

**DRAFT PLAN OF MANAGEMENT FOR THE
KALBARRI BLUE HOLES
FISH HABITAT PROTECTION AREA**

FISHERIES MANAGEMENT PAPER NO. 178

**Department of Fisheries
168 St Georges Tce
PERTH WA 6000**

March 2004

ISSN 0819-4327



**Draft plan of management for the
Kalbarri Blue Holes
Fish Habitat Protection Area**

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OPPORTUNITY TO COMMENT

DRAFT PLAN OF MANAGEMENT PROPOSED KALBARRI BLUE HOLES 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
Locked Bag 39
Cloisters Square Post Office
PERTH WA 6850

The closing date for submissions is 30 June 2004.

SECTION 1 INTRODUCTION

The proposed Kalbarri Blue Holes Fish Habitat Protection Area (FHPA) is located immediately to the west of the town of Kalbarri (Figure 1). The Kalbarri Blue Holes FHPA includes part of a near-shore limestone reef system, which stretches intermittently from Red Bluff in the South to the Murchison River Mouth in the North. The proposed FHPA has been nominated to protect and conserve an unfished example of a near-shore reef community. In order to achieve this aim, and encourage the appreciation and conservation of fish, a number of management strategies are proposed which restrict recreational and commercial fishing. The proposed FHPA is approximately 300 metres long and 100 metres wide, and is illustrated in Figure 2.

The Blue Holes are one of the few accessible and relatively safe beaches for families to explore within close proximity of the town. The reef is accessible to the general public by two car parks, and intensively used by locals and visitors to the Kalbarri area. The population of Kalbarri is increasing and subsequently the residential areas are expanding, as the town is one of the fastest growing towns in the Mid-West. The area is also a popular tourist destination. Peak use of the Blue Holes area is experienced during the summer holidays, when families are on holidays, tourist numbers rise and weather is conducive for use of the site.

The reef system is a popular recreational fishing site, particularly during summer months. Western Rock Lobster (*Panulirus Cygnus*) and Roe's Abalone (*Haliotis roei*) are also removed in season in the vicinity by both recreational and commercial fishing licence holders. Other marine organisms, such as oysters are also opportunistically harvested.

The Friends of Blue Holes (FOBH) first nominated the Kalbarri Blue Holes as a Fish Habitat Protection Area (FHPA) under Section 115 of the *Fish Resources Management Act (FRMA) 1994* in 2001. The Minister for Fisheries subsequently endorsed formal consideration of the FHPA in July 2002.

The Australian Marine Conservation Society WA documented the benthic habitat and the diversity of tropical and temperate species in April 2002. More than 200 species were identified, including seagrasses, algae, fish, reef dwelling organisms and corals (Appendix 1). The proposed Kalbarri Blue Holes FHPA was identified as a representative site which is typical of the near-shore reef ecosystem in the West-Coast bioregion. The need to protect a portion of this distinctive bioregion has been acknowledged in the report 'A Representative Marine Reserve System for Western Australia' (CALM, 1994) and in the 'Environmental Management Plan for the Gascoyne Region' (Department of Fisheries, 2002).

The preparation of this draft plan of management has been assisted by a 'Fishcare' grant. The content of the plan reflects community feedback obtained at a workshop held in Kalbarri (Appendix 3). Public feedback was also obtained from a questionnaire available at the tourist centre (Appendix 5). This draft plan has been prepared by the Friends of the Blueholes and the Department of Fisheries, in consultation with the Shire of Northampton, local indigenous groups, and commercial and recreational fishing groups. However, it should be noted the draft strategies contained within the plan do not necessarily reflect the views of these organisations.

The overall objective of the proposed FHPA and the associated Plan of Management is to conserve and protect a portion of the near-shore reef ecosystem in the vicinity of the Blue Holes, and to manage activities within the area, to promote the observation and protection of fish living within the area. Strong community commitment has already been demonstrated, and this is crucial in the implementation of the proposed management plan.

It is anticipated public education will promote the strategies contained within the plan of management for the area and it is acknowledged community involvement is critical to successful implementation of strategies contained within the plan. Prosecution of repeat offenders by the Department of Fisheries WA may occur if breaches of regulations imposed under the *Fish Resources Management Act 1994* (following the declaration of the FHPA to manage fishing activities) are clearly demonstrated.

SECTION 2 METHODOLOGY

2.1 Identification of the site

In 2001, members of the local Kalbarri community discussed the past, current and future state of the Kalbarri Blue Holes, and its cultural, social, economic and environmental values to the community. Anecdotal evidence suggests the site has experienced increasing human use, particularly as the popularity of Kalbarri as a tourist destination grows.

Friends of Blue Holes (FOBH) nominated the Kalbarri Blue Holes as a Fish Habitat Protection Area (FHPA) under Section 115 of the *Fish Resources Management Act (FRMA) 1994* in 2001. Friends of Blue Holes subsequently obtained a Fish Care Grant from the Department of Fisheries WA, for financial assistance in the preparation of the draft plan.

A marine survey conducted by Australian Marine Conservation Society WA (AMCSWA) produced a species list for a portion of the intertidal reef area south of the Murchison River mouth, and area and described and mapped the benthic habitat (Appendix 1). This survey indicated that the reef ecosystem in the vicinity of the Blue Holes is in good health, and represents a complex and diverse reef community.

2.2 Consultation

FOBH are a community group which reflect the views of a portion of the community. To gather further community feedback on the proposed FHPA, a public workshop was organised on the 18 January 2003. This workshop was advertised in newspapers including the *Geraldton Guardian*, the *Midwest Times* and *The West Australian*. The workshop was well attended by people of diverse backgrounds (Appendix 4) and all favoured the establishment of a FHPA at Blue Holes. A copy of the questionnaire distributed at this workshop is included as Appendix 2 and subsequent feedback received at the workshop included as Appendix 3. Another questionnaire was available for public comment at the visitor centre, and is included as Appendix 5 along with a summary of responses received.

Subsequently, this draft management plan has been developed for the proposed Kalbarri Blue Holes FHPA, and incorporates the responses from the community workshop. This draft plan has been prepared following consultation with the Friends of Blue Holes, the Shire of Northampton, commercial and recreational fishers, Recfishwest and local indigenous groups. It must be noted this draft plan does not necessarily reflect the unanimous view of all these groups.

