

DRAFT PLAN OF MANAGEMENT
FOR THE PROPOSED
POINT QUOBBA FISH HABITAT PROTECTION AREA

FISHERIES MANAGEMENT PAPER NO. 173

Department of Fisheries
168 St. George's Terrace
Perth WA 6000

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Draft Plan of Management
For the proposed
Point Quobba Fish Habitat Protection Area

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WOULD YOU LIKE TO COMMENT?

DRAFT PLAN OF MANAGEMENT

PROPOSED POINT QUOBBA 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
Department of Fisheries
3rd Floor, SGIO Atrium
170 St George's Terrace
Perth WA 6000

The closing date for submissions is 15 October 2003.

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

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SECTION 1 INTRODUCTION

The proposed Point Quobba Fish Habitat Protection Area (FHPA) adjoins the well-known *Blowholes* tourist attraction at Quobba Station, 75 kilometres north-west of Carnarvon WA, at the northernmost point of Shark Bay (see Map 1).

Point Quobba is a popular site for locals and tourists for beach activities, fishing and snorkelling, and as a place for children to learn to swim and gain an awareness of the marine environment.

The marine life and habitats of the area are of considerable scientific and recreational interest and are highly valued in the local community. However, they are at risk from their high level of use and from conflict between users due to their proximity to popular tourism, boat ramp, camping and settlement areas on-shore.

In June 2002 the Blowholes Protection Association (BPA) approached the Minister for Fisheries, expressing a desire to declare Point Quobba a FHPA. The perceived benefits of this declaration would be to:

- Bolster the current Reef Observation Area fishing closure;
- Eliminate usage practices that are damaging the reef;
- Clarify fishing restrictions; and
- Reduce conflict between users.

FHPAs are established under section 115 (2) of the *Fish Resources Management Act 1994* (FRMA), and may be set aside by the Minister for Fisheries for the following purposes:

1. The conservation and protection of fish, fish breeding areas, fish fossils or the aquatic ecosystem; and/or
2. The culture and propagation of fish and experimental purposes related to that culture and propagation; and/or
3. The management of fish and activities related to the appreciation and observation of fish¹.

In August 2002 the Minister for Fisheries granted approval for the Department of Fisheries to assist the local community in the development of a plan of management for the proposed FHPA.

Staff of the Department's Fish and Fish Habitat Protection Program and Gascoyne Regional Office subsequently had discussions with interested people to develop a reasonable understanding of community expectations. Those individuals included local commercial and recreational fishers and representatives from Quobba Station, the Shire of Carnarvon and the Blowholes Protection Association (BPA).

¹ NOTE: The *FRMA 1994* defines 'fish' as an aquatic organism of any species (dead or alive) except for the higher vertebrates and includes parts of an organism, such as a shell. Under this broad definition, all the biological components of an aquatic ecosystem with the exception of birds, mammals, reptiles and amphibians are defined as fish. This includes the reefs themselves (Fisheries Management Paper No 117, 1998:49)

SECTION 2 METHODOLOGY

This draft management plan was developed through a process of literature review, data gathering and consultation with the Carnarvon community, key bodies and government agencies. Little published information on the Point Quobba lagoon area was found, so most of the benthic habitat and bathymetric information was provided through interviews with key people with good local knowledge.

Discussions were also carried out with staff of the Department of Fisheries in Carnarvon and Perth, the Carnarvon Shire, and the Departments of Conservation and Land Management, and Planning and Infrastructure.

Letters were sent to the people who had previously expressed an interest in, or who might be affected by, the proposal, seeking information from them and their opinions on the proposed FHPA. This was followed up by inspections of the site and consultations in Carnarvon from 13 to 16 May 2003. A list of people consulted is at Appendix 1.

SECTION 3 DESCRIPTION OF AREA

3.1 Location

The proposed Point Quobba Fish Habitat Protection Area (FHPA) adjoins the well known 'Blowholes' tourist attraction next to Quobba Station, 75 kilometres north-west of Carnarvon WA.

Point Quobba is the centre of a fisheries closure of 400 metres radius that prohibits "the taking of all fish and aquatic organisms by any means of capture other than oysters taken by hand" (see Map 1). The closure was declared in 1987, and includes waters beneath the cliffs, the rock platform between Point Quobba and its small associated island, and part of the shallow coral reef and lagoon south east of the point. This area subsequently become the subject of a section 43 order under the provisions of the *Fish Resources Management Act 1994*, which prohibits fishing within the area, but allows for the collection of oysters.

3.2 Geomorphology

Point Quobba, the northernmost point of Shark Bay, marks the boundary between two geomorphic sub-regions, referred to as the 'Cliff Coast' and the 'Dune Coast'².

The Cliff Coast shoreline north from Point Quobba is composed of late Pleistocene Tamala limestone, with low limestone cliffs (less than 10 metres high), rocky shores, wave-cut rock platforms and occasional small beaches. The Blowholes, just north of Point Quobba, result from wave action in caves and fissures in the limestone platforms.

² DA Lord & Associates in *Draft Carnarvon Coastal Strategy* SMEC Aust P/L 2001.

The limestone cliff formation diverges southward from the coast as a submerged drop-off feature at about 5-15 metres depth.

The Dune Coast shoreline, extending south-east from Point Quobba to Miaboolya Beach, is a sedimentary coast formed by contemporary coastal processes. A narrow single beach ridge dune along the coast south of Point Quobba is backed by a series of vegetated parabolic dunes within which some blowouts are present.

3.3 Marine habitats

Being in a transition zone between tropical and temperate climatic zones, the fish habitats at Point Quobba are highly diverse, containing a mix of endemic temperate South-west Australian species with tropical and temperate Indo-Pacific species.

3.3.1 Offshore

The waters west of the cliffs at Point Quobba are relatively deep at 7-15 metres, with limestone rubble and platforms giving way to sand further offshore. The rock surfaces and fissures are prolific with hard and soft corals, sponges, fish and other marine life.

3.3.2 Rock platform

The rock platform west of Point Quobba and the small associated island is subjected to heavy seas which cascade over the back of the platform (known locally as ‘the waterfall’) into two channels, joining together to flow strongly into the lagoon at a speed of up to four knots. Rock oysters are prolific in the channels, pools and on the platform, and can be gathered by hand when seas and tides permit.

3.3.3 Coral reef and lagoon

Immediately south east of Point Quobba and its associated island, the shallow coral reef is about 400 metres wide, extending beyond the closed area to a point offshore from the boat ramp. Many of the small reef fish in the part of the lagoon known as ‘the Aquarium’ are tame and can be hand-fed with bread.

The reef appears to have formed on a submerged wave-cut limestone platform. The one to two metre-deep lagoon, formed behind the reef crest, is the area of greatest interest to snorkellers, having a wide diversity of coral and marine life (see Section 3.4 of this document).

Within the lagoon, a submerged sand bar bisects the coral formations, connecting the island to a shallow sandy beach-side channel. Near the boat ramp, the channel is used for the mooring

of boats and, over time, some anchor damage to reef corals has occurred. At very low tides, the coral is often exposed to the open air.

3.3.4 Ocean beach

While the boat ramp is in waters sheltered by the reef, the beach immediately south (and as far as Black Rock) is in a high-energy wave environment. This beach slopes steeply to deeper waters, often containing large banks of seagrass wrack from further south in Shark Bay.

3.3.5 Limestone pavement

The first major offshore habitat type is a limestone pavement described by divers as “good crayfish bottom, but relatively barren”. It extends southward from the shallow coral reef and is about 700 metres wide and four to seven metres deep.

The remainder of the pavement southwards is characterized by holes and crevices with only sparse marine growth, while the steep face of the reef and pavement immediately below has abundant coral. The western extremity of this habitat has shallow breaking reefs and is the drop-off marking the former cliff line.

