mangroves span a wide range of invertebrate and vertebrate groups. This fauna is often distributed in distinct zones related to frequency of tidal flooding, soil types, salinity, and the type of surrounding plant community. Many of the animals exploit the mangal as a habitat, nursery ground or a source of food.

Fauna in mangroves may be distinguished as either 'resident' or 'temporary'. Resident fauna includes ground-dwelling surface animals such as crabs, shrimps and worms; tree teredo (also known as "ship worm"), and a host of insects, birds and bats, which use mangrove foliage as habitat and derive food from leaves, flowers and fruit.

Mangroves provide vital feeding grounds for temporary fauna made up of free-swimming animals such as fish and crustaceans that invade the mangal environment at high tide, and of terrestrial animals such as birds, reptiles and mammals that invade the areas at low tide. Additionally, numerous fish and crustacean species (notably banana prawns) use the mangrove environment as a nursery.

Thus, in terms of plant primary production, feeding grounds and nursery beds, mangroves are a vital resource.

It has been shown that the destruction of mangroves can lead to a major change in near-shore ecology, with a subsequent decline in recreational and commercial fishing. Studies have shown that in some coastal waters, most fish caught commercially were linked to food chains that depended on mangroves - as demonstrated in the Carnarvon Senior High School study.

Consequently, mangrove loss is accompanied by a dislocation of the food chain, accompanied by the loss or severe depletion of organisms within the chain. Destruction of mangroves also results in a loss of habitat for a large range of terrestrial organisms such as insects, birds and bats.

Mangroves also help to stabilise coastlines and protect them from storm attack by absorbing wave energy, slowing down currents and protecting the substrate against erosion. Where mangroves have been removed, coastlines that once experienced moderate shore erosion have undergone greater erosion (Semeniuk *et al.* 1978).

For preservation of natural habitats, protection from coastal erosion, and the sustenance of offshore fisheries, careful management of mangrove habitats is essential. It must be recognised that tidal flats in front of mangrove systems and the supra-tidal flats behind them are important to the system concerned.

### **3.1.2 Salt Marshes**

Salt marshes exist in low energy environments around the mangrove system and the upper reaches of tidal influence. These areas support low shrubby glass worts (popularly known as brown samphires) and in some places there are wide expanses of bare mud. In addition, these flats support algal mats, which are an important component of the mangrove system.

Sediments are introduced onto the salt marshes during normal tidal inundations and storms, and are deposited from suspension and trapped by plants. (Graig 1983).

The salt marsh system - which includes bare mud flats - supports a system of algal mats. Above this are samphire communities which is a low herbland dominated by *Holasarcia*, *Salicornia*, *Frankenia* and *Atriplex*. Saltwater couch (*Sporobolus virginicus*) is present in the transition zone between the samphire and sand dune plant communities.

### 3.1.3 Dune Ridges

The dunes in this area have generally been formed by wind-blown sand, which has accumulated by sand-trapping vegetation. They include incipient fore-dunes, established fore-dunes and hind-dunes.

Fore-dunes are the foremost vegetated sand dune occurring immediately landward of an unvegetated beach. They are initially colonised by beach spinifex (*Spinifex longifolius*) soft roly-poly (*Salsola kali*) and beach morning glory (*Ipomoea brasiliensis*) (Graig 1983).

Hind-dunes are behind the fore-dunes and separated from them by swales. They support a more diverse vegetation than fore-dunes including buffel grass (*Cenchrus ciliaris*) and occasional shrubs.

The sand dunes support an open low shrubland with *Spinifex longifolia*, *Baeckia* sp, and sand dune vegetation communities.

The Miaboolya system is also important for terrestrial animals and is home to a number of wetland bird species. Migratory species can be seen in high numbers seasonally. Studies of birds have been conducted to the north at Lake MacLeod and south at Shark Bay, but little work has been conducted at Miaboolya specifically.

## 3.2 Importance of the Miaboolya Ecosystem

As outlined above, the Miaboolya system has regional importance as a fish nursery and general fish habitat. However, there are hundreds of kilometres of tidal mangrove creeks and extensive areas of salt marsh in the Gascoyne region. The question is: “Why is the Miaboolya area measurably more productive than the neighbouring systems?”

Unlike other creeks in the region, the Miaboolya system is extensively influenced by the Gascoyne River. As shown in Figure 3, the river has a catchment that extends over 600 kilometres inland and covers an area of 79,000 square kilometres (Allan Bradley, pers. Com.). The catchment is generally covered by pastoral leases, but also includes areas of the State Conservation Estate, small areas of horticultural development and townsites.

When the Gascoyne River floods, large volumes of water are discharged through the its associated delta. The Miaboolya Creek system is an anabranch of this delta.

The floodwaters include fresh water, sediments and nutrients that are uncommon in the waters of Shark Bay. It is probable that the influxes of fresh water and nutrients elevate the primary production of the mangroves, algal mats and salt marshes that

make up the system. The sediments - kept mobile by the near-shore wave climate - generate the system of offshore banks and troughs that shelter juvenile fish.

In addition, the sediments limit water clarity in the near-shore waters, protecting young fish from predators. These attributes can be seen in the conceptual model of the Miaboolya ecosystem (see Figure 5).

The proposed Miaboolya Beach FHPA is located within Reserve No. 27137 (Recreation, Camping and Recreation) which is vested in and managed by the Shire of Carnarvon. The Reserve is zoned 'rural' in the Shire of Carnarvon District Planning Scheme No 11, reserved for recreation under the Scheme and is covered by a Coastal Policy Area. It is also recognised in the Carnarvon Coastal Policy.

The reserve environment is being degraded through unrestricted vehicular access through the salt marsh, rubbish dumping, fire and inappropriate fishing methods.



#### **4.0 DESCRIPTION OF USERS**

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The proposed Miaboolya Beach FHPA is located within Reserve No. 27137 (Recreation, Camping and Recreation). There has been no formal survey of the public use of the reserve, but observation by Fisheries Officers indicates most of the overnight visitors to Miaboolya Beach are tourists who are passing through Carnarvon.

Tourists are attracted to the area by various publications that advertise Miaboolya Beach as a free camping ground. Also, the Carnarvon Tourist Bureau and local fishers recommend the area as a good fishing spot.

Access to Miaboolya Beach for vehicles is via beach tracks, which lead to a small open area used for camping and car parking.

The Carnarvon community also uses the Miaboolya area for fishing and mud crabbing. Other recreational activities include off-road driving, trail bike riding, horse riding, family picnics, daytrips, beachcombing and swimming. Nude bathing is permitted on the beach north of the car park.





## **5.0 VALUES OF THE AREA**

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During the public consultation process undertaken by Department of Fisheries during preparation of this draft plan, a large number of user groups with an interest in the Miaboolya Beach area were identified. Each of these groups holds the area as being of significant value, for different reasons. The users and their comments are listed in Appendix 1.