2.3 Objectives of Fish Habitat Protection Areas

It is proposed to establish the Kalbarri Blue Holes FHPA in accordance to Section 115 of the *Fish Resource Management Act 1994*. The act allows the Department of Fisheries to enforce spatial closures of the aquatic ecosystem, and to establish a set of

management regulations for a diversity of activities, that are not limited to the regulation of fishing activities. The proceedings and draft management followed the *Guidelines for the Establishment of a Fish Habitat Protection Area* (Department of Fisheries, 2001a).

The FHPA is to be established for:

- (i) the conservation and protection of fish*, fish breeding areas, fish fossils or the aquatic ecosystem; and
- (ii) the management of fish and activities relating to the appreciation or observation of fish.

**NOTE: The Fish Resource Management Act 1994 defines 'fish' as all aquatic organisms (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 the [Blue Holes] 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)*

This draft plan contains:

- A description of the site of the Kalbarri Blue Holes FHPA;
- A description of the environmental, heritage, recreational, research and education values of the area;
- An identification of current and potential threats to the area;
- Management options;
- An indication of community involvement in the management of the area; and
- A draft plan of action to implement management strategies.

SECTION 3 DESCRIPTION OF SITE

Kalbarri or Wutumalu, as it is known to local indigenous people, is located in the Mid West region of Western Australia, approximately 590 kilometres north of Perth (27° 43' S and 114° 09' W), as indicated in Figure 1. The Blue Holes forms part of an inshore coastal limestone reef system, located to the west of the town of Kalbarri. The intertidal and sub-tidal reef platforms feature irregular shaped depressions with sandy bottom, commonly referred to as the 'Blue Holes'.

Kalbarri is bordered to the north by the Murchison River, and surrounded in the east and south by the Kalbarri National Park (183,004 hac). To the south, the Kalbarri National Park starts at Red Bluff and features spectacular coastal cliffs. Expansion of the residential area is limited to the stretch of coast between Red Bluff and the Murchison River.

The Blue Holes reef system is composed of broken, undulating calcarenite limestone, some aaelinite limestone and Tumblagooda sandstone. The limestone often supports colonies of seagrasses (*Amphibolis*) and algae (*Sargassum* and *Cystophora*). Smooth, bare areas are exposed Tumblagooda sandstone, which also manifests itself as the spectacular land features of the region. The aquatic sandstone areas are generally devoid of seagrass and algae, but are covered in oysters or limpets. Small colonies of corals are associated with both limestone and sandstone features, these are unique since they occur within metres of the beach. This provides a relatively safe environment, which is highly accessible during periods of low swell.

The tidal range is in the order of 0.5m, which exposes large sections of the intertidal platform. Semidiurnal tides are experienced in the area and obtain maximal ranges in spring and autumn. Subsequently, conditions within the intertidal environment change rapidly throughout the day. Some organisms will arrive and depart with the tides and season, while others remain as residents with varied tolerance to environmental variability. The inshore, intertidal area is often exposed and is inhabited by a variety of marine organisms.

The outer edges of the intertidal platform are the high-energy, impact zones, where the waves unload their energy and sweep cool, oxygenated water over the platform. The net water flow within the reef system is generally northwards (except after periods of prolonged northerly winds). The sub-tidal platform extends 400m west to depths of 15-20m. Outside the surf-zone, the bottom is rugged with many cliffs and overhangs, which becomes more gently undulating further to the west.

The Blue Holes reef system provides a structurally diverse habitat for temperate and tropical organisms. The marine survey conducted by AMCSWA identified more than 200 species, including 10 species of sponge, 17 species of algae, 4 seagrasses, 11 species of hard coral, 71 species of fish, 11 echinoderms and 14 crustaceans (Appendix 1). Many organisms, such as corals, tropical fish and basket stars occur in close proximity of the beach and can be viewed in a relatively safe environment. The intertidal pools are also utilised by migratory and highly mobile fish species including the western rock lobster and tailor as a foraging area.

The northern boundary of the proposed Kalbarri Blue Holes FHPA is located immediately west of the Blue Holes car park and extends south from this point for a distance of 300 metres, and westward 100 metres to the edge of the intertidal reef platform.

3.1 Climate

In winter temperatures are a mild 10-20 °C, however summer temperatures can peak at up to 40 °C.

In summer strong winds are common, especially the afternoon southerly winds, that arise when large high pressure cells dominate the continent. Nonetheless, when heat troughs (tropical lows) or ex-tropical cyclones travel down the coast, weak winds with easterly and northerly components are experienced. It is during these times ambient that temperatures peak. In winter the winds are variable and weak. During this time, strong winds and rains are generally associated with rain bearing depressions or fronts that move eastwards across the Indian Ocean.

An annual rainfall of 370mm is experienced, but is highly variable. Most of the rain is derived from winter fronts, but occasionally the area is affected by rain bearing summer heat troughs. The rainfall is highly variable in accordance to large-scale climatic events linked to the Southern Oscillation Index and as a result discharge rate of the Murchison River catchment into the ocean is highly variable.

SECTION 4 DESCRIPTION OF USERS

A diverse range of people use and visit the Kalbarri Blue Holes reef area, including the local community, schools, visitors, tourism operators, surfers, divers, commercial and recreational fishers.

SECTION 5 VALUES OF AREA

Kalbarri is a rapidly growing town that supports a thriving fishing, surfing and tourism industry. All industries are based upon the use of natural resources and assets. Tourism in Kalbarri peaks during school holidays with maximal use of the Blue Holes area experienced in the summer holidays when temperatures peak and water activities are favoured.

Kalbarri Blue Holes is one of the few places for safe swimming along a high energy, rocky coastline. The area is a central recreational site for the local community, due to its close proximity to the urban area. Tourists and tourist operators also use the site. The marine environment is diverse and is considered to be of high conservation value. Since the site is highly accessible and already attracts a lot of users, it is also of educational value.

A summary of a community workshop undertaken in January 2003 elaborates upon the values attributed by the community and government representatives to the site (Appendix 3).

5.1 Environmental Values

A marine survey of the proposed FHPA documented a healthy and diverse reef community composed of both temperate and tropical species (Appendix 1). However, anecdotal evidence from local residents suggests that the number of larger individuals of many territorial fish have reduced in as a result of fishing activity.

The close proximity of a growing town and popular tourist destination has resulted in extensive use of the area. Small colonies of corals occur within metres of the beach are highly accessible during periods of low swell.

The proposed FHPA also has the potential to become a well-managed unfished near shore reef marine community which would provide a valuable educational tool. Furthermore, research could document the 'recovery' of the area, following the cessation of fishing over time. Adjacent areas of similar composition, that are not protected, could be used as comparative study sites.