3.3.6 Reef and sand

Between the limestone pavement and the beach, the habitat is composed of a sand and limestone rubble substrate among many reefs, some of which are quite close to the beach and reflect change in the underlying geology. The water depth increases quickly from the beach to a similar depth to the pavement area. Good coral and marine life occurs on the reefs.

3.4 Marine fauna and flora

(The text in this section has been provided by Mr Roger Swainston.)

“The northern edge of the [Point Quobba] lagoon is formed by an island and a shallow limestone platform linking it to the mainland. Pounded by waves, encrusting algae and sponges, sea urchins wedged in crevices, oysters, chitons and other hardy invertebrates survive. At low tide, blennies and damselfish dart to and fro in rock pools,, and occasionally octopus glide from pool-to-pool, hunting stranded fish or shore crabs.

Water sweeps across the reef, carrying a soup of small food particles, and is funnelled into the narrow gap between island and mainland. Oysters abound in this high water energy environment forming a bar along the inner edge of the rocky reef platform.

Just behind the bar, the current - often a raging torrent when swell and tide are high - has carved out a deep basin. Here, a multitude of fish species gather to feed on small

food particles in the water - butterflyfishes, wrasses, parrotfishes, sergeant majors and small electric-blue damselfish are abundant.

Over 100 species of fish may be seen in this natural aquarium. Lionfish shelter in large crevices, while young estuary cod and lizardfish lie on the basin floor, waiting to ambush unwary prey. Other larger predators such as mangrove jack, spangled emperor and longtom hang in the current. Though protected from the strongest waves, the water here is still turbulent and corals are robust. Small solid bushes of *Acropora* (a variety of brain coral), encrusting corals and sponges cover the rocks.

As the water flows out of this basin, it swirls across a flat stony area, exposed at very low tide, where giant clams are abundant, and around into the lee of the island. Small black-tip reef sharks may often be seen in the shallows. The island itself provides a favoured resting place for terns, Ospreys and other seabirds.

Joined by water flooding into the lagoon over the outer reef, most of the southward water flow follows a channel along the shoreline. Whiting, mullet, small spangled emperor and many other fish move up-current, feeding along this sandy shoreline strip, as does the occasional larger shark looking for an easy meal.

Moving seaward from the sand, across a weedy rubble field, small parrotfish and yellow-dotted maori wrasse feed and shelter. Deeper channels meander out through the lagoon toward the outer reef. Humbug, *Dascyllus* and *Chromis* hover above and beaked leatherjacket move amongst blue staghorn coral branches.

Large colonies of *Acropora* and many tropical species of fish, carried south to here from warmer waters north of Point Quobba, can be found. Turtles often sleep in this maze and large parrotfish and emperor, or perhaps a flutemouth or porcupine fish can be encountered.,.

Further toward the outer reef, plate coral has grown almost to the surface. In this shallow area, with high water flow and plenty of sunlight, algae grows well on the dead coral and limestone. Schools of convict surgeonfish graze across these shallow fields. The deep shelves beneath collapsed plates of coral are home to moray eels, crayfish, wobbegong and yellow armoured knightfish, which hide on the dark ledges.

Beyond, the outer reef tumbles abruptly down in deep gullies between lumps of coral and weed-covered limestone to a sloping sandy floor. Larger fish such as mackerel and golden trevally, as well as many different types of wrasse, patrol this area.

Waves breaking on the outer reef push water across the lagoon to join the current flowing south. At the southern end of the lagoon, water pours out into the bay, swirling around enormous domed colonies of *Lobophyllia* brain coral. This coral has huge fragile polyps and thrives in this small area, protected from almost all wave action.

Ocean beach meets the lagoon here and garfish, tailor, longtom and other open-water fish congregate to feed on material carried out from the lagoon. Seagrass wrack, deposited by the waves in this corner of the bay provides a home for many small invertebrates, and attracts whiting and dart to the area.

The ocean beach curves away from the lagoon towards windswept Black Rock, surrounded by pot-holed and rocky limestone shallows. The bay contains patches of seagrass and lumps of limestone reef. Dolphins often hunt through this area, surfing the reef breaks and chasing longtom or shark mackerel. Dugongs have also been observed in the area.”

SECTION 4 DESCRIPTION OF USERS

The Point Quobba lagoon and beach area is the nearest clear-water ocean beach to Carnarvon, with those ocean beaches closer to the town having cloudy estuarine water. It is very popular with local people, particularly during summer and the Christmas and Easter school holiday periods.

Many locals have shacks at the Blowholes or use the area for camping and day use. During winter, weekend fishing and diving are popular recreational activities, as is potting and diving for western rock lobster during the season

In winter, particularly between June and September, many retired people site their caravans in the caravan park for extended periods, often two or three months. Fishing is the dominant activity.

Many tourists visiting the Blowholes and other tourist attractions in the area are drawn to the lagoon and engage in fishing, sight-seeing and feeding the fish in the part known as “the aquarium”. However, it has been reported that many find the area unwelcoming, because of the apparent closed community of squatters’ shacks.

Commercial fishers fish for Spanish mackerel during the season from a land-base at Quobba Point, and use the ramp for access to their fishery offshore. Catches are transferred manually from the boat to a vehicle on the beach and then into the fish factory at Carnarvon for marketing.

A group of individuals with a particular interest in the marine and terrestrial environment surrounding the Point Quobba area has been formed, referred to as the Blowholes Protection Association (BPA). The BPA includes owners of the shacks built along and behind the primary dune system at Point Quobba to assist with the management of the area, and to provide input into the long term management of the area by both State and local Government.

The BPA has particular concerns about the management of the marine environment at Point Quobba, and was instrumental in promoting consideration of the area as a FHPA. It is anticipated that the Shire of Carnarvon’s current plans to upgrade the settlement will add value to the recreation experience of the area.

This draft management plan for the proposed Point Quobba FHPA relates only to marine waters up to the high water mark.

Few usage statistics for the area are available, however it is known that there are 42 shacks at the Blowholes, and 95 caravan sites extending from the main area behind the primary beach

dune toward Black Rock. During peak periods, up to 130 vans have been reported to utilize the beach area.

The annual average daily traffic count for the Blowholes Road taken at a point 43km from the North West Coastal Highway in 1997 was 133.

4.1 Major activities

A major attribute of the Point Quobba area is the clear water and white sand beach of the lagoon. The lagoon and associated reef are used extensively by families for swimming, snorkelling, fishing and beach activities. It is an important area for children learning to swim, snorkel and appreciate marine life.

A popular activity with tourists and children is hand-feeding the tame fish in 'the aquarium' at the tip of Point Quobba. Many small reef fish - as well as some larger parrot fish and baldchin groper - can be seen and approached by snorkellers.

Fishing in the lagoon is limited by virtue of the snags on the coral bottom, so fishing for whiting over the sand areas and casting and spinning for tailor are the main activities. Nets are occasionally laid along the beachside channel for whiting.

The boat launching and mooring area is sited just within the protected waters of the lagoon at its eastern entrance. Although referred to as a 'boat ramp', launching is actually over the sand and requires a four-wheel drive vehicle, although traction aids are available.

Retrieval of boats is often only possible at high tide because of the steep nature of the ramp. Vessels therefore must often be moored along the beach to await retrieval. Boats up to eight metres use the ramp for access to offshore fishing, diving, spearfishing, mostly with SCUBA, and to lay and retrieve lobster pots.

Recreational fishing for rock lobster is a major activity during the season, from both the beach and boats. Setting pots and diving with air are the most common methods, however free diving from the beach and boats also occurs. Western rock lobster are plentiful due to the rocky nature of the substrate, and possibly also because the area is part of a larger permanent closure for commercial rock lobster fishers.

Beach fishing close to Point Quobba is fruitful because of the deep water and reefs close to the beach. The high flow-through rate of waters in the lagoon creates an especially good fishing location just east of the boat ramp, where many species including spangled emperor, queenfish, the various types of 'nor'-west snapper, pink snapper, dart, garfish, squid and tropical species can be caught. Trolling for tailor and mackerel from the shallow coral reef is a popular activity, as is line fishing and spearfishing from boats for reef fish.