### **5.1 Environmental Values**

The area is a habitat for an abundance of native fauna. These include juvenile finfish species such as tailor (*Pomatomus saltatrix*), mullet (*Argyrosomus spp.*) and sand whiting (*Sillago ciliata*), and various crab species including mud crabs, blue swimmer and green mud crabs (family Portunidae). All these species are important to the Carnarvon region and are part of the ecological balance that exists within the Miaboolya Beach ecosystem.

The mangals found within Miaboolya Creek are of environmental importance.

Publications and research shows that Miaboolya Creek is south of the general southern distribution of the mud crab. Anecdotal evidence suggests that Carnarvon populations of mud crabs have existed solely due to the mangrove environment afforded by Miaboolya Creek, which provides recruitment and breeding sites. Miaboolya is the major primary habitat, with smaller satellite mud crab populations within the surrounding creek systems.

Resident and migratory populations of birds, marine turtles and dolphins also exist within the area and contribute to its environmental value.

### **5.2 Cultural Values**

Consultation with the Gnulli native title group has shown that the Miaboolya area is of important cultural and historical value to the local Aboriginal people. The area was - and still is - a place for food collection and gathering for social occasions. The Gnulli group is committed to the conservation of this area for these reasons.

### **5.3 Research and Education Values**

Miaboolya Creek has a high value for research and education purposes. The Carnarvon Senior High School has been conducting biological and ecological studies in the area for several years.

The work by CSHS students on finfish has been instrumental in alerting Department of Fisheries to the significance of the area to juvenile finfish. The school's more recent work on mud crabs has also contributed to an understanding of the area.

The CSHS initially proposed that Miaboolya Beach become a Fish Habitat Protection Area. Research on this proposal was undertaken by the CSHS with the help of a Fishcare WA grant.

The Department of Fisheries is also currently conducting research to identify the breeding grounds of mud crabs and develop an understanding of their population dynamics. The project will lead to improved management of human impacts in the area.

#### ***5.4 Recreational Values***

The Miaboolya area is heavily used for recreation by the local community and visitors. The creek and adjoining beach play host to a wide range of leisure activities as previously discussed.

## 6.0 THREATS

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Human activities are impacting on the Miaboolya Beach ecosystem. Table 1 lists the main threats to the area.

**TABLE 1: THREATS TO THE ENVIRONMENT AT MIABOOLYA BEACH**

THREAT	COMMENT
Mangrove system degradation	Already widespread loss of mangroves observed. Changes in hydrology, e.g. creek mouth blocking more frequently and silting.
Fishing	Adverse fishing techniques being used by some. Fishing activity possibly affecting juvenile fish stocks.
Vehicles	General destruction caused through reckless 4WD activity. Degradation of dunes and mud flats.
Digging for mud crabs	Can cause habitat degradation and mangrove destruction.
Camping	Lighting of camp fires
Possible engineering works	Possible future works - for example river training, port development, pipeline construction etc. - would require assessment by the Environmental Protection Authority.
Littering	Littering is an ongoing issue at Miaboolya.



## **7.0 MANAGEMENT PLAN**

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### **7.1 Aim**

The aim of the proposal for a Fish Habitat Protection Area (FHPA) outlined in this management plan is to protect and rehabilitate the aquatic habitat of Miaboolya Beach and the associated mangrove ecosystem; and involve the community in its management.

The establishment of a FHPA will lay a framework that will enable future changes in management of the area. It will also enable better management of human activities, minimise their impacts and encourage community stewardship for the conservation of Miaboolya Beach and its surrounds.

### **7.2 Boundary**

It is proposed that the Miaboolya Beach FHPA will include the area shown on Figure 1 and described as:

- all Western Australian coastal waters north of a line drawn due west from Point Whitmore and between a line drawn due south from Bejaling Hill and the Western Australian coastline;
- all waters within the boundaries of reserve number 27137 which is vested in the Shire of Carnarvon for the purposes of recreation, camping and picnicking; and
- all waters on the vacant Crown land which is south and east of reserve A 27137 and separates reserve A 28220 (One Tree Nature Reserve) from the sea.

### **7.3 Purpose of Fish Habitat Protection Area**

The Minister for Fisheries may set aside an area of State waters as a Fish Habitat Protection Area (FHPA) pursuant to Section 114 of the *Fish Resource Management Act (FRMA) 1994*

FHPAs are gazetted by the Minister for Fisheries under Section 115 of the *FRMA 1994*. The Minister may gazette a FHPA for the following purposes:

1. The conservation and protection of fish, fish breeding areas, fish fossils or the aquatic ecosystem.
2. The culture and propagation of fish and experimental purposes related to that culture or propagation.

3. The management of fish and activities relating to the appreciation or observation of fish.

The proposed Miaboolya Beach FHPA is intended being set aside for purposes 1 and 3 above.

## **7.4 State and National Context**

The policy “New Horizons in Marine Park Management” outlines the WA Government's approach to the development of a system of marine protected areas in Western Australia. The New Horizons policy states FHPAs may be established to protect fish and their habitats.

In 1999 the WA Government released the “State of the Environment Report”, which was prepared under the auspices of the Environmental Protection Authority. This provides an overview of the key environmental issues facing WA, including a synopsis of issues associated with the marine environment.

In December 1999, the WA Government then released “Environmental Action: the State Government's Response to the State of the Environment Report”. This report states that the Department of Fisheries will continue to establish a system of FHPAs, to provide for effective management of fish and their habitats.

The priorities for establishing these protected areas are drawn up by the Department of Fisheries during the process of preparing a Fisheries Environmental Management Strategy for each region of the State. In addition, there is a process that enables community groups to nominate areas for protection, which is outlined in the Department of Fisheries’ “Guidelines for the Establishment of Fish Habitat Protection Areas” (Fisheries Management Paper No. 152).

The Fisheries Environmental Management Review for the Gascoyne Region was released in May 2001, which identified the Miaboolya area as being an area in need of special protection.

In February 2001 the Environmental Protection Authority of Western Australia released its “Guidelines for the Protection of Mangroves”.

In June 1998 the Australian and New Zealand Environment and Conservation Council released the “Interim Marine and Coastal Regionalisation for Australia Version 3.3” (IMCRA). IMCRA provides the first layer in a broad planning framework in which more detailed information on ecosystems must be used to assist decision-making within Australian and New Zealand. Furthermore, IMCRA will be used as a planning framework for the development of the National Representative System of Marine Protected Areas.

The IMCRA divides the Australian Marine Environment into 60 bioregions. Miaboolya Beach is in the Shark Bay bioregion, which is represented by Shark Bay

Marine Reserve and Shark Bay Marine Park in the Nations System of Marine Protected Areas. However, as outlined in Section 3 of this document, the Miaboolya ecosystem is unlike the remainder of Shark Bay and warrants special consideration.