5.2 Heritage Values

The Kalbarri reef system has value to both Aboriginal and European people.

5.2.1 Aboriginal Heritage

To Aboriginal people, the highly accessible nature of this coastal reef system in near proximity of the river mouth is likely to have made it a significant site for hunting fish and gathering seafood. The River Mouth, which is now the locality of Kalbarri, is called Wudumalu or Wutumalu by the local Nhanda language group, similarly Red Bluff is referred to as Gabagaba and Witecarra as Withikara (source: Nhanda

Language Draft Dictionary, Yamatji Language Centre). A native title claim extends across most of the region and has been lodged with the Yamatji Land and Sea Council.

The Department of Fisheries acknowledges input from the Yamatji Language Centre, Geraldton and the Yamatji Land and Sea Council for the provision of the above advice.

5.2.2 European Heritage

Historical records indicate that the Dutch survivors of the Batavia shipwreck visited a mainland river mouth in the Mid West in 1629. It is highly likely this landing occurred near Kalbarri.

The Murchison area was mined by Cornish miners, who enjoyed the respite offered by the fresh waters of the river. The sheltered waters of the Murchison River, provided a natural harbour for fishing vessels and resulted in settlement by fishermen and their families. Maximum use of the harbour occurs in February when additional licensed fishing boats move north to fish the offshore Big Bank area and use the town and harbour for services. Recreational boats are also launched in the Murchison River. The river mouth can be difficult to pass during extremely large swells and low tides.

Like many towns north of Perth, European settlement at the site increased in 1950's with the expansion of commercial fishing activities along the Western Australian coast. The western rock lobster industry has traditionally been the main sources of direct or indirect employment in coastal towns between Perth and Kalbarri. However, since the 1950's tourism has increased dramatically and now provides a significant source of income for the area.

5.3 Recreational Values

The Blue Holes reef system and its waters are highly popular for a variety of recreational activities.

The Blue Holes is one of the few safe beaches where swimming is possible outside the Murchison River. The site is both easily accessible and very attractive to locals and visitors, and during periods of low swell provides an ideal and very attractive swimming location and snorkelling area for both children and adults.

The near-shore reef in the vicinity of the proposed FHPA is known to be a popular recreational fishing site for line fishers targeting pelagic fin-fish such as tailor, both from the shore and by boat. Recreational rock lobster potting also occurs in the area.

Existing recreational uses of the site have been listed by participants of the community workshop (Appendix 3) and are indicative of the importance of the site to the local community. It is clear that the community values the diversity of the aquatic habitat and its intrinsic potential for conservation, education and tourism. The

workshop participants indicated they would like the area protected for future generations to enjoy and experience.

5.4 Commercial Values

The proposed FHPA is located within the ZONE B of the West Coast Rock Lobster Managed Fishery. However the waters proposed to be included within the FHPA are relatively shallow and it is dangerous to manoeuvre a boat within the rocky pools, particularly during high swell conditions.

The proposed FHPA is also located within Area 8 of the Roe's Abalone Managed Fishery. Whilst some occasional abalone fishing occurs within the proposed FHPA, it is understood the majority of fishing occurs north of Kalbarri.

5.5 Education and Research Values

The educational and research values of the proposed Kalbarri Blue Holes FHPA include:

- The opportunity for school groups, universities and the general public to observe and monitor an unfished near shore reef ecosystem in close proximity to Kalbarri; and
- The opportunity to protect a representative mixed assemblage of both temperate and tropical marine flora for research and education.

The establishment of the Kalbarri Blue Holes FHPA is likely to encourage community groups and possibly schools and other institutions to participate in on-going research of the reef, which may engender further community awareness and protection of the reef.

SECTION 6 CURRENT AND POTENTIAL THREATS

6.1 Increased user pressure

The major threat faced by the area is increased use as the Kalbarri population grows and tourism increases. Both extractive and non-extractive activities can have detrimental effects on the marine system. The proposed FHPA aims to remove the pressures originating from extractive activities. However, it should be noted that some non-extractive activities such as reef walking also has the potential to damage habitat.

6.2 Extractive Activities

The removal of reef biota has the potential to alter the composition of the marine community and subsequently change subtle dynamics within the ecosystem. Anecdotal evidence from some long-term Kalbarri residents suggests that the Blue Holes reef system has suffered as a result of long-term recreational fishing in the area, and long term Kalbarri residents claim that some fish species which were once common to the area are no longer represented in the area.

6.2.1 Recreational fishing

The proposed FHPA is easily accessible by land, and recreational fishing for pelagic fish such as tailor (*Pomatomus saltatrix*) is a popular activity at both the northern and southern extremities of the proposed FHPA, and off the western edge of the intertidal reef platform.

Recreational shore based rock lobster fishers also target the area. Pots are placed in crevices and holes on the outer edge of the reef platform, particularly during low swell conditions. Boat based recreational rock lobster fishing also occurs off the intertidal reef platform during the December 'whites run'.

The removal of shellfish (oysters and abalone), crustaceans, echinoderms (sea urchins and relatives) and cephalopods (squid and octopus) for eating and bait is also a popular activity during low swell.

Anecdotal advice from some long-term Kalbarri residents suggests that the cumulative impact of extractive activities has resulted in the loss of some fish species within the Blue Holes area. It is likely, that continued targeting of territorial species may further deplete the remaining territorial fish stocks.

6.2.2 Collecting

While the recreational collection of coral and live rock is prohibited throughout WA, the recreational collection of dead shells, seaweed and other flotsam occurs within the

FHPA. Persons with a commercial 'Marine Aquarium Fishery' licence can also legally remove organisms and live rock within the proposed FHPA.

Individuals walking over the inter-tidal reef areas also have the potential to damage the reef substrate and exposed organisms.

6.2.3 Commercial fishing and Aquaculture

Commercial fishing for the western rock lobster takes place off the outer edge of the intertidal reef platform during low swell conditions, in waters with a minimum depth of four metres. There is a risk (albeit low) for fishing gear associated with these operations to be washed onto the reef platform during periods of unexpected swell.

Commercial abalone fishing occasionally occurs within the proposed FHPA, however the majority of this fishing activity occurs on the coastline north of Kalbarri. In 1997 a combination of environmental factors resulted in the high mortality of abalone in near shore reef areas in the vicinity of Kalbarri. While there are a number of licensed abalone fishers authorised to fish the area, only four divers currently work the area as part of a coordinated fishing plan. This is a commendable industry initiative to promote local abalone stock recovery and to avoid localised depletion of the stocks in vulnerable areas.