Rock oysters can be gathered by hand, when seas and tides permit, in the closed area near Point Quobba. However, collection of the rocky substrate upon which the oysters grow is prohibited within the existing section 43 closure. Other shellfish species, such as trochus shells and clams, are gathered for consumption. Collecting shells and coral for decoration and souvenirs occurs in the lagoon and on rock platforms occasionally.

The collection of large quantities of coral and “live rock” by both licensed and recreational coral collectors is a sensitive issue which has created community conflict among Carnarvon residents in the recent past. In 2002 the Minister for Fisheries declared a total prohibition on the recreational collection of coral and live rock in all WA state waters, pending the preparation of a long term management strategy (due to be completed in late 2003). However, commercial collection is still possible within the proposed FHPA

Dab netting at night for garfish well out from the lagoon and boat ramp has been an integral part of commercial mackerel fishing operations at Quobba Point. This activity does not affect the recreational catch of garfish and is not considered to have a significant environmental impact on the area.

SECTION 5 VALUES OF AREA

5.1 Conservation values

The Wilson Report³ recommended that an area from Red Bluff to Point Quobba be considered as a Marine Reserve. It noted that the ecosystems supported by the many habitats are largely unspoilt and highly diverse, containing a mix of endemic temperate south-west Australian species with tropical and temperate Indo-Pacific species. The *Fisheries Environmental Management Plan For The Gascoyne Region*⁴ also highlighted the Point Quobba area as worthy of consideration as a FHPA.

The Point Quobba coral reef and lagoon provides a good example of a sheltered near-shore reef easily accessible to Carnarvon residents. It is considered to have a high conservation value by virtue of the protection of the reef platform area within the existing section 43 fisheries closure proclaimed in 1987, which prohibits the taking of all fish and aquatic organisms except for oysters (by hand).

5.2 Recreation values

The marine waters in the vicinity of Point Quobba area are regionally important and highly valued by the people of Carnarvon for recreation because they are clear, and largely protected from open ocean swell, providing an excellent swimming and diving location. The adjacent hinterland also provides a suitable camping area.

Point Quobba is also one of the few places along the Gascoyne coast where both boat launching is possible and camping is permitted.

³ Department of Conservation and Land Management, 1994. *A Representative Marine Reserve System for Western Australia, Report of the Marine Parks and Reserves Selection Working Group*. Perth.

⁴ *Fisheries Environmental Management Plan For The Gascoyne Region - Draft Report 2002*. Fisheries Management Plan No 142.

5.3 Education and scientific values

The marine ecosystem within the proposed FHPA is of considerable scientific and recreational interest, and is highly valued by the local community, particularly in schools, as a place where children can gain an awareness of the marine environment.

5.4 Tourism values

Tourist activity in the region is heavily based on enjoyment of the natural environment and the recreational opportunities provided by the coastal resource. Although not widely promoted in tourist literature, the Point Quobba area receives a significant number of tourists who visit the adjacent Blowholes and chance upon the area, either during a day trip or as part of a tour of the 'Carnarvon Outback Coast'.

Significant numbers of tourists and "grey nomads" (aged pensioners) stay for extended periods. Day visitors to the Point Quobba area mostly base themselves in Carnarvon during their time in the region, bringing considerable economic benefit to the town.

5.5 Aboriginal significance

Point Quobba lies within the traditional area of the Baiyungu people, who are members of the Gnulli Group. The Baiyungu people use the area regularly, sometimes to collect trochus at Point Quobba and Black Rock for consumption. The Gnulli Native Title Claim (WC97_028) covers the entire study area.

No registered Aboriginal sites are in the area, but there is need to conduct an anthropological assessment of the heritage values of the Point Quobba site, particularly if development plans for the settlement proceed. Any assessment should include the water area and consultation with Aboriginal people with traditional associations with the area.

SECTION 6 CURRENT AND POTENTIAL THREATS

There are a number of current and potential threats to the marine life at Point Quobba reef and lagoon. Most of these relate to the area outside the existing section 43 fishing closure. However, some inappropriate activities occur within it, either through ignorance of the law, or through shortcomings in the wording of the section 43 Order.

For example, Notice No. 330 of 1987 prohibits the *taking* of fish, but not *attempting to take* fish, with the result that Fisheries Officers cannot act against people fishing unless they have fish in their possession.

6.1 Recreational fishing

Recreational fishing in the Point Quobba area outside the existing section 43 fishing closure has the potential to affect fish populations, particularly resident territorial fish and ‘tame’ fish in the lagoon. Divers have reported entanglements of fishing line on the coral.

Outside the lagoon area, spearfishing (with or without the use of SCUBA diving gear) is likely to have had a selective impact on resident fish species, however there is little information available to warrant any restrictions on this activity. Migratory and pelagic fish moving through the area are not likely to be significantly affected by fishing activity.

6.2 Collection of coral and live rock

In past years, the collection of corals and ‘live rock’ by both commercial and recreational collectors has caused extreme community concern and conflict amongst members of the Carnarvon community. To see pieces of coral or live rock taken from the reef has invoked an extremely emotional response, particularly where significant quantities are involved and where there is no legislation to limit the quantity taken.

In 2002 the Minister for Fisheries declared a total prohibition on the recreational collection of coral and live rock in all WA state waters, pending the preparation of a long term management strategy (due to be completed in late 2003). However, commercial collection is still possible within the proposed FHPA. The commercial collection of corals in WA is currently the subject of review by the Department of Fisheries.

6.3 Collection of molluscs

The collection of oysters by hand within the area closed to fishing at Point Quobba is permitted, however there have been reports of people taking the rock substrate upon which the oysters grow. This activity has the potential to cause long-term damage to the rocky, intertidal areas.

Consultation carried out locally indicates that trochus, giant clams and other shellfish are also taken for consumption and there is a general view that the area is becoming depleted, particularly of clams. Other shellfish/shells are often taken for decoration.

6.4 Reef walking

The lagoon area at Point Quobba is shallow, and ideally suited to observation by snorkelling. However, it is extremely vulnerable to reef walking at low tides (except on the sand areas), as visitors are likely to trample on the delicate corals and other sedentary marine organisms. .

There is potential for controlled walk areas for tourists to view the coral at low tides to be considered at some stage in the future. Also, there is a need for educational and interpretative signage to inform visitors of the sensitive nature of the reef ecosystem, to minimise damage to sedentary marine life including corals.

6.5 Boat launching and mooring

The protected location of the 'boat ramp' in the sandy channel behind the reef at Point Quobba is the only place that can be used for boat launching purposes in the area. Each year, cyclones or winter storms move sand to and from the beach, however the ramp has remained in much the same position, with a navigable channel between the reef and beach.

Moorings have been placed near the reef edge to allow a boat to be positioned in the deepest section of the channel. At low tide, the reef is exposed and if the stern of the boat is not secured to the beach, the vessel is likely to be damaged by the reef, and in turn, the reef damaged by the boat. The constant re-laying of moorings and anchors also damages coral on the reef.

It has been suggested that a length of ship's anchor chain, suitably positioned and secured east of the boat ramp, could be used to eliminate all the separate moorings. Boats could then be attached to the chain, via suitable small chains and ropes.

Boat launching and retrieval should not adversely affect the reef as long as care is taken to avoid propeller damage to coral.

6.6 Boating and jet skis

During consultation carried out locally by the Department of Fisheries, several people indicated that motorised dinghies and jet skis traversing the reef and lagoon area should be excluded from the lagoon, as there appears to be an element of inconsideration in those who operate them.

Noise pollution, danger to swimmers and marine animals, speeding over shallow reefs and conflict between users have been cited as problems resulting from the use of motorised dinghies and jet skis. As the use of jet skis is likely to be disruptive to fish living in and around the lagoon and is likely to detract from persons appreciating/observing fish there, the former activity is considered to be incompatible with the latter, but would be acceptable south-east of the boat ramp.