## 7.5 Selection Criteria Justification

Miaboolya Beach has been nominated as a FHPA on the basis of the selection criteria outlined in the “Guidelines for the Establishment of FHPAs” (Fisheries Management Paper No. 152). The selection criteria are outlined in more detail in Table 2 below.

**TABLE 2: MIABOOLYA BEACH FHPA SELECTION CRITERIA**

Purpose of FHPA	Selection Criteria (need for protection)
<b>Fish Protection</b>	<ul style="list-style-type: none"> <li>❖ Miaboolya Beach is a major nursery site for juvenile fish species and the only known breeding area for tailor in the Gascoyne Region.</li> <li>❖ It is a popular recreational fishing/crabbing spot and there is evidence that netting and crabbing may be impacting on the fish stocks and their habitats.</li> </ul>
<b>Habitat Protection</b>	<ul style="list-style-type: none"> <li>❖ Miaboolya Creek is an important fish breeding and nursery area.</li> <li>❖ The mangrove habitat is of great local importance for mud crabs.</li> <li>❖ Miaboolya Creek is distinctive and unlike any other creek system within the Gascoyne region.</li> </ul>
<b>Research</b>	<ul style="list-style-type: none"> <li>❖ The research work commenced by Carnarvon Senior High School and the Department of Fisheries provides a valuable basis for further study.</li> <li>❖ Opportunities for further studies include mud crab population dynamics, mangrove ecology, nutrient flows, and monitoring of hydrology within the creek.</li> <li>❖ Establishment of a FHPA could help co-ordinate research efforts, with a focus on resolving particular management problems.</li> </ul>

<p><b>Resource Protection</b></p>	<ul style="list-style-type: none"> <li>❖ The mangrove areas are important for mud crabs and other fish, birdlife and other aquatic organisms.</li> <li>❖ The current existence of disruptive fishing practices is detrimental to the fishing resource. This includes the damage caused by digging mud crabs from their burrows.</li> <li>❖ Dramatic death of mangroves already noticed within the site is probably due to changing hydrology.</li> <li>❖ Future management of the Gascoyne River could impact upon the Miaboolya Creek system.</li> <li>❖ Near-shore engineering works could damage the breeding and nursery areas, unless proposals undergo appropriate environmental assessment.</li> </ul>
<p><b>Human Use and Resource sharing</b></p>	<ul style="list-style-type: none"> <li>❖ A FHPA will provide a focus for improved management of the area including control of off-road driving and promotion of sustainable fishing practices.</li> <li>❖ A FHPA will encourage responsible behaviour through increased community awareness and possible restrictions.</li> <li>❖ Future engineering works and development may impact upon the aquatic environment of the Miaboolya system if habitat issues are not considered during the planning process.</li> </ul>
<p><b>Education and Observation</b></p>	<ul style="list-style-type: none"> <li>❖ A FHPA will provide a focus for community education and ecotourism.</li> <li>❖ More people may visit the area to observe birds or nature once the value of the area has become more widely known</li> </ul>



## **8.0 OBJECTIVES AND PROPOSED MANAGEMENT STRATEGIES**

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It is proposed to set aside the waters as outlined in Section 7.2 of this plan as a Fish Habitat Protection Area (FHPA) vested with the Minister of Fisheries under the *Fish Resources Management Act 1994*. The establishment of a FHPA will formally recognise and promote the Miaboolya area as one of high conservation value. The waters within Reserve A 27137 would be jointly vested in the Shire of Carnarvon and the Minister for Fisheries.

The preliminary public consultation process preceding the preparation of this draft identified a number of key issues that the plan should address, including education, community involvement, recreational fishing and commercial fishing.

Objectives have been set and strategies developed to achieve these objectives, which are discussed in greater detail below.

The following abbreviations are used in this section:

DoF Department of Fisheries  
SoC Shire of Carnarvon  
CSHS Carnarvon Senior High School  
Gnulli Gnulli Native Title Group

### **8.1 Education**

*Objective: To educate the community, state government agencies, local government and visitors to the area about the Miaboolya Beach environment.*

Protection of Miaboolya area will be enhanced if the public become involved in its management. In order to maintain the level of protection required, the public must be aware of Miaboolya Beach, the nearby mangrove ecosystem, and the activities that may jeopardise its habitats.

Issues will be included in the community awareness program such as native species protection within the area, mangrove ecosystem conservation, and the development of responsible fishing practices.

#### **8.1.1 Recommendations**

1. Continue current and proposed research projects undertaken in the area in association with Carnarvon Senior High School (CSHS) and Department of Fisheries (DoF) to develop a better understanding of the Miaboolya system and involve students in the management of the area. (CSHS/DoF)

2. Extend the lifetime of projects so that students are involved for a number of years. Introducing students to the area through a school project will help to promote awareness and engender an understanding and appreciation of the ecological value of Miaboolya in the next generation of carers. (CSHS)
3. Erect multi-lingual signs in the area to educate visitors about local native species, habitats, mangrove ecosystems, responsible fishing methods etc. (DoF)
4. Develop a series of information packages about the Miaboolya site including maps and codes of conduct for visitors. (DoF)

## **8.2 Community Involvement**

*Objective: To encourage the community to be involved in the management of the Miaboolya system and take an active role in its conservation and rehabilitation.*

The long-term protection of the Miaboolya system will be depend on a strong sense of community ownership of the area and effective community involvement in its management.

### **8.2.1 Recommendations**

1. Encourage and develop a series of community based conservation and education projects. Funding for the work may be available from Fishcare WA or other funding bodies. (DoF)
2. Use Miaboolya Beach as the venue for national projects such as ‘Clean Up Australia Day’ and ‘Coast Care Day’. (DoF/SoC)
3. Encourage the wider community to take part in the decision-making and management behind the management of the site and the introduction of a FHPA. (DoF)

## **8.3 Recreational Fishing**

*Objective: Ensure that the people of Western Australia and visitors have a quality recreational fishing experience within the Miaboolya system while protecting its important environmental values in the long term.*

There is potential for significant over-fishing to occur at Miaboolya. Many finfish species use the area as a nursery, and a high abundance of juvenile fish can be observed within the site of the proposed FHPA.

In addition, some unacceptable fishing methods are used in the area at present, including the destruction of mud crab burrows. Establishment of an FHPA could assist in reducing the use of adverse fishing techniques.

Currently, the waters of all creeks within a distance of 10 kilometres north of Point Whitmore and the waters of all creeks within a distance of five kilometres south of Mangrove Point (including all waters within a radius of 400 metres of their mouths) are closed to recreational netting at all times.

During the consultation process, people expressed the view that the existing daily bag limit of 10 mud crabs is too high in view of the small area of the mangal and the high fishing pressure. A lower limit of 5 was suggested instead. This lowering of the bag limit for mud crabs is also recommended in the draft report of the Gascoyne Recreational Fishing Working Group.