There are no aquaculture activities within the proposed FHPA.

6.3 Near-shore water quality

Seasonal discharge from the Murchison River occurs following inland rainfall events in winter and summer. The prevailing southerly winds experienced along the Western Australian coast usually result in a north flowing coastal current. However, sediment loaded riverine water may occasionally move southwards along the coast and affect water quality within the proposed FHPA. The riverine water is brackish and often turbid.

Stormwater discharge from the urban areas of Kalbarri discharge directly into the near shore marine waters in the vicinity of the proposed FHPA. This discharge may include herbicides, pesticides and fertilisers, which have the potential to affect local water quality.

Boat sullage discharge into the ocean from the Murchison River, and high concentrations of sun-screen washed off from swimmers during summer months also has the potential to affect near-shore water quality.

6.4 Other Environmental threats

6.4.1 *Foreshore erosion*

Large winter swells seasonally alter the morphology of the coastline and affect the extent to which the inshore reef is covered by sand, and hence the amount of beach present at different times of the year. This is a natural occurrence, and results in a net northern flow of coastal sediment.

6.4.2 *Climate*

Intertidal areas are naturally exposed to the sun, and to varying extents by daily tides. Prolonged periods of extremely low tides were experienced in 2002, when most of the reef was exposed during the day. This prolonged exposure resulted in additional environmental stress on sedentary intertidal organisms.

Ocean swell during winter months also contributes to natural seasonal damage to the reef substrate and biota such as corals.

SECTION 7 PROPOSED MANAGEMENT STRATEGIES

It is anticipated that the declaration of the proposed FHPA will assist in the development within the community of a sense of stewardship for the area, minimise potentially harmful activities, and enable effective management of the area by the local community;

7.1 Boundaries of the proposed Kalbarri Blue Holes FHPA

The proposed boundary of the FHPA is indicated in Figure 2 and extends out to the reef edge to the west, north to the northern boundary of the existing Blue holes car park, and south to just north of Syphons car park. The eastern edge follows high water mark along the coast

Draft Strategy:

- Investigate, with the assistance of the Department of Fisheries, the practicality of installing marker buoys to mark the north-west and south-west boundaries of the proposed FHPA.
- Install, with the assistance of the Department of Fisheries, interpretive signs in car parks to advise visitors to the area of the boundaries of the FHPA, and promote awareness of the environmental values of the area.

7.2 Commercial fishing and aquaculture

Within the proposed FHPA there is the potential for commercial fishing for western rock lobster, and to a lesser extent, Roe's abalone, to occur. There are no aquaculture operations present.

Commercial fishing is contrary to the key objective of the FHPA to conserve and protect fish.

Draft Strategy:

- Prohibit all commercial fishing and aquaculture within the proposed FHPA under the provisions of the *FRMA 1994*.

7.3 Recreational Fishing

7.3.1 Line fishing

Recreational line fishing is a popular activity along the Kalbarri coast, particularly in summer months during periods of low swell. Fishing occurs from boats, beach and reef platforms, and targets primarily pelagic fish species such as tailor.

When fishing occurs near the reef platform, fishing rigs (sinkers, line and hooks) can become snagged and litter the marine system.

A five-year management strategy for recreational fishing on the West Coast of WA was recently completed by the 'West Coast Recreational Fishing Working Group' (Department of Fisheries, 2001b). This strategy was prepared in response to a need to manage the increasing pressure on WA's aquatic environment and fish stocks from growing numbers of recreational fishers, increasing coastal development, and the demands of various key user groups along the central West Coast in areas such as Kalbarri.

This report indicates most species taken by anglers in the vicinity of the Kalbarri Blue Holes FHPA are mainly those that are widely distributed throughout the West Coast bio-region. Recent research undertaken by the Department of Fisheries indicates that stocks targeted by these fishers are sustainable at current catch levels.

While this report is clearly aimed at a much larger area than just the Kalbarri Blue Holes, the aim and management strategies are applicable to its ecosystem. A key management strategy is to ensure the sustainability and biodiversity of fish stocks and their habitats. It recommends that management should be based on the best available information.

In the case of the proposed Kalbarri Blue Holes FHPA, the key objective of the FHPA to conserve and protect fish.

As highly mobile pelagic fin-fish species, such as tailor with large ranges cannot be effectively protected using spatial closures, it could be argued that fishing for these fish should remain possible within the proposed FHPA. However, territorial reef fish species which may also targeted by some recreational fishers can be protected using a spatial closure such as a FHPA.

It is difficult from a compliance point of view to enforce species-specific fishing activities within the proposed FHPA, and confusion may arise as to which species can be caught. For this reason, a total prohibition on recreational fishing throughout the FHPA is recommended.

This is to achieve the overall objective of conserving and protecting fish, and to manage activities within the FHPA relating to the appreciation and observation of fish. In reaching this conclusion it is important to bear in mind the total length of the proposed FHPA is 300 metres, and recreational fishing can continue to occur north and south of the FHPA.

Draft Strategy:

- Prohibit all recreational fishing within proposed FHPA under the provisions of the *FRMA 1994*.

7.3.2 *Potting and removal of other reef dwelling organisms*

During periods of low swell, recreational rock lobster fishers drop pots off the outer reef edge and within tidal rock pools inside the proposed FHPA. Oysters, echinoderms, cephalopods, trochus shells and other organisms are also removed as bait or eaten opportunistically. Anecdotal evidence from local Kalbarri residents suggests the abundance of these organisms has decreased over recent years.

The use of anchors and pots may contribute to damage of the reef substrate within the proposed FHPA and is contrary to the overall objective of conserving and protecting fish and the aquatic ecosystem. It is recommended that there be no removal of any marine organisms from within the FHPA.

Draft Strategy:

- Prohibit recreational rock lobster fishing within the proposed FHPA under the provisions of the *FRMA 1994*.
- Prohibit the removal of any marine organisms within the proposed FHPA under the provisions of the *FRMA 1994*.

7.3.3 *Spear fishing (underwater fishing)*

Spear fishing with and without scuba gear currently occurs within the inter-tidal pools of the proposed FHPA, allowing divers to target large residential fish. Divers also cross the reef area within the proposed FHPA to access deeper waters off the western side of the reef platform.

Spear fishing presents a risk to other users of the proposed FHPA, and is likely to have contributed to the depletion of resident fish stocks. At the public workshop overwhelming support was expressed for the prohibition of spear guns and other fish hunting devices within the area.