6.7 Water quality

Toilets and waste disposal associated with the shack settlement at Point Quobba have the potential to enter the lagoon via the groundwater. In addition, erosion of the limestone track above the foreshore near the part of the lagoon known as "the aquarium" may be affecting water quality. These effects need to be considered in future plans for development of the settlement.

SECTION 7 MANAGEMENT PLAN

7.1 Aim

The aim of this management plan is to protect the coral assemblages, fish and marine environment of Point Quobba lagoon and associated habitats for education, appreciation and observation purposes; and to actively involve the community in its management.

The establishment of the Point Quobba area as a FHPA would provide a framework to enable better management of human activities, minimise their impacts, and encourage community stewardship for the conservation of the lagoon and its surrounds.

7.2 Purpose of the Fish Habitat Protection Area

Under section 115 (2) of the *Fish Resources Management Act 1999*, an area may be set aside as a FHPA for the following purposes:

1. The conservation and protection of fish, fish breeding areas, fish fossils or the aquatic eco-system; and/or
2. The culture and propagation of fish and experimental purposes related to that culture or propagation; and/or
3. The management of fish and activities relating to the appreciation or observation of fish.

It is proposed that the purposes of the Point Quobba FHPA should be category 1 and 3, as above.

If a FHPA at Point Quobba is gazetted, the existing section 43 order at Point Quobba will be revoked, and a revised section 43 order prepared to give effect to the proposed fishing prohibition within the lagoon areas, as proposed within this draft plan of management.

7.3 Selection criteria and justification

The coral reef and lagoon at Point Quobba is proposed as a FHPA on the basis of the selection criteria outlined in the *Guidelines For The Establishment Of A Fish Habitat Protection Area* (Fisheries Management Paper No. 152). Table 1 expands on the above purposes and addresses the suite of selection criteria.

Table 1 Selection criteria for the establishment of Fish Habitat Protection Areas (FHPAs)

Purpose of FHPA		Selection Criteria	Justification of Proposed FHPA
1	<i>Fish protection</i>	An area that provides for the protection, conservation or maintenance of protected, endangered, or threatened species of fish or other aquatic organisms.	The Point Quobba coral reef and lagoon provides the best example of a sheltered near shore reef easily accessible to Carnarvon residents. It has high conservation value by virtue of the protection of its key areas by the fishing closure proclaimed in 1987.
	<i>Habitat protection</i>	Areas of significant value for breeding, spawning, feeding, sheltering, or which serve as nursery areas or migration routes for fish and other aquatic organisms.	The area known as “the aquarium” in Point Quobba lagoon has high value as a fish-feeding site, with significant tourism and educational value. The protection already provided by the fishing closure means that fish habitats remain in good condition and aquatic species can be studied relatively free of human interference.
	<i>Resource protection</i>	Areas of scientific interest or of importance for the economic or biological sustainability of particular aquatic organisms.	The ecosystems supported by the many habitats are largely unspoilt and highly diverse, containing a mix of endemic temperate south-west Australian species and tropical/temperate Indo-Pacific species.
	<i>Rehabilitation</i>	Areas of importance for fish and fish habitat which have been degraded through human impacts, but which have the potential to be rehabilitated.	There is evidence of degradation of the lagoon through human activity destroying coral.
2	<i>Aquaculture & research</i>	Areas which may be of special value for the culturing and breeding of fish, or for conducting aquatic research.	Not relevant. Note that research is covered in <i>Observation & education</i> below.
3	<i>Human use & resource sharing</i>	Areas used by commercial and recreational users, where their activities may impact adversely on the aquatic environment or lead to resource-sharing problems.	The commercial and recreational collection of coral and marine species has led to conflict between users of the lagoon/reef. The Point Quobba area is valued because it is the nearest clear water ocean beach to Carnarvon. It has high recreation value due to its safe waters, excellent fishing, and varied opportunities for diving.
	<i>Observation & education</i>	Areas of value for public education on various aspects of fish and the interpretation of issues associated with fish and their habitats, or of value for the observation or appreciation of fish.	The marine life and habitats of the Point Quobba area are of considerable scientific and research interest. They are highly-valued in the local community, particularly in schools, as a place for children to gain an awareness of the marine environment.

Note: Compiled from Table 1 in *Guidelines For The Establishment Of A Fish Habitat Protection Area* (Fisheries Management Paper No. 152).

7.4 State and national context

The WA Government policy⁵ for marine reserves and marine protected areas provides for the establishment of a system of protected areas, of which one kind is a Fish Habitat Protection Area (FHPA) which will be managed by the Department of Fisheries.

The Minister for Fisheries can create or revoke a FHPA by an order in the Government Gazette. As described in section 5.1, the values identified in the Wilson Report and the *Draft Fisheries Environmental Management Plan For The Gascoyne Region* (Fisheries Management Paper No. 142) support the creation of a FHPA at Point Quobba.

The Minister for Fisheries may also vest the management of a FHPA in a community group that is a 'body corporate'.

The proposed FHPA would generally meet the criteria for the World Conservation Union (IUCN) Category IV, Habitat/Species Management Area, which is a protected area managed mainly for conservation through management intervention so as to ensure the maintenance of habitats or particular species.

SECTION 8 MANAGEMENT OPTIONS

8.1 Boundary of FHPA

All of those consulted during the preparation of this report agreed that the principal objective of the proposed Point Quobba FHPA should be to protect the corals in the lagoon from damage, especially from large-scale commercial and recreational harvesting operations; and that the protection should apply to all of the lagoon area, not just the present area that is closed to fishing.

Two main options for the creation of a FHPA were suggested:

1. All of the lagoon area, either as a partial or total fishing closure area.
2. All of the lagoon area, plus the waters from the boat ramp to Black Rock.

8.1.1 Protection of the lagoon

The present area that is closed to fishing within 400 metres of Point Quobba has been successful, despite reports of some illegal activity at times. Most of the people consulted considered that the prohibition on the taking of all fish and marine life should be extended to cover *all* of the reef and lagoon, in the form of a FHPA.

Many considered that the presence of fishing, spearfishing, netting, taking lobsters and boating, including their moorings, were inconsistent with conservation of the area or damaging to the ecosystem and these activities should be prohibited within the lagoon. It was

⁵ *New Horizons - The Way Forward in Marine Conservation and Management*. Government of WA, 1998

pointed out that these activities could (still) be carried out just as easily south-east of the boat ramp.

Some took a more lenient view and pointed out that the major issue at Point Quobba was protection of the corals and that there was no need to prohibit some of the other activities. For example, fishing for species such as whiting, tailor and nor' west snapper was said to have no effect on the reef ecosystem, as the fish were migratory and merely visited or passed through the lagoon - with school of fish in some cases presenting an overwhelming temptation to fishers to cast a line.

Many acknowledged that mooring activity was damaging coral, but that position of the present boat ramp site was the only feasible location for it and that proper control of moorings in the area would prevent damage.

Given that the aim of this draft management plan is to protect the coral assemblages, fish and marine environment of the proposed Point Quobba FHPA for *educational* purposes, safeguarding the entire suite of aquatic species from undue disturbance is necessary. The lagoon enclosed by the reef can be considered as a complete physical unit and it would be logical to extend the total fishing closure over the whole lagoon area, as indicated in Map 1. Equally, as explained in section 6 of this document, the wording of any Order must prohibit *attempting* to take fish, rather than the present *taking* of fish, so that Fisheries Officers can act against people who are found fishing in the closed area, but apparently without fish in their possession.

Many people thought that the use of jet skis and powered dinghies in the point Quobba lagoon was a source of community conflict, could damage coral, disturb marine life and would be inconsistent with conservation objectives. However, it was also widely acknowledged that boating access to the ramp along the beachside channels posed no significant threat to the area.