In addition, it was recommended that the area of the existing recreational netting closure be extended. Discussions with the major stakeholders resulted in a recommendation that recreational netting be prohibited between the One Mile Jetty and the Miaboolya Beach car park.

This prohibition would include some waters that are outside the proposed Miaboolya Beach FHPA. As recreational netting has the potential to capture or damage juvenile fish, the Gascoyne Recreational Fishing Working Group draft report recommends a limitation on recreational netting in a number of locations including Miaboolya Beach.

### **8.3.1 Recommendations**

1. Regulate to prohibit netting within the FHPA from the northern end of the Miaboolya Beach car park to the One Mile Jetty in the south, to protect juvenile tailor stocks. (DoF)
2. Regulate to prohibit the destruction of mud crab burrows. (DoF)
3. Regulate to decrease daily bag limits of mud crabs to five to conserve stocks. (DoF)
4. Regulate so that mud crabs can only be taken only by means of drop nets. (DoF)

## **8.4 Commercial Fishing**

*Objective: Encourage the commercial fishers to contribute to the conservation of the Miaboolya system.*

There is an experimental fishery targeting blue swimmer crabs (*Portunus pelagicus*). The commercial fishers provide valuable crab biological data through their catch records. They can record the population numbers of crabs, as well as their migratory movements. Mud crabs (*Scylla spp.*) are caught as part of the by-catch, but are returned to the water alive.

This is a valuable opportunity for Department of Fisheries to record data regarding mud crabs and the commercial fishers could be utilised as an important resource in understanding more about the mud crab population at Miaboolya.

#### **8.4.1 Recommendations**

1. Utilise the information provided by the commercial (experimental) fishers in the area with regards to mud crab populations. (DoF, CSHS)

### **8.5 Gascoyne River Management**

*Objective: Minimise the effects of changes to the Miaboolya ecosystem resulting from the implementation of management strategies for the Gascoyne River.*

Recent deaths of fish and turtles in large areas of the Miaboolya mangal may have resulted from changes to the natural river flooding patterns. Some observers believe the changes to the course of the Gascoyne River have led to increased levels of silt being deposited in the estuary. It is also believed that this has led to the estuary mouth being closed more frequently.

During these periods of separation of the Miaboolya estuary mouth from the sea, increased water temperature and evaporation results in elevated salinity levels in the estuary. This has resulted in the widespread death of fish and turtles and may have contributed to the loss of mangals.

It is believed the risk of undesirable change in the aquatic environment in the Miaboolya area could be minimised if the Department of Fisheries was permitted to contribute to the Gascoyne River catchment planning and management process.

#### **8.5.1 Recommendations**

1. Monitor water quality within the creek such as flow patterns, general water parameters and salinity levels to assist in protecting the mangal. (DoF, CSHS)
2. Maintain records of observations such as dead fauna (turtles, fish, crabs) that may occur as a result of the creek being blocked or other seasonal conditions (DoF, CSHS)
3. Monitor water conditions in the mangal and open the Miaboolya estuary mouth if high salinity levels threaten fish stocks and the mangals. (DoF, CSHS)
4. Investigate the cause of previous mangrove deaths and prepare a mangrove monitoring and rehabilitation plan. (DoF)
5. Seek representation for the Department of Fisheries on the Gascoyne River Catchment Management Advisory Group. (DoF)

## **8.6 Land Use Planning**

*Objective: Ensure that planning documents relevant to the area reflect the need to protect the Miaboolya aquatic system.*

From time-to-time, planning documents are prepared on behalf of State Government authorities and the Shire of Carnarvon that may result in land-use changes, which could effect the health of the Miaboolya system. Advice will be provided to ensure these documents reflect the need to protect the system.

### **8.6.1 Recommendations**

- Provide advice about the need to protect the Miaboolya system during the development and management plans and planning schemes relevant to the area. (DoF)

## **8.7 Nature-Based Tourism**

*Objective: To manage nature-based tourism within the Miaboolya system.*

Properly managed nature-based tourism is consistent with the education objective and the conservation of the Miaboolya system. Recreational activities such as bird-watching, wetland and mangrove tours, as well as informational presentations on traditional Aboriginal fishing methods, were raised as possible activities which could occur at Miaboolya during the consultation process.

### **8.7.1 Recommendations**

1. Provide local tourism operators with information produced for visitors about the need to protect the system. (DoF)
2. Impose appropriate conditions, to protect the environment, upon any approval to undertake nature-based tourism in the Miaboolya area. (DoF)

## **8.8 Mining and Exploration**

Currently, no mining activity occurs within the area and is not currently the subject of any mining exploration activity. The environmental impacts associated with mining are managed pursuant to the *Environmental Protection Act 1986*.

### **8.8.1 Recommendations**

Refer any proposal to undertake mining exploration or development within the proposed Miaboolya Beach FHPA to the Environmental Protection Authority for assessment and to ensure habitat protection issues are considered. (DoF)

## **8.9 Resourcing, Surveillance and Enforcement**

*Objective: To provide the resources required to effectively protect the values of the proposed Miaboolya Beach FHPA.*

The protection of the values of the proposed Miaboolya Beach FHPA will require the allocation of resources to it. The Department of Fisheries and Carnarvon Shire Council staff have responsibilities that relate to the resources of the area.

### **8.9.1 Recommendations**

1. Ensure that state and local government officers have appropriate authority and training to undertake enforcement activities in the Miaboolya area. (DoF, SoC)
2. Develop and maintain good working relationships between the external agencies or groups carrying out information programs or research that can help preserve the terrestrial and aquatic environments of the Miaboolya ecosystems. These include CALM, Waters and Rivers Commission, Agriculture WA and local community groups. (DoF)
3. Seek funding to help in the employment of local Aboriginal people to assist in the management, enforcement and research associated with Department of Fisheries within the FHPA. (DoF, Gnulli)
4. Ensure there are sufficient funds made available to state and local government agencies or community groups to conduct the required patrols, education and maintenance necessary for the proposed Miaboolya Beach FHPA. (DoF)

## **9. IMPLEMENTATION PLAN**

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### **9.1 Reservation**

After the public submissions on this draft management plan have been considered, it is intended the offshore waters and the waters in lot 30, as described in section 7.2 of this document, will be set aside as a FHPA.

The Department of Fisheries will then work with the Carnarvon Shire Council and the Department of Land Administration to make the legal arrangements required to change the vesting and purpose of Reserve 27137 so that the Miaboolya Beach FHPA can be extended to incorporate the waters in that reserve

### **9.2 General**

This draft plan for the Miaboolya Beach FHPA is available for public comment for a period of six weeks. After that period, a summary of submissions will be prepared and a recommendation made to the Minister for Fisheries. If the Minister agrees to establish a FHPA, a final plan will be prepared.

The final plan will contain an implementation strategy, which reflects the public submissions and the Minister's priorities. It will prioritise the recommendations for implementation, based on the public submissions and the need to obtain the resources to undertake the activities outlined in the recommendations.