Spear fishing is an extractive activity which is contrary to the overall objective of conserving and protecting fish. It is also contrary to the management of activities relating to the appreciation and observation of fish and it is therefore recommended that it be prohibited within the FHPA.

Draft Strategy:

- Prohibit all forms of spear fishing within the FHPA under the provisions of the *FRMA 1994*.

7.4 Recreational boating and use of jet skis

Motorised vessels (boats and jet skis) can be launched in the natural harbour provided by the Murchison River. The boats leave the river mouth on favourable tides, but do not anchor within the proposed FHPA as it is too shallow and hazardous for small craft, unless they are in serious trouble.

The use of jet skis is likely to become increasingly popular as a result of increasing tourism in the Kalbarri region. The use of such vehicles is contrary to a key objective of the FHPA to conserve and protect fish, and to manage activities relating to the appreciation of fish. Participants at the public workshop also unanimously expressed the wish to ban all motorised vessels, including jet skis from within the FHPA.

Therefore, a prohibition on the use of all motorised vessels within the FHPA is recommended.

Draft Strategy:

- Prohibit the use of all motorised vessels, including jet skis within the waters of the proposed FHPA under the provisions of the *FRMA 1994*.

7.5 Collecting

Rock, seaweed and reef fauna, including anemones, sea urchins and shellfish are easily accessible the rocky intertidal reef platforms, which run parallel to the beach within the FHPA.

The Department of Fisheries has prohibited the recreational collection of coral and 'live rock' throughout WA, however individuals with a 'Marine Aquarium Fishery' licence can legally collect within the proposed FHPA.

One of the key objectives of the proposed FHPA is to conserve and protect fish, fish breeding areas, fish fossils and the overall aquatic ecosystem. Therefore, it is important that all parts of the reef ecosystem remain 'in-situ', to ensure the long-term sustainability of a healthy reef ecosystem.

It is recognised sampling of marine flora and fauna may be necessary on occasion as part of continuing research and monitoring proposals within the Kalbarri Blue Holes 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 *Fish Resource Management Act 1994*.

Draft Strategy:

- Prohibit the commercial collection of all marine organisms within the FHPA under the provisions of the *FRMA 1994*.

7.6 Snorkelling and scuba diving

The proposed Kalbarri Blue Holes FHPA is a popular snorkeling and scuba diving site. A location within the proposed FHPA, locally referred to as the 'key hole', provides divers with easy access through the fringing coastal limestone reef to deeper waters.

Passive recreation activities such as snorkelling and scuba diving promote public awareness of the natural value of the reef habitat, and are consistent with the objectives of a FHPA to manage activities relating to the appreciation and observation of fish.

Draft Strategy:

- Promote snorkelling and scuba diving within the proposed FHPA.

7.7 Aquatic nature-based tourism

Aquatic nature-based tourism (aquatic eco-tourism) ventures are considered to be a useful way to increase public awareness and education about environmental values.

The Department of Fisheries has licensing and management arrangements for this form of tourism. This requires all ecotourism ventures to have an Aquatic Ecotourism licence before they are allowed to operate.

To facilitate the assessment of these licence applications, the Department has prepared 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*). To ensure operations of this kind are undertaken in a responsible manner, MPG 12 provides guidelines that assist the Department of Fisheries' Executive Director in the assessment of applications for aquatic nature based aquatic tourism based ventures.

Although aquatic nature based tourism is by its nature believed to have a minimal impact on fish and fish habitats, the assessment guidelines encourage a precautionary approach until the relative impacts of ecotourism ventures on fish resources and fish habitat has been established. This approach is consistent with a key objective of the FHPA to manage activities relating to the appreciation of fish.

Draft Strategy:

- Prepare policies and operating guidelines for environmentally sensitive and controlled nature based aquatic tourism ventures, in accordance with the '*The assessment of applications for the granting, renewal or transfer of fishing tour operator licences and aquatic ecotourism operators' licences*' (Ministerial Policy Guideline No. 12).

- Prepare pamphlets, with the assistance of the Department of Fisheries, advertising environmental values of the proposed FHPA, to promote a code of conduct at popular tourism nodes, to educate visitors, and to promote passive forms of recreation such as swimming and snorkelling.

7.8 Stormwater, river, groundwater and nutrient management

Water quality within the near-shore marine environment is affected by nutrients from stormwater, river water and groundwater discharge from the adjacent urban area. Nitrogen in particular is known to contribute to macroalgal growth in marine communities, and a major source of nutrients within the catchment is excessive fertiliser use on private and public land.

The management of diffuse sources of nutrient pollution is obviously difficult, as it involves numerous groups and individuals working in partnership with local government and State government agencies to tackle the problems through an Integrated Catchment Management approach.

Awareness and education programs need to continue to maintain the understanding of the local community of existing nutrient management problems and the need to alter current practices.

Draft Strategy:

- Coordinate, in cooperation with relevant government agencies and schools, a long-term water quality and catchment management plan, focusing on the Kalbarri townsite.

7.9 Information, Interpretation and Management

A primary objective of this draft plan is to raise public awareness, appreciation and understanding of the biodiversity and conservation values of the proposed Kalbarri Blue Holes FHPA, and to promote community stewardship and management.

An understanding of the Aboriginal heritage values of the area should be encouraged. This information is required to ensure management and interpretation programs are consistent with these values.

The Department of Fisheries recognises management of the proposed FHPA will primarily be through the community. It is anticipated a working group will be established (in conjunction with the Northampton Shire Council) that will have a vital role in the coordination of management strategies for the FHPA, with support from key local and State Government agencies where appropriate.

Draft Strategies:

- Endorse the protection of the proposed Kalbarri Blue Holes FHPA through interpretive exhibits and photographic displays at educational and environmental facilities.
- Encourage, with the assistance of the Department of Fisheries, training on the role and value of the proposed FHPA for local government authority rangers.
- Support an anthropological assessment of the Aboriginal heritage values of the site, This assessment should include consultation with Aboriginal people with traditional associations with the area.

7.1 Research and Monitoring

By encouraging use of the FHPA, increasing public visits may put additional pressure on the fragile reef ecosystem. Therefore, it is vital to ensure there is:

- Appropriate baseline monitoring of the marine ecosystem, utilising existing data where possible;
- A coordinated continuous monitoring program to compare and interpret data over a period of time. This should include the monitoring of recreational activities and so identify which areas of the FHPA are under the greatest user pressure; and
- An integrated approach to research proposals within the FHPA.