Accordingly, it is proposed that the existing fishing closure area be extended as part of the proposed FHPA to encompass all of the coral reef and lagoon area as far as the boat ramp, as shown in Map 1. Use of the ramp would continue, but the mooring area should be rationalised by the provision of a fixed mooring system within the beachside channel, with most mooring positions being east of the ramp.

Collecting oysters, swimming, snorkelling, and beach activities would continue in the proposed FHPA unchanged.

8.1.2 Boat ramp to Black Rock

Members of the Blowholes Protection Association recommended that the proposed FHPA should extend southward to Black Rock, to protect near-shore ecosystems. This would provide continuity and consistency of management of the marine area in front of the current shack settlement at Point Quobba and the area currently being considered for redevelopment by the Shire of Carnarvon.

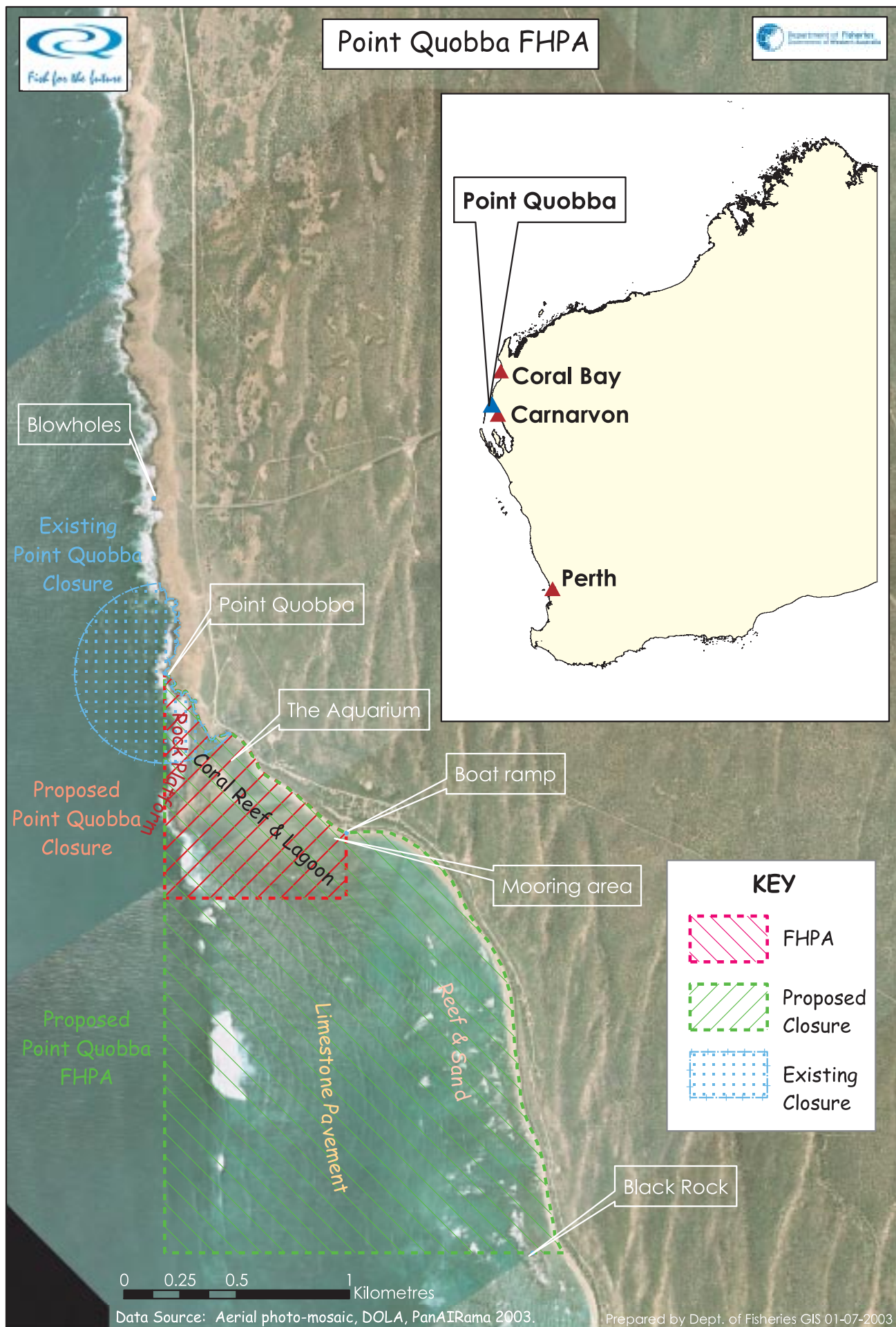
Most people consulted during the preparation of this draft plan of management supported this proposal, provided the controls were limited to protection of corals and benthic habitats. They saw no need to restrict fishing, spearfishing, diving or lobster fishing, but some considered that netting and spearfishing with SCUBA should be prohibited. The alternative view was that extending the proposed FHPA to Black Rock would achieve little and be an unnecessary restriction on peoples' activities.

There is merit in the idea to extend the proposed FHPA to Black Rock, in order to provide a degree of protection for the offshore ecosystems. It would also provide continuity and consistency of management of the area and prevent coral collection from simply occurring further along the beach. In addition, the resulting FHPA would become a benchmark area for future research and provide a buffer area for the lagoon.

Within this area, corals, live rock and benthic organisms, including clams, would be protected, but line and spear fishing, and taking rock lobster and abalone in season, subject to normal fishing regulations, would be unaffected.

Boating and the use of jet skis would also be unaffected. It has been suggested that spearfishing with SCUBA should be prohibited, but the consultation carried out suggest there would be little support for this step and more solid biological evidence would be needed to support a prohibition.

Similarly, recreational netting is an issue being considered on a state-wide basis to clarify those areas open for netting. 'Dab' netting for bait by commercial fishers has no significant impact and should continue.



Map 1 : Proposed Point Quobba FHPA

8.2 Recommended boundaries

It is recommended that a FHPA be established over the waters from a point 400 metres north-west of Point Quobba to Black Rock, as shown in Map 1. The proposed FHPA would be composed of two areas:

1. A general management area protecting coral, live rock and benthic fauna; and
2. A core area composed of the lagoon and reef that would be closed to fishing (except for collecting oysters by hand).

For effective compliance, obvious boundaries are essential, so that people readily understand where restrictions apply:

- The overall FHPA can be identified by navigators with simple 'east-west' and 'north-south' compass bearings to Black Rock and the tip of the island near Point Quobba, respectively.
- The core lagoon and reef area can be readily identified visually, however marker buoys would assist navigation in difficult sea conditions.

The recommended boundaries would cover the significant benthic habitats and facilitate navigation and effective compliance.

8.3 Community involvement in management

The Blowholes Protection Association (BPA) originally nominated the Point Quobba reef system as a FHPA. In response, the Department of Fisheries has encouraged community involvement in its protection, prior to the preparation of this draft management plan.

It is anticipated that declaration of a FHPA will assist in the development within the community of a sense of stewardship for the area, and enable an effective joint management program of the marine and coastal resources between the community and the Department of Fisheries.

Protection of the values of the Point Quobba area will have to rely heavily on community support and stewardship to ensure effective compliance with regulations, due to the remoteness of the location of the proposed FHPA and the limited number of Department of Fisheries staff available in the Gascoyne region. This means that information and educational initiatives, including establishing a community ethic about appropriate forms of behaviour toward the marine environment, will be essential.

The establishment of the two areas shown in Map 1 as a FHPA would provide a framework to:

- Enable better management of human activities;
- Minimise potentially harmful activities ; and
- Encourage community stewardship for the conservation of Point Quobba lagoon and its surrounds.

Under appropriate arrangements with Department of Fisheries and the Shire of Carnarvon, the BPA could provide a valuable role in the management of the proposed FHPA.

SECTION 9 PREFERRED MANAGEMENT STRATEGIES

9.1 Recreational fishing

It is proposed that the area of the current closure to all forms of fishing at Point Quobba should be extended to include *all* of the waters of the lagoon area. Collecting oysters by hand, swimming, snorkelling and beach activities would continue unchanged in the proposed FHPA.