It will be the responsibility of Department of Fisheries to coordinate the implementation program, and report to the community on progress each year. The final plan will be subject to review in 2010.





## 10. REFERENCES

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## 11. LIST OF GROUPS AND PEOPLE CONSULTED DURING THE PRE-PLANNING PROCESS

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5/4/00          *Ray Monk*                  *Fishing Equipment Retail*  
Feels area needs protection, concerned at numbers of mud crabs taken, encourages schools to continue research.

5/4/00          *Tracy Brothers*              *Formally in charge of CSHS research program*  
Aware of unique area, would like to see further protection for crabs and juvenile fish and ongoing research.

6/4/00          *Lex Fullerton*                *Local*  
Believes the protection of area would help promote eco-tourism and would like to see sustainable aquaculture. More study needed on the whole ecosystem, birds and marine life.

7/4/00          *Mike Mahony*                *Wildlife Officer, CALM*  
Supported idea, CALM nature reserve adjacent.

11/4/00        *Leslie Cook*                 *KARU*  
Supported idea and is in partnership with the Department of Fisheries.

11/4/00        *Don Chainy*                 *Marine/Fishing Retailer*  
Would like some further protection. Miaboolya is an important tourist and local fishing / crabbing spot - look at bag limits, more patrols of area by fisheries officers to stop illegal take of fish from area. Important netting area lies to the north of car park.

14/4/00        *Rowina Mitchell*            *Gascoyne Development Commission*  
Good to see school involved, agrees area needs protection walk trails (low impact) through area.

14/4/00        *Gnulli Native Title Group*  
Want more protection for area and would like to see Gnulli trainee involved. Reduce bag limits for the area. Gnulli are involved in river protection. Protect heritage values of the area.

17/04/00      *Bruce Hegge*                *SMEC Engineering Team*  
*Jeff Barham*  
*Ken Tinley*  
Agree in principle [with Miaboolya Beach FHPA] - outside their study area.

18/04/00      *Peter Bailis*                *Department of Environmental Protection*

Not concerned about FHPA if it is going to have a positive impact - would like copy of draft to comment and is interested if aquaculture is involved in the area.

26/04/00      *Toney Dowling*      *Graham Lewis*  
Coastal reserve merits protection.

26/4/00      *John Dunning*      *Principal Carnarvon Senior High School*  
26/04/00      *Yar Phan*      *Local community spokesman for the Vietnamese community*

27/04/00      *Carnarvon Recreational Fishing Advisory Committee*  
Showed support for project and would like to comment on plan when released.

28/04/00      *Denham Recreational Fishing Advisory Committee*  
Not within their area, but would be interested in commenting on the draft plan for Miaboolya Beach FHPA.

02/05/00      *Public meeting held*  
See notes of meeting.

15/05/00      *Dave Paynter*      *Recreational Fisher/Fishing Retailer*  
Supports idea of FHPA. He would like to see more research and education of people as to the importance of the area - which is important for recreational fishing.

17/05/00      *Chris Armstrong*      *Gascoyne Development Commission*  
Agrees that area needs further protection, little is known about the bird life in the area – more research, promotion of walk trails and eco tourism and look at netting rules and bag limits.

08/06/00      *Keith Pearson*      *Carnarvon Shire, Town Planner*  
Town planning scheme does not cover Miaboolya. It is currently zoned ‘Agricultural’ which offers almost no protection – to change area contact Lindsay Stephens. Plan could allow shire to seek more funding – maybe allowing improved access, more rubbish collection. Shire rangers are interested in project and some are already trained as honorary fisheries officers.

09/06/00      *Dave Bauer*      *Environmental Consultant*  
Mangrove area needs more study. He agrees area is unique, i.e. bird life and ecosystem. Possible rejuvenation of mangroves.

23/06/00      *Lindsey Stephens*      *Tony Dowley*  
Working on rezoning of area to offer it more protection.

14/07/00      *David Rose*      *Regional Manager, CALM Denham*  
He does not oppose idea - good to see area is being offered more protection. It also would be good to see CALM Wildlife and the Department of Fisheries working together in the Miaboolya area.

21/07/00      *ABC Radio interview*  
This explained the proposed draft plan for Miaboolya Beach FHPA and asked for interested people to contact Department of Fisheries. No inquiries were received.