In devising long-term monitoring and research programs, the natural variability of the marine ecosystem will be taken into consideration. In view of the high level of community involvement in the protection and management of the proposed FHPA, it is also important to ensure monitoring and research proposals are suitable for implementation by the community.

Draft Strategies:

- Promote gathering of baseline information including fish counting, habitat mapping.
- Coordinate the interpretation of information gathered through baseline surveys and on-going monitoring programs.
- Encourage research of marine flora and fauna, to develop an understanding and appreciation of the proposed Kalbarri Blue Holes FHPA .
- Support the preparation of on-going monitoring programs to determine:
 - (a) The effect of divers and aquatic nature based tourism ventures on the marine environment.
 - (b) The impact of climate change and oceanographic processes.

- Encourage the trial of monitoring methods developed by the Australian Marine Conservation Society (AMCS) in cooperation with the Department of Conservation and Land Management (CALM) as part of Phase Three of 'The Marine Life of Western Australia' program.
- Ensure that there is an integrated approach to research proposals conducted within the FHPA, to maximise the baseline information.

SECTION 8 COMMUNITY INVOLVEMENT IN MANAGEMENT

Under the provisions of the *Fish Resource Management Act 1994*, the declaration of a FHPA follows demonstrated community involvement in the management of the area. To date, this community support has been offered by Friends of Blue Holes, who nominated the reef system as a FHPA.

This draft plan identifies management strategies to ensure the proposed FHPA is managed in a way which will maintain and promote the environmental values of the area. Due to the remoteness of the proposed FHPA, protection of the area's values will rely heavily on community support and stewardship to ensure effective compliance with regulations. 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 Department of Fisheries will be directly responsible for the implementation of strategies which can be enforced directly under the provisions of the *Fish Resources Management Act 1994*. It is anticipated that the establishment of a working group will provide a key role in supervising the continuous implementation of strategies contained within this draft plan. The working group will include representation from key groups including the Shire of Northampton, the Friends of the Blueholes, the Department of Fisheries and community members.

SECTION 9 IMPLEMENTATION

This draft plan is open to public comment. After the consideration of public submissions received, a final Plan of Management will be prepared by the Department of Fisheries, and released to the public.

If a FHPA is successfully implemented, it is anticipated the working group will be established soon after formal gazettal of the FHPA. The working group will include representation from key groups including the Shire of Northampton, the Friends of the Blueholes, the Department of Fisheries and community members. It is anticipated the working group will provide a key role in supervising the continuing implementation of all the strategies contained within the Plan of Management.

It would be the responsibility of Department of Fisheries to implement those strategies which can be enforced under, or are directly related to, the *Fish Resources Management Act 1994*.

These responsibilities include:

- Gazettal of the FHPA;
- Prohibit all forms of commercial and recreational fishing, and aquaculture within the FHPA;
- Prohibit the removal of all marine flora and fauna including live and dead shells and shell fish, coral and live rock within the FHPA;
- Prohibit spear fishing activity;
- Assist in investigating the practicality of installing marker buoys indicating the extent of the FHPA;
- Prohibit the use of motorised vessels including jet skis within the FHPA;
- Assist in the installation of interpretive signage indicating the extent and purpose of the FHPA;
- Assist in the preparation of pamphlets advertising environmental values of the proposed FHPA, to promote a code of conduct at popular tourism nodes, to educate visitors, and to promote passive forms of recreation such as swimming and snorkelling; and
- Assist in the training on the role and value of the FHPA for local government authority rangers and Voluntary Fisheries Liaison Officers.

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**Appendix 1 The results of a marine survey of the
proposed Kalbarri Blue Holes FHPA**

APPENDIX 1

**The results of a marine survey
of the
Proposed Kalbarri Blue Holes
Fish Habitat Protected Area**

April 2002

Edited by H. Paterson

By Members of
The Australian Marine Conservation Society
On behalf of
The Friend of The Blue Holes

The results of a marine survey of the
Proposed Kalbarri Blue Holes
Fish Habitat Protected Area
April 2002

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SUMMARY

A survey of the proposed Kalbarri Fish Habitat Protection Area, to the west of the town of Kalbarri, was undertaken in April 2002. The aims of the survey were to:

- 1 Identify the benthic habitats and develop a substrate map.
- 2 Compile a species list as a base line for future monitoring.

The surveyed area consisted of a perched beach oriented north/south. Parallel to and extending 100 m west of the beach was an intertidal reef platform, which extended to a subtidal platform. The substrate was characterised by calcarenite and to a less degree aeolinite limestone partially overlain with calcareous sand. Deeper depressions called 'blue holes' occur along the length of the platform.

In the northern part of the study area oysterbeds cover sandstone outcrops surrounded by coral colonies. The southern sector has seagrass *Amphibolis antarctica* overlying limestone pavement as the dominant habitat. The near shore sandbanks along the length of the study area also provided seagrass habitat with *Halophila* and *Heterozostera* meadows which were quite dense and established in places.

The offshore area adjacent to the reef slope and lip was characterised by gently undulating calcarenite (limestone) pavement with a moderately dense algal cover; small depressions and outcrops were relatively common.

INTRODUCTION

The proposed Kalbarri Blue Holes Fish Habitat Protected Area (The study area) is a 400m stretch of beach and reef platform reaching another 400m west into the sea. Local people and visitors use the inner reef area for beach and water based recreational activities. The outer area is difficult for swimmers and divers due to the swell surge and can only be accessed during favourable conditions.

In 2001 members of the local community with an interest in the Kalbarri Blue Holes began the process of protecting a small part of the reef platform area from fishing impacts. They obtained a Fishcare Grant from the Department of Fisheries to assist in developing a Fish Habitat Protection Area. They invited members of The Australian Marine Conservation Society WA to help

undertake the initial survey of the area. This survey was conducted in April 2002. The objectives were to:

- 1 Produce a species list for the proposed study area
- 2 Produce a benthic habitat map of the proposed study area

Kalbarri is located on the mid west coast of Western Australia at approximately 27° 43' S and 114° 09 W.

The habitat consists of intertidal and sub tidal reef platforms, with holes having sandy bottoms. The tidal range is in the order of 0.50m with much of the intertidal platform exposed at 1m above chart datum. The outer limits of the intertidal platform are often subject to large swell, making this a very high-energy zone.

Beyond the platform the bottom is initially rugged with many cliffs and overhangs but becomes more gently undulating further to the west, eventually becoming sandy.