Within the remainder of the proposed FHPA (to Black Rock), the ability to carry out recreational line fishing, spearfishing, netting and catch rock lobster and abalone would remain unchanged.

Strategy:

- Prohibit taking, or attempting to take, fish and other marine life (except for oysters, by hand) within the lagoon area of the FHPA.

9.2 Collecting

Corals, seaweed and reef fauna, including anemones, ‘live rock’ (substrate which has living marine organisms attached to it) and shellfish may be collected easily from the Point Quobba area and their incidental depletion is a concern.

The purpose of a management plan for the proposed FHPA is to protect the coral assemblages, fish and marine environment of Point Quobba lagoon and associated habitats for education, appreciation and observation purposes, as well as the key habitats of the adjoining offshore area.

It is therefore important that all parts of the Point Quobba reef ecosystem remain undamaged, to ensure its long-term sustainability and health. The collection of oysters would be permitted, but taking rock substrate (to which the oysters are attached) along with the oysters causes longer term damage to the resource and would not be allowed. The Department of Fisheries has recently legislated to prohibit the collection of coral and ‘live rock’ for recreational purposes.

It is recognised that, at times, the sampling of marine flora and fauna may be necessary as part of on-going research and monitoring proposals within the FHPA. In this case, exemptions for the collection of samples of marine flora or fauna would need to be sought from the Department of Fisheries under the provisions of the *FRMA 1994*.

Strategy:

- Prohibit the collection of marine flora and fauna (except oysters), including live shell fish, coral and live rock within the FHPA.

9.3 Moorings, boating and use of jet skis

The risk of damage to the Point Quobba reef system by anchors should be managed through the installation of environmentally-friendly boat moorings in the channel adjacent to the boat ramp and the prohibition of anchoring in the area. The location and number of moorings would be determined following consultation with key stakeholder groups.

As the use of jet skis is likely to be disruptive to fish living in and around the lagoon and is likely to detract from persons appreciating or observing fish there, the activity is considered to be incompatible with these activities, but would be acceptable south-east of the boat ramp.

Strategies:

- Prohibit the anchoring of any craft within the lagoon area;
- Install environmentally-sensitive public boat moorings and encourage their use by the boating public; and
- Prohibit the use of jet skis in the lagoon area.

9.4 Nature-based tourism

Properly managed nature-based tourism is consistent with the education objective and the conservation of the Point Quobba FHPA. Nature-based tourism ventures are considered to be a useful way to increase public awareness and education about environmental values, while at the same time providing an income to tour operators.

The Department of Fisheries has licensing and management arrangements for the aquatic tour industry⁶. These require all nature-based tourism ventures to have been issued an 'Aquatic Eco-tourism' licence by the Department of Fisheries before they are allowed to operate.

Strategies:

- Provide local tourism operators with information produced for visitors about the need to protect the Point Quobba reef system; and
- Impose appropriate conditions, to protect the environment, upon any approval to undertake nature-based tourism in the Point Quobba area.

9.5 Information, interpretation and education

A primary objective of this draft plan of management is to raise public awareness, appreciation and understanding of the biodiversity and conservation values of the Point Quobba FHPA, and to promote community stewardship and management of it. An understanding of the Aboriginal heritage values of the area should also be encouraged.

This information is required to ensure that management and interpretation programs for Point Quobba are consistent with these values.

⁶ Ministerial Policy Guideline (No.12), *'The assessment of applications for the granting, renewal or transfer of fishing tour operator licences and aquatic eco-tourism operators licences'*.

Strategies:

- Prepare and install multi-lingual signage at the FHPA, indicating its extent and purpose;
- Erect signs in the area to educate visitors about local species, habitats, and responsible fishing methods;
- Consider the provision of a reef diving trail to assist divers and a controlled walk area for reef walking;
- Encourage training on the role and value of the FHPA for local government authority rangers and Voluntary Fisheries Liaison Officers; and
- Support an anthropological assessment of the Aboriginal heritage values of the FHPA, including consultation with Aboriginal people with traditional associations to the area.

9.6 Research and monitoring

In encouraging use of the [proposed] FHPA, it is recognised that increased public usage may put additional pressure on the fragile reef ecosystem. It is therefore vital to ensure that there is appropriate baseline monitoring of the marine ecosystem, and a coordinated on-going monitoring program to compare and interpret data over a period of time.

This monitoring should include the recreational activities being carried out in the FHPA, in order to identify which areas of the FHPA are under the greatest user pressure.

Strategy:

- Encourage research institutions to establish an on-going monitoring program in the FHPA.

SECTION 10 IMPLEMENTATION PLAN

This draft management plan for Point Quobba needs to be the subject of public consultation in accordance with requirements of the *Fish Resources Management Act 1994* for establishing a FHPA.

If this draft plan of management plan is adopted, it will be the responsibility of Department of Fisheries, in consultation with community groups, to coordinate the implementation of the management strategies in the plan, and to provide progress reports to the community.

The following plan of action for the future management of the Point Quobba FHPA would be undertaken by the Department of Fisheries:

- Implement the management strategies contained the plan, which relate to the restriction of specific fishing activities under the provisions of the *FRMA 1994*.
- Prepare and install signage and environmentally-friendly boat moorings within the FHPA, in consultation with key stakeholder groups, as funds become available.
- Establish a working group, with input from the BPA and the Shire of Carnarvon, to establish mechanisms to implement the management strategies in the plan.
- Investigate potential sources of funding to implement recommendations in the plan, where appropriate.

REFERENCES

DA Lord & Associates in *Draft Carnarvon Coastal Strategy* SMEC Aust P/L 2001

Department of Conservation and Land Management, 1994. *A Representative Marine Reserve System for Western Australia, Report of the Marine Parks and Reserves Selection Working Group*. Perth.

Department of Conservation and Land Management, 1998. *New Horizons - The Way Forward in Marine Conservation and Management*. Government of WA.

Department of Fisheries, 1998. *Management of the Houtman Abrolhos System*. Fisheries Management Paper No 117.

Department of Fisheries, 2002. *Fisheries Environmental Management Plan For The Gascoyne Region - Draft Report*. Fisheries Management Paper No 142.

Department of Fisheries, 2001. *Guidelines For The Establishment Of A Fish Habitat Protection Area*. Fisheries Management Paper No. 152.

Department of Fisheries, 1999. *The assessment of applications for the granting, renewal or transfer of fishing tour operator licences and aquatic eco-tourism operators licences'* Ministerial Policy Guideline No.12.

APPENDIX 1 LIST OF PEOPLE CONSULTED

Clr. Peter Blurton	Shire of Carnarvon, Carnarvon
Clr. Karl Brandenburg	Shire of Carnarvon, Recreational Fishing Advisory Committee (RFAC), Carnarvon
Mr Nathan Cope	Marine Aquarists Association, Perth
Mr Brad Cox	Outback Coast Dive Club, Carnarvon
Mr Stuart Field	Department. Conservation & Land Management, Perth
Mr Simon Glossop	WA Tourism Commission, Carnarvon
Mr Tim Meecham	Quobba Station, Carnarvon
Mr Jim Miller	Blowholes Protection Association, Carnarvon
Mr Peter Moore	Professional Fisherman, Geraldton
Mr Phil Moore	Professional Fisherman, Geraldton
Mr Kevin O'Meara	RFAC, Volunteer Fisheries Liaison Officer (VFLO), Carnarvon
Mr Clinton Strugnell	Chief Executive Officer, Shire of Carnarvon, Carnarvon
Mr Steve Thompson	Shire Planner, Shire of Carnarvon, Carnarvon
Mr Phil Woods	Chair, Carnarvon RFAC, Carnarvon
Mr Laurie Caporn	Department of Fisheries, Carnarvon
Mr Shane Aylmore	Department of Fisheries, Carnarvon
Mr Tim Nicholas	Department of Fisheries, Carnarvon
Mr Cameron Dawes-Smith	Department of Fisheries, Carnarvon