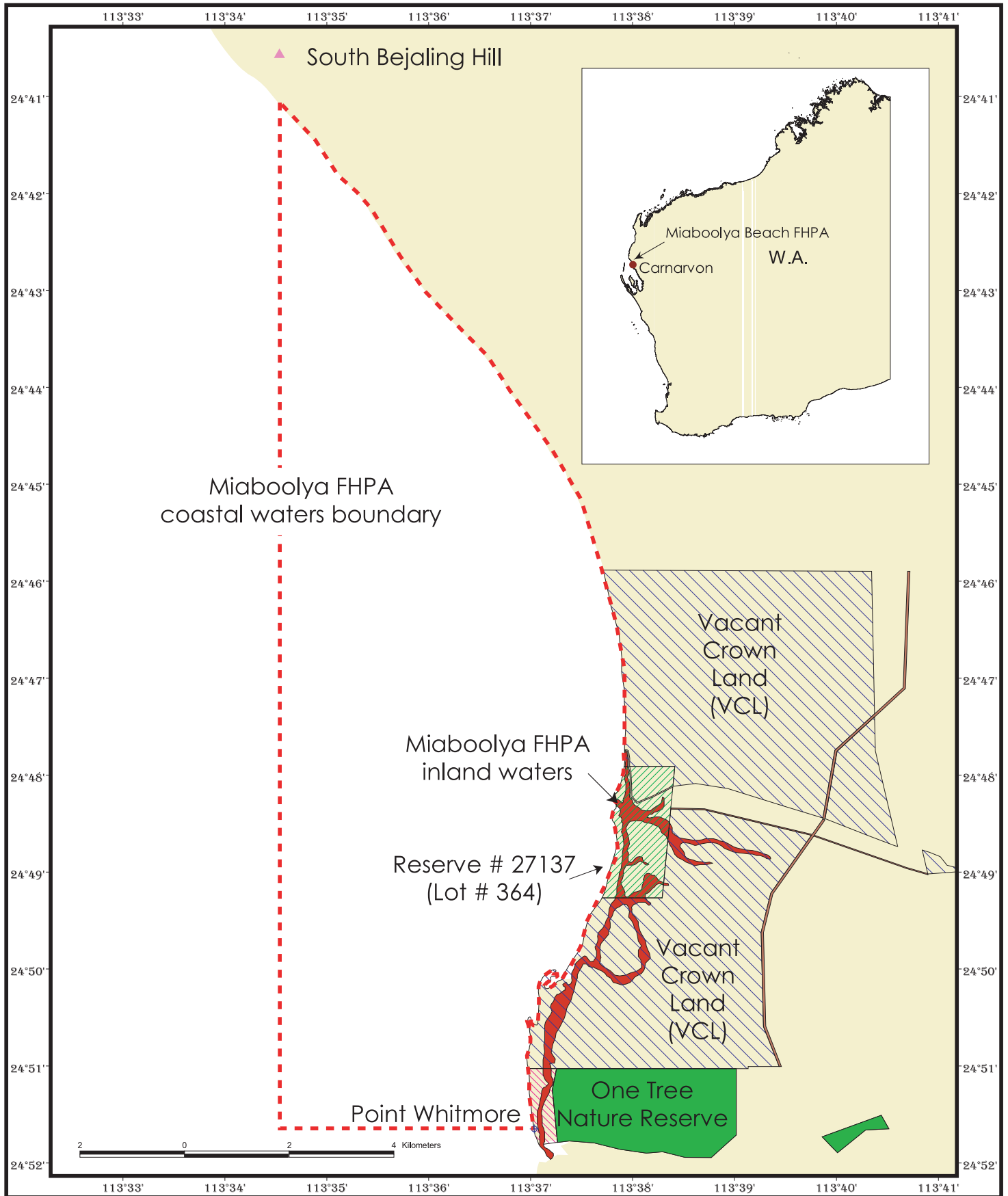


Figure 1 Location of proposed Miaboolya Beach FHPA

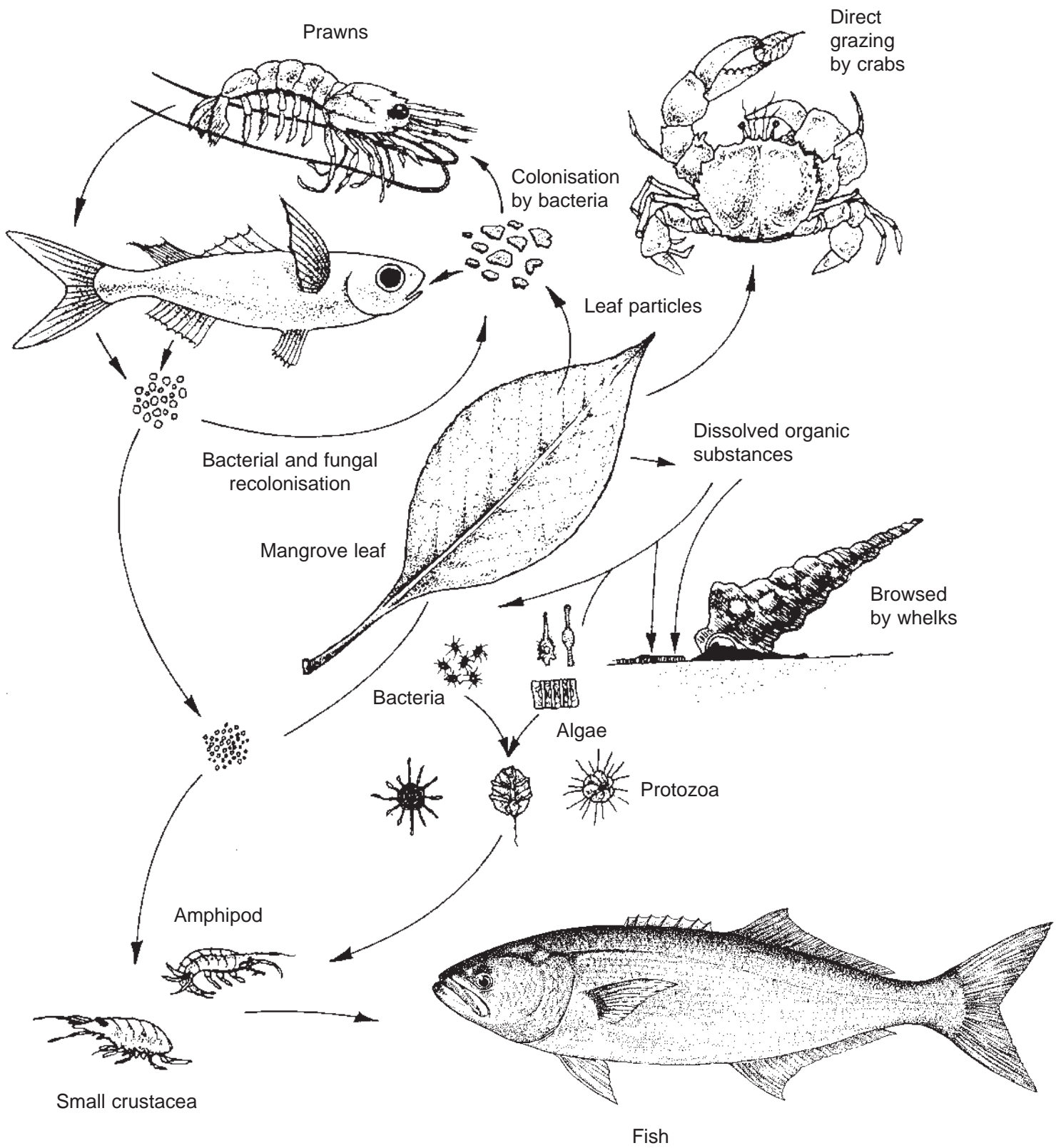


Figure 2 Supply of mangrove material to the food chain (adapted from Semenuik 1972)