MARINE SURVEY

The survey of this marine environment involved nine divers over a two-day period using both SCUBA and snorkel.

On the first morning of the survey all divers snorkelled on the inner intertidal reef platform. The area was divided into four equal zones to facilitate mapping and to develop an understanding of the distribution of flora and fauna. All divers began at the southern extent to make use of the long shore current. Substrate mapping was conducted as well as invertebrate, fish, algae and seagrass identification. Most of the identification relied on individual's expertise; however, a number of specimens were collected for identification on the beach with the aid of books (specimens were collected under licence). Two divers conducted video records of the area, one concentrating on seagrass and algae and the other on coral.

Five divers undertook two dives outside the reef in the afternoon at a general depth of 10 - 15m. One group videoed the bottom and noted the seagrass and algae present (D1). Another pair began at the southern end and swam north ending their dive in the middle of the proposed area. This group concentrated on the substrate and fish.

On the second day the divers split into two groups. A group of four divers dived at a depth of 20m with one video camera. This group recorded fish, seagrass, algae and invertebrate species in addition to looking at the substrate. The second group snorkelled inside the reef finishing the remaining identifications and videoing interesting areas.

Over the two days the shape of the beach was profiled using a Debenham Level. There were a total of nine transects run on the beach.

The recordings were collated at the end of the day, with species unable to be identified to at least family, excluded from the final list. No quantitative data (other than the beach profile) was collected during the survey.

RESULTS

Substrate Mapping

Preliminary interpretations of the substrate types were developed using aerial photography. These drawings were ground-truthed by divers.

The following key describes the area and the substrate types used in map 1 (Appendix 2).

Sand - Commonly occurs in very shallow (<0.5 m) near shore waters. Seagrass and algae are absent from the surface. Generally found adjacent to shallow calcarenite rock platform or grading into shallow sandbanks.

Sandbanks - Occur in shallow inshore locations, generally adjacent to shallow calcarenite rock platform or bare sand substrate. Sandbanks have a height of up to 0.5m and are characterised by a sparse seagrass covering of *Halophila spp.* and *Heterozostera*.

Bare calcarenite (limestone) platform - The limestone platform occurs as either a bare rock surface or with a thin veneer of sand in inshore locations. Sparse algae growth may occur, however the surface of the mostly horizontal platform is predominantly exposed.

Inshore calcarenite (limestone) platform - The majority of the reef 'lagoon' is characterised by broken and undulating calcarenite outcrops. In places, seagrass (*Amphibolis spp.*) and alga (often *Sargassum* and *Cystophora*) are found on the rocky substrate –varying in density and species composition. The rock substrate is characterised by frequent small depressions and crevasses (with small to moderate overhangs (to 0.5m). Depressions are up to 1.5m in depth and of varying shape.

***Amphibolis spp.* on calcarenite substrate** - This is included as a separate substrate classification as the density of seagrass was not noted to occur elsewhere within the reef 'lagoon'. *Amphibolis spp.* provides a dense covering to the limestone pavement substrate and few other seagrass or algal species occur.

Sandstone outcrops - the rock outcrops locally referred to as 'oyster covered' are in fact sandstone (Tumblagooda Sandstone formation which is widespread in the Kalbarri-Port Gregory region and outcrops at the cliffs at Red Bluff). The sandstone outcrops are characterised by a thin horizontal bedding and coarse grain size. Sandstone substrate is considerably different to the limestone substrate in that the sandstone is characterised the absence of algae or seagrasses. The surfaces are often bare and have an almost 'smoothed' appearance or are covered in limpets and 'oysters'. The outcrops are exposed at low tide. Where sand covers the sandstone surfaces, the sand reaches depths of only 5-6cm. Corals also occur about the sandstone outcrops in the northern part of the study area.

Blue Holes - The larger depressions in the reef lagoon, commonly referred to as the 'Blue Holes' are of varying depth (1-2.5m) and are irregular in shape. The outer edges of the 'holes' are characterised by a limestone ridge and overhanging ledge (width 0.5-2m). Coral outcrops are common around the edges of the holes and under the overhangs where hydrodynamic conditions are most calm. Topography within the 'blue holes' is varied, and depressions and potholes are common. Bare rock rubble may be found where current flow is turbulent and scouring of rock substrate is noted where rock rubble is trapped or at the northern boundaries of the holes where it is likely the dominant northerly current has a greater impact on transport of sediment and rock debris. Sandy substrate also occurs in the depressions. The 'blue holes' are characterised by a wide range of micro-habitats as a result of the varied topography, hydrodynamic conditions and range of substrates.

Reef Crest and Back Reef Platform

This area could not be surveyed due to the wave conditions -the estimate of extent of this unit is based on wave breaking conditions (noted on the aerial photograph) and expectations following survey of similar reef systems.

Offshore rocky substrate

The offshore area adjacent to the reef slope and reef crest is characterised by gently undulating calcarenite (limestone) substrate with a moderately dense (*Sargassum* dominated) algal cover; small depressions and outcrops are relatively common. To the south of the study area the reef slope has a significantly lower gradient than in the north. Where the reef slope was encountered, rock ledges, ridges and depression/runnel/trench topography was encountered. The runnels are 2-3m in depth. Sandstone outcrops were also noted as part of the offshore rock substrate (horizontal layering and quartz-rich geology apparent), however any significant difference between habitats provided by limestone and sandstone offshore rock substrate were not noted. Isolated potholes (diameter 2m) with significant basal scouring were recorded. Shallow (4-5m depth) rock substrate was sparsely vegetated.

Offshore, the rock substrate grades to sand at approximately 17 -18m depth. This sand- rock boundary is characterised by either limestone ledges (1-2m height) or low rock outcrops (minimal gradient). Sandy substrate is characterised by ripples suggesting a dominant northerly drift (with some West to East swell component) current. Sand is fine to medium grain size, however gravels and cobbles are common, especially in scour holes, gutters and depressions. The sand-rocky substrate boundary runs approximately north-south.

Marine Species Survey

Two-hundred species of flora and fauna were identified to the family, genus or species level during the two-day survey. These included seventeen algae; four sea grasses; six sponges; eleven scleractinian corals; one annelid; fourteen crustaceans; fifty-two molluscs; eleven echinoderms and seventy-seven chordates of which 6 were ascidians and the remainder were fish. In addition to identifying many species the known ranges of several species has been extended. The brittle star *Ophiarachnella ramsayi* and the Echinoid *Holopneustes porosissimus* have had their ranges extended north from the Houtman Abrolhos. There was also the first record of the ascidian *Pyura gibbosa* from the Kalbarri region.