FISHERIES MANAGEMENT PAPERS

- 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).
- No. 15** Draft management plan, Control of barramundi gillnet fishing in the Kimberley. R. S. Brown (1988).
- 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)
- No. 20** The Offshore Constitutional Settlement, Western Australia 1988.
- 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)
- No. 24** Management of the Perth metropolitan purse-seine fishery. N. Moore (1989).
- 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).
- No. 42** Appendix to the final report of the Recreational Fishing Advisory Committee. (1991)
- No. 43** A discussion of options for effort reduction. Southern Gillnet and Demersal Longline Fishery Management Advisory Committee (1991).
- No. 44** A study into the feasibility of establishing a system for the buy-back of salmon fishing authorisations and related endorsements. (1991)
- No. 45** Draft Management Plan, Kimberley Prawn Fishery. (1991)
- No. 46** Rock Lobster Industry Advisory Committee, Chairman's report to the Minister (1992)
- No. 47** Long term management measures for the Cockburn Sound restricted entry fishery. Summary of submissions and final recommendations for management. P. Millington (1992).
- No. 48** Pearl oyster fishery policy guidelines (Western Australian Pearling Act 1990). Western Australian Fisheries Joint Authority (1992).
- No. 49** Management plan, Kimberley prawn fishery. (1992)
- No. 50** Draft management plan, South West beach seine fishery. D.A. Hall (1993).
- No. 51** The west coast shark fishery, draft management plan. D.A. Hall (1993).
- No. 52** Review of bag and size limit proposals for Western Australian recreational fishers. F.B. Prokop (May 1993).
- No. 53** Rock Lobster Industry Advisory Committee, Chairman's report to the Minister for Fisheries. (May 1993)
- 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).
- No. 58** The introduction and translocation of fish, crustaceans and molluscs in Western Australia. C. Lawrence (October 1993).
- No. 59** Proceedings of the charter boat management workshop (held as part of the 1st National Fisheries Manager Conference). A. E. Magee & F. B. Prokop (November 1993).
- No. 60** Bag and size limit information from around Australia (Regulations as at September 1993) F. B. Prokop (January 1993).
- 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)
- No. 79** Management of the Northern Demersal Scalefish Fishery. J. Fowler (June 1995)
- No. 80** Management arrangements for specimen shell collection in Western Australia, 1995. J. Barrington & C. Campbell (March 1996)
- No. 81** Management Options (Discussion Paper) for the Shark Bay Snapper Limited Entry Fishery. Shark Bay Snapper Limited Entry Fishery Working Group, Chaired by Doug Bathgate (June 1995)
- No. 82** The Impact of the New Management Package on Smaller Operators in the Western Rock Lobster Fishery R. Gould (September 1995)
- No. 83** Translocation Issues in Western Australia. Proceedings of a Seminar and Workshop held on 26 and 27 September 1994. F. Prokop (July 1995)
- No. 84** Bag and Size Limit Regulations From Around Australia. Current Information as at 1 July 1995. Third Australasian Fisheries Managers Conference, Rottne Island. F. Prokop (July 1995)

- No. 85** West Coast Rock Lobster Fishery Management Plan 1995 - Draft for Public Comment. Edited by M. Moran (August 1995)
- No. 86** A Review of Ministerial Policy Guidelines for Rock Lobster Processing in Western Australia from the Working Group appointed by the Minister for Fisheries and chaired by Peter Rich (December 1995)
- No. 87** Same Fish - Different Rules. Proceedings of the National Fisheries Management Network Workshop held as part of the Third Australasian Fisheries Managers Conference. F. Prokop
- No. 88** Balancing the Scales - Access and Equity in Fisheries Management - Proceedings of the Third Australasian Fisheries Managers Conference, Rottnest Island, Western Australia 2 - 4 August 1995. Edited by P. Summerfield (February 1996)
- No. 89** Fishermen's views on the future management of the rock lobster fishery. A report. Prepared on behalf of the Rock Lobster Industry Advisory Committee by The Marketing Centre. (August 1995)
- No. 90** A report on the issues effecting the use of the Dampier Archipelago. Peter Driscoll, Landvision Pty Ltd (March 1996)
- No. 91** Shark Bay World Heritage Property - Management Paper for Fish Resources. Kevin A Francesconi (September 1996)
- No. 92** Pearling and Aquaculture in the Dampier Archipelago - Existing and Proposed Operations. A report for public comment. Compiled by Ben Fraser (September 1996)
- No. 93** Shark Bay World Heritage Property - Summary of Public Submissions to the Draft Management Plan for Fish Resources. Kevin A Francesconi (September 1996)
- No. 94** Rock Lobster Industry Advisory Committee Report - Management arrangements for the Western Rock Lobster Fishery for the 1997/98 season. Frank Prokop (May 1997)
- No. 95** Australian Salmon and Herring Resource Allocation Committee. P McLeod & F Prokop (*in press*)
- No. 96** Summary Report of the Freshwater Aquaculture Taskforce (FAT) by Chris Wells (*in press*)
- No. 97** (*in press*)
- No. 98** A Pricing Policy for Fisheries Agencies - Standing Committee on Fisheries and Aquaculture Management Committee. P Millington (March 1997)
- No. 99** Management of the South Coast Purse Seine Fishery. J Fowler, R Lenanton, Kevin Donohue, M Moran & D Gaughan.
- No. 100** The Aquaculture of non-endemic species in Western Australia - Redclaw crayfish (*Cherax quadricarinatus*). Tina Thorne (June 1997)
- No. 101** Optimising the worth of the catch - Options and Issues. Marec Pty Ltd (September 1997)
- No. 102** Marine farm planning and consultation processes in Western Australia. Dave Everall (August 1997)
- No. 103** Future management of the aquatic charter industry in Western Australia by the Tour Operators Fishing Working Group (September 1997).
- No. 104** Management of the Houtman Abrolhos System (draft). Prepared by the Abrolhos Islands Management Advisory Committee in conjunction with Fisheries Western Australia (October 1997)
- No. 105** Plan for the Management of the Houtman Abrolhos Fish Habitat Protection Area (draft). Prepared by the Abrolhos Islands Management Advisory Committee in conjunction with Fisheries Western Australia (October 1997)
- No. 106** The impact of Occupational Safety and Health on the management of Western Australian Fisheries. Cameron Wilson (*in press*)
- No. 107** The Aquaculture of non-endemic species in Western Australia - Silver Perch (*Bidyanus bidyanus*). Tina Thorne (June 1997)