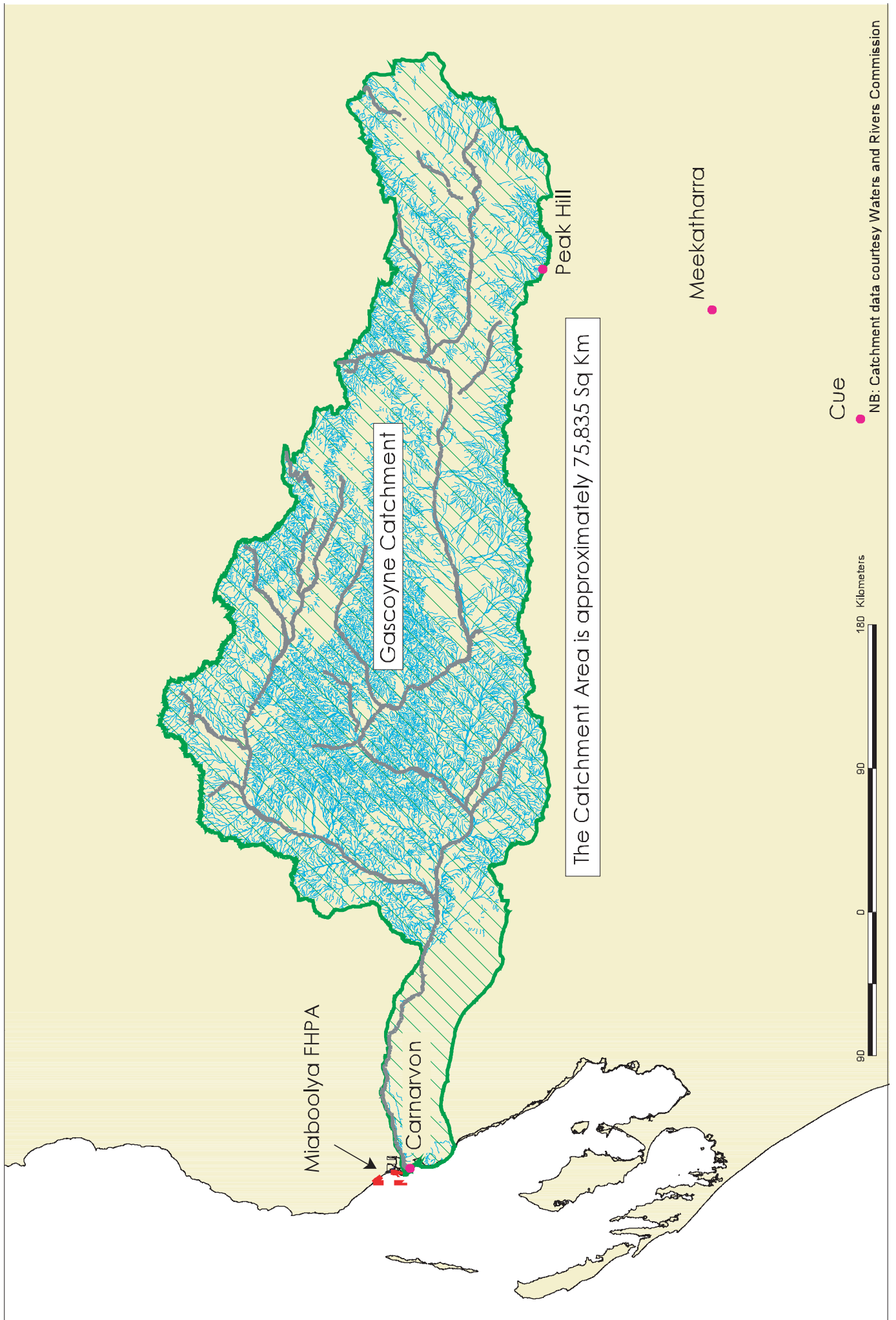


Figure 3 Gascoyne River catchment



*Figure 4 Aerial photograph of proposed Miaboolya Beach FHPA*



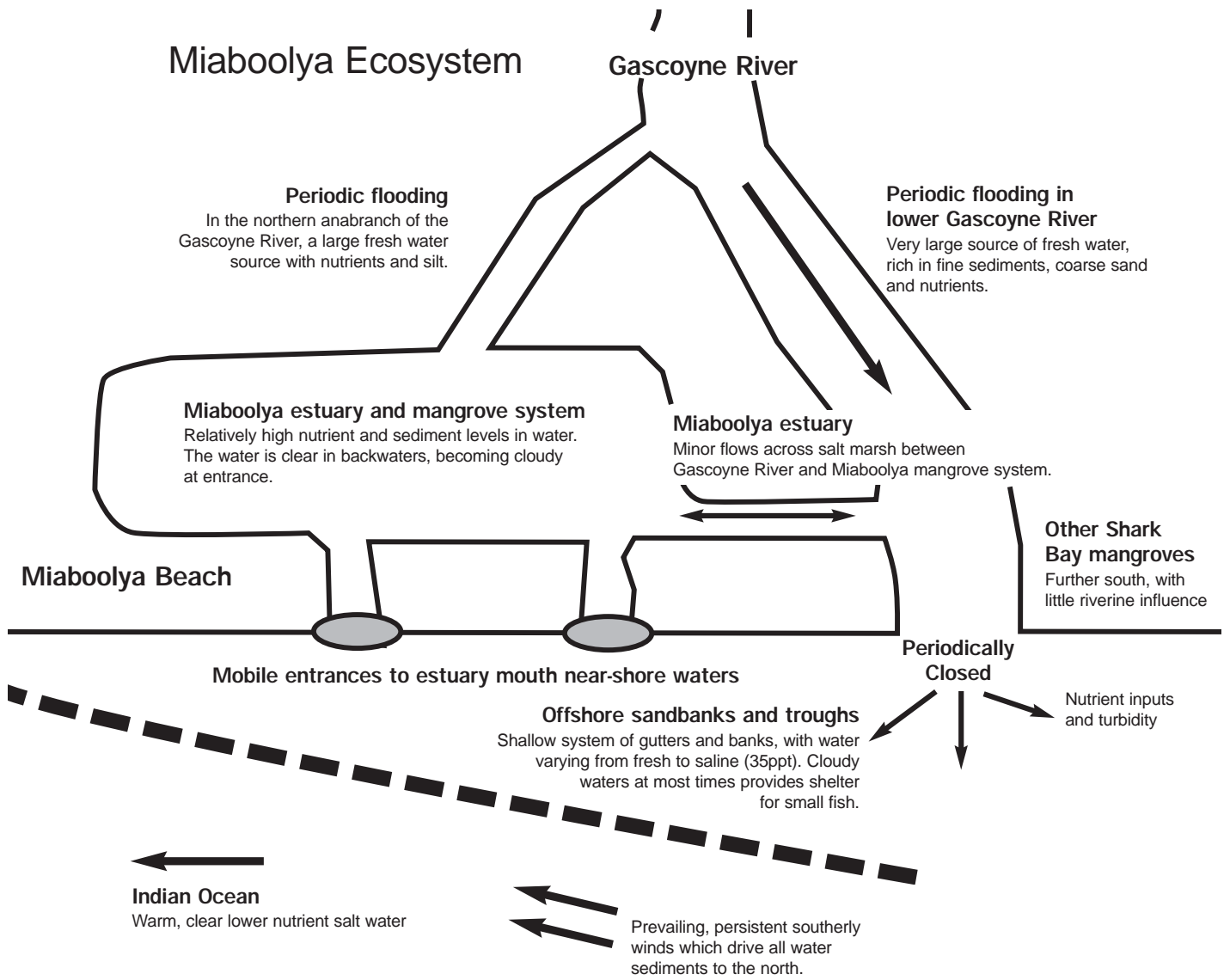


Figure 5 Conceptual model of Miaboolya Ecosystem

## **FISHERIES MANAGEMENT PAPERS**

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- No.1** The Report of the Southern Western Australian Shark Working Group. Chairman P. Millington (1986).
- No.2** The report of the Fish Farming Legislative Review Committee. Chairman P. Rogers (1986).
- No.3** Management Measures for the Shark Bay Snapper 1987 Season. P. Millington (1986)
- No.4** The Esperance Rock Lobster Working Group. Chairman A. Pallot (1986).
- No.5** The Windy Harbour - Augusta Rock Lobster Working Group. Interim Report by the Chairman A. Pallot (1986).
- No.6** The King George Sound Purse Seine Fishery Working Group. Chairman R. Brown (1986).
- No.7** Management Measures for the Cockburn Sound Mussel Fishery. H. Brayford (1986).
- No.8** Report of the Rock Lobster Industry Advisory meeting of 27 January 1987 . Chairman B. Bowen (1987).
- No.9** Western Rock Lobster Industry Compensation Study. Arthur Young Services (1987).
- No.10** Further Options for Management of the Shark Bay Snapper Fishery. P. Millington (1987).
- No.11** The Shark Bay Scallop Fishery. L. Joll (1987).
- No.12** Report of the Rock Lobster Industry Advisory Committee to the Hon Minister for Fisheries 24 September 1987. (1987)
- No.13** A Development Plan for the South Coast Inshore Trawl Fishery. (1987)
- No.14** Draft Management Plan for the Perth Metropolitan Purse Seine Fishery. P. Millington (1987).
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- No.16** The South West Trawl Fishery Draft Management Plan. P. Millington (1988).
- No.17** The final report of the pearling industry review committee . F.J. Malone, D.A. Hancock, B. Jeffriess (1988).
- No.18** Policy for Freshwater Aquaculture in Western Australia. (1988)
- No.19** Sport Fishing for Marron in Western Australia - Management for the Future. (1988)
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- No.21** Commercial fishing licensing in Western Australia. (1989)
- No.22** Economics and marketing of Western Australian pilchards. SCP Fisheries Consultants Pty Ltd (1988).
- No.23** Management of the south-west inshore trawl fishery. N. Moore (1989)
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- No.25** Rock Lobster Industry Advisory Committee report to the Minister for Fisheries November 1988. (1989)
- No.26** A report on marron fishing in Western Australia. Chairman Doug Wenn MLC (1989).
- No.27** A review of the Shark Bay pearling industry. Dr D.A.Hancock, (1989).
- No.28** Southern demersal gillnet and longline fishery. (1989)
- No.29** Distribution and marketing of Western Australian rock lobster. P. Monaghan (1989).
- No.30** Foreign investment in the rock lobster industry. (1989)
- No.31** Rock Lobster Industry Advisory Committee report to the Hon Minister for Fisheries September 1989. (1989)
- No.32** Fishing Licences as security for loans. P. Rogers (1989)
- No.33** Guidelines for by-laws for those Abrolhos Islands set aside for fisheries purposes. N. Moore (1989).
- No.34** The future for recreational fishing - issues for community discussion. Recreational Fishing Advisory Committee (1990).
- No.35** Future policy for charter fishing operations in Western Australia. P. Millington (1990).
- No.36** Long term management measures for the Cockburn Sound restricted entry fishery. P. Millington (1990).
- No.37** Western rock lobster industry marketing report 1989/90 season. MAREC Pty Ltd (1990).
- No.38** The economic impact of recreational fishing in Western Australia. R.K. Lindner, P.B. McLeod (1991).
- No.39** Establishment of a registry to record charges against fishing licences when used as security for loans. P. Rogers. (1991)

- No.40** The future for Recreational Fishing - Forum Proceedings. Recreational Fishing Advisory Committee (1991)