- No. 108** Issues affecting Western Australia's inshore crab fishery - Blue swimmer crab (*Portunus pelagicus*), Sand crab (*Ovalipes australiensis*). Cathy Campbell (September 1997)
- No. 109** Abalone Aquaculture in Western Australia. Cameron Westaway & Jeff Norriss (October 1997)
- No. 110** Proposed Voluntary Fishery Adjustment Scheme - South Coast Purse Seine Managed Fishery Report by Committee of Management (October 1997)
- No. 111** Management Options for Pilbara Demersal Line Fishing. Gaye Looby (December 1997)
- No. 112** Summary of Submissions to Fisheries Management Paper No. 108 - issues affecting Western Australia's inshore crab fishery. Compiled by Cathy Campbell (April 1998)
- No. 113** Western Rock Lobster Management - Options and Issues. Prepared by Kevin Donohue on behalf of the Rock Lobster Industry Advisory Committee. (June 1998)
- No. 114** A Strategy for the Future Management of the Joint Authority Northern Shark Fishery. Prepared by Tim Bray and Jo Kennedy. (June 1998)
- No. 115** Guidelines for granting Aquaculture Leases. Prepared by Fisheries WA, the Aquaculture Development Council & the Aquaculture Council of WA. (July 1998)
- No. 116** Future Management of the Aquatic Charter Industry in Western Australia - Final Report. By the Tour Operators Fishing Working Group (September 1998)
- No. 117** Management of the Houtman Abrolhos System. Prepared by the Abrolhos Islands Management Advisory Committee in conjunction with Fisheries Western Australia. (December 1998)
- No. 118** Plan for the Management of the Houtman Abrolhos Islands Fish Habitat Protection Area (Schedule 1)
- No. 119** Access to Wildstock for Aquaculture Purposes (not published)
- No. 120** Draft Management Plan for Sustainable Tourism at the Houtman Abrolhos Islands. Prepared by LeProvost, Dames and Moore for the Abrolhos Islands Management Advisory Committee in conjunction with Fisheries WA. (December 1998)
- No. 121** Future Directions for Tourism at the Houtman Abrolhos Islands - Draft for Public Comment. Prepared by LeProvost, Dames and Moore for the Abrolhos Islands Management Advisory Committee in conjunction with Fisheries WA. (December 1998)
- No. 122** Opportunities for the Holding/Fattening/Processing and Aquaculture of Western Rock Lobster (*Panulirus cygnus*). A discussion paper compiled by Fisheries WA. (November 1998)
- No. 123** Future directions for the Rock Lobster Industry Advisory Committee and the Western Rock Lobster Managed Fishery. A discussion paper prepared by Kevin Donohue on behalf of the Rock Lobster Industry Advisory Committee. (December 1998)
- No. 124** A Quality Future for Recreational Fishing in the Gascoyne. Proposals for Community Discussion. A five-year management strategy prepared by the Gascoyne Recreational Fishing Working Group (May 1999).
- No. 125** Changes to Offshore Constitutional Settlement Arrangements; North West Slope Trawl Fishery and Western Deepwater Trawl Fishery. A discussion paper by Fiona Crowe and Jane Borg (May 1999)[not published]
- No. 126** The South Coast Estuarine Fishery. A discussion paper by Rod Pearn and Tony Cappelluti. (May 1999)
- No. 127** The Translocation of Barramundi. A discussion paper by Makaira Pty Ltd.[July 1999]
- No. 128** Shark Bay Pink Snapper Managed Fisheries in WA
- No. 129** Review of the Western Australian Pilchard Fishery 12 - 16 April 1999. Prepared by K.L. Cochrane, Fisheries Resource Division, Food and Agriculture Division of the United Nations (November 1999)
- No. 130** Developing New Fisheries in Western Australia. A guide to applicants for developing fisheries Compiled by Lucy Halmarick (November 1999)

- No. 131** Management Directions for Western Australia's Estuarine and Marine Embayment Fisheries. A strategic approach to management (November 1999)
- No. 132** Summary of Submissions to Fisheries Management Paper No. 126 - The South Coast Estuarine Fishery - A Discussion Paper. Compiled by Rod Pearn (November 1999)
- No. 133** Abalone Aquaculture in Western Australia, A Policy Guideline (December 1999)
- No. 134** Management Directions for WA's Coastal Commercial Finfish Fisheries. Issues and proposals for community discussion (March 2000)
- No. 135** Protecting and Sharing Western Australia's Coastal Fish Resources. The path to integrated management. Issues and proposals for community discussion (March 2000)
- No. 136** Management Directions for WA's Recreational Fisheries (March 2000)
- No. 137** Aquaculture Plan for the Houtman Abrolhos Islands (April 2000)
- No. 138** Information on Quota Management of Rock Lobster Fisheries in South Australia, Tasmania and New Zealand. By Kevin Donohue and Eric Barker (May 2000)
- No. 139** A Quality Future for Recreational Fishing on the West Coast. Proposals for Community Discussion. A five-year management strategy prepared by the West Coast Recreational Fishing Working Group (June 1999)
- No. 140** Aquaculture Plan for the Recherche Archipelago, Western Australia. (June 2000)
- No. 141** Fish Protection Measures in Western Australia (June 2001)
- No. 142** Fisheries Environmental Management Plan for the Gascoyne Region (June 2002)
- No. 143** Western Rock Lobster. Discussion paper for seasons 2001/2002 and 2002/2003 (July 2000)
- No. 144** The Translocation of Brown Trout (*Salmo trutta*) and Rainbow Trout (*Oncorhynchus mykiss*) into and within Western Australia. Prepared by Jaqueline Chappell, contributions from Simon Hambleton, Dr Howard Gill, Dr David Morgan and Dr Noel Morrissy. (*not published, superseded by MP 156*)
- 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) (April 2002)
- No. 148** Draft Bycatch Action Plan for the Shark Bay Prawn Managed Fishery (Summary Report) (April 2002)
- No. 149** Final Plan of Management for the Lancelin Island Lagoon Fish Habitat Protection Area (March 2001)
- No. 150** Draft Plan of Management for the Cottesloe Reef Proposed Fish Habitat Protection Area (April 2001)
- No. 151** Inventory of the Land Conservation Values of the Houtman Abrolhos Islands (*in press*)
- No. 152** Guidelines for the Establishment of Fish Habitat Protection Areas (June 2001)
- No. 153** A Five-Year Management Strategy for Recreational Fishing on the West Coast of Western Australia. Final Report of the West Coast Recreational Fishing Working Group (August 2001).
- No. 154** A Five-Year Management Strategy for Recreational Fishing in the Gascoyne. Final Report of the Gascoyne Recreational Fishing Working Group (September 2001)
- No. 155** Plan of Management for the Cottesloe Reef Fish Habitat Protection Area (September 2001)
- No. 156** The Translocation of Brown Trout (*Salmo Trutta*) and Rainbow Trout (*Oncorhynchus mykiss*) into and within Western Australia (June 2002)
- No. 157** Policy for the Implementation of Ecologically Sustainable Development for Fisheries and Aquaculture within Western Australia. By W.J. Fletcher (May 2002)

- No. 158** Draft Plan of Management for the Miaboolya Beach Fish Habitat Protection Area (March 2002)
- No. 159** The Translocation of Barramundi (*Lates calcarifer*) for Aquaculture and Recreational Fishery Enhancement in Western Australia. By Tina Thorne.
- No. 160** The Introduction and Aquaculture of Non-endemic Species in Western Australia: the 'Rotund' Yabby *Cherax rotundus* and the All-male Hybrid Yabby. A Discussion Paper. (June 2002)
- No. 161** Plan of Management for the Miaboolya Beach Fish Habitat Protection Area (September 2002)
- No. 162** Reseeding of grazing gastropods and bivalves into the marine environment in Western Australia – a discussion paper. By Jane Borg.
- No. 163** Review of recreational take of coral in Western Australia – a discussion paper October 2002.
- No. 164** Report of the Mackerel Independent Advisory Panel to the Executive Director, Department of Fisheries, on criteria for access to, and management arrangements for, the proposed Mackerel Fishery (Interim) Management Plan (November 2002)
- No. 165** Report to the Minister for Agriculture, Forestry and Fisheries by the Integrated Fisheries Management Review Committee (November 2002)
- No. 166** Fisheries Statutory Management Authority Inquiry. A background paper (February 2003)
- No. 167** Draft Fisheries Environmental Management Plan for the Northern Region (*in press*)
- No. 168** Aboriginal Fishing Strategy: Report to the Minister for Agriculture, Forestry and Fisheries by the Hon E. M. Franklyn QC, Chairman of the Aboriginal Fishing Strategy Working Group
- No. 169** Hardy Inlet discussion paper (*in press*)
- No. 170** Management of the proposed Geographe Bay Blue Swimmer and Sand Crab Managed Fishery. By Jane Borg and Cathy Campbell (*in press*)
- No. 171** Draft Aquaculture Plan for Shark Bay (*in press*)
- No. 172** Draft Aquaculture Plan for Exmouth Gulf (*in press*)
- No. 173** Draft Plan of Management for the proposed Point Quobba Fish Habitat Protection Area