- No.41** The future for Recreational Fishing - The Final Report of the Recreational Fishing Advisory Committee. Recreational Fishing Advisory Committee (1991).
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- No.54** Rock Lobster Industry Advisory Committee, Management proposals for 1993/94 and 1994/95 western rock lobster season (July 1993).
- No.55** Rock Lobster Industry Advisory Committee, Chairman's report to the Minister for Fisheries on management proposals for 1993/94 and 1994/95 western rock lobster seasons (September 1993).
- No.56** Review of recreational gill, haul and cast netting in Western Australia. F. B. Prokop (October 1993).
- No.57** Management arrangements for the southern demersal gillnet and demersal longline fishery 1994/95 season. (October 1993).
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- No.61** Economic impact study. Commercial fishing in Western Australia Dr P McLeod & C McGinley (October 1994)
- No.62** Management arrangements for specimen shell collection in Western Australia. J. Barrington, G. Stewart (June 1994)
- No.63** Management of the marine aquarium fish fishery. J. Barrington (June 1994)
- No.64** The Warnbro Sound crab fishery draft management plan. F. Crowe (June 1994)
- No.65** Not issued
- No.66** Future management of recreational gill, haul and cast netting in Western Australia and summary of submissions to the netting review. F.B. Prokop, L.M. Adams (September 1994)
- No.67** Long term management strategies for the Western Rock Lobster Fishery. (4 volumes) Evaluation of management options Volume 1. B. K. Bowen (September 1994)
- No.68** Long term management strategies for the Western Rock Lobster Fishery. (4 volumes) Economic efficiency of alternative input and output based management systems in the western rock lobster fishery, Volume 2. R.K. Lindner (September 1994)
- No.69** Long term management strategies for the Western Rock Lobster Fishery. (4 volumes) A market-based economic assessment for the western rock lobster industry, Volume 3. Marec Pty Ltd (September 1994)
- No.70** Long term management strategies for the Western Rock Lobster Fishery. (4 volumes) Law enforcement considerations, Volume 4. N. McLaughlan (September 1994)
- No.71** The Rock Lobster Industry Advisory Committee Chairman's Report, October 1994, The Western Rock Lobster Fishery - Management proposals for the 1994/95 and 1995/96 seasons (November 1994)

- No.72** Shark Bay World Heritage Area draft management plan for fish resources. D. Clayton (November 1994)
- No.73** The bag and size limit review: new regulations and summary of submissions. F. Prokop (May 1995)
- No.74** Report on future management options for the South West trawl limited entry fishery. South West trawl limited entry fishery working group (June 1995)
- No.75** Implications of Native Title legislation for fisheries management and the fishing industry in Western Australia. P. Summerfield (February 1995)
- No.76** Draft report of the South Coast estuarine fishery working group. South Coast estuarine fishery working group. (February 1995)
- No.77** The Offshore Constitutional Settlement, Western Australia. H. Brayford & G. Lyon (May 1995)
- No.78** The Best Available Information - Its Implications for Recreational Fisheries Management. Workshop at Second National Fisheries Managers Conference, Bribie Island Queensland. F. Prokop (May 1995)
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- No.83** Translocation Issues in Western Australia. Proceedings of a Seminar and Workshop held on 26 and 27 September 1994. F. Prokop (July 1995)
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- No. 145** The Aquaculture of non-endemic species in Western Australia - Silver Perch (*Bidyanus bidyanus*). As amended October 2000. Tina Thorne. This replaces Fisheries Management Paper No. 107.
- No. 146** Sustainable Tourism Plan for the Houtman Abrolhos Islands (February 2001)
- No. 147** Draft Bycatch Action Plan for the Shark Bay Prawn Managed Fishery (Full Report)
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