Sponges

Ten sponge specimens were identified by staff at the WA Museum. Five of the specimens were Demosponges and the other five were Calcarea although only one of these species was identified. Some of the species had been seen previously around Perth, at South Mole and in the Marmion Marine Park. It is therefore likely that the Kalbarri specimens belong to species that have a temperate distribution in WA.

Corals

Eleven species of coral were identified by members of the survey party and by Western Australian Museum staff viewing samples and images of the corals.

It should be noted that the general size of the coral colonies is smaller than the colonial size found as far south as the Lancelin Island. This raises the question of the degree of influence that the Leeuwin current has on this system. The Leeuwin current may prove to be the conduit for larval transport, however the prevailing local conditions may fail to support populations long enough for

them to grow to considerable sizes. This may result in a high species richness and considerable turnover in individual colonies. Further study in this area should gauge existing colonies and colonisation of coral colonies within the inner lagoon. In addition loss or damage to colonies through increased recreational use of the area or through prevailing environmental conditions can also be assessed.

The coral fauna is typical of south-western Australia coastal areas, apparently with fewer species than Geograph Bay where 14 species have been recorded. However more species are likely to be found outside the reef when more diving there is possible. The Blue Holes provide a limited habitat for corals, with periodical sand scour, but several large healthy colonies of *Montipora mollis* were found in this area.

Fish

Seventy-one fish species were recorded during the survey. There were many tropical species observed. As with the coral species the viability of the species found needs to be assessed. Further investigations should determine if species populations such as those of *Chaetodon lunula* (Raccoon butterfly fish) are reproducing locally at replacement levels or are they dependent on larval recruitment from elsewhere?

Algae and Seagrasses

Seventeen species of algae and 4 species of Seagrass were identified in the study area. The calcarenite reef surfaces in the lagoon area were observed to support mainly sparse populations of brown algae, particularly *Dictyopteris* and *Padina*. Beneath ledges and in more sheltered location various red algae were also observed, in particular various genticulate (articulated) coralline species. Seagrasses occurred in two main habitat types: *Amphybolis* ovaly, *Heterozosta* and *Syringodium isoetifolium* were observed on sandy substrates in deeper patches of water and close inshore in the lagoon.

The offshore reef system was observed to support mainly large brown algae, especially *Ecklonia radiata* and *Sargassum* sp, with genticulate coralline red algae making up the understory. This ties in well with the typically rough-water habitats preferred by these larger brown algae. More diverse algae assemblages were observed in more sheltered locations, in potholes and under ledges. It should be noted that this was a preliminary survey with only four small algal species identified.

DISCUSSION

The proposed Kalbarri Fish Habitat Protection Area was found to support a diverse array of marine life and provide a range of benthic habitat types. The area is relatively undisturbed with healthy seagrass meadows and few green algae, indicative of a healthy system. Various tropical reef fish were identified and there is the potential for fish populations to increase in size and diversity should the area be afforded some protection. There are many small coral colonies that appear to have recently established in addition to a couple of established colonies.

This survey provides baseline data, essential for establishing an on-going monitoring plan for the area in the future. In addition it provides an opportunity to look at potential shifts in species should fishing pressures be reduced. For example:

Trochus shells were prolific inside the reef. This raises the question regarding the number of natural predators for this species. Octopus is a predator to trochus that has been targeted within the area. (pers. obs. K Wheeler) If this area is declared a FHPA then monitoring might focus on changes in octopus and trochus numbers.

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Appendix 2 Questionnaire distributed at proposed Kalbarri Blue Holes FHPA workshop January 2003

WORKSHOP 1
Saturday 18th January, 2003
GROUP DISCUSSION QUESTIONNAIRE

1. Do all the people in your group feel adequately informed about what a Fish Habitat Protection Area is?
(if not please refer to the facilitator for guidance and more information)
2. What activities do you undertake when you visit the Blue Hole area being considered for a Fish Habitat Protection Area?
Mark the map where you undertake these activities (perhaps create a legend eg. x for a swimming place, y for fishing spot).
3. What do you consider the most important features or values of the Blue Holes area being considered for a Fish Habitat Protection Area?
4. Do you see any BENEFITS in having a Fish Habitat Protection Area at Blue Holes? What are those benefits?
5. Do you see any DISADVANTAGES in having a Fish Habitat Protection Area at Blue Holes? What are those disadvantages?
6. What activities would your group allow to occur in the proposed Blue Holes Fish Habitat Protection Area?
7. What activities would your group NOT allow to occur in the proposed Blue Holes Fish Habitat Protection Area?

BREAK FOR AFTERNOON TEA

8. If you were to choose the boundary for the Blue Holes Fish Habitat Protection Area where would it extend?
(Draw on the map where your group agrees the boundaries of the Blue Holes Fish Habitat Protection Area could extend - it could be larger or smaller than the area proposed)

9. Should zoning occur within the boundary you have indicated above to reduce any conflict between users?

(Where could these zones be? - draw on your map)

Zones can be made within an area to separate conflicting uses from one another.

Examples:

Boating in shallow enclosed waters may conflict with snorkelling activities.

Commercial fishing may conflict with recreational fishing.

Often zoning will need to be justified to the many other users of an area, think about this as you discuss this point.

10. Does anyone in your group not support Blue Holes being gazetted as a Fish Habitat Protection Area? Please list their reasons.

(Names are not necessary).

Appendix 3 Responses provided by groups at the Kalbarri Blue Holes FHPA workshop January 2003

APPENDIX: 3

Responses provided by groups at the Kalbarri Blue Holes proposed FHPA, 18 January 2003

Group 1

Question

- (1) yes
- (2) crayfishing & fishing,
tank dives,
snorkel with family,
snorkeling & swimming,
snorkeling & crayfishing.
- (3) Protect area for children and families to enjoy,
Coral can be seen easier,
variety of marine life.
Easy access for families,
oysters you can pick & eat from rocks.
- (4) Further protection of fish & marine life,
education,
what new species can be found,
protect before it is stuffed up completely.
Learn how weather patterns affect the habitat.
- (5) NO
- (6) Anything non destructive ,
low impact visitation, activities,
No take of anything.
- (7) Crayfishing,
spearfishing,
No take of anything e.g. Oysters, abalone, & Coral.
- (8) Align with northern edges of car park, North west from northern edge of car park,
North west from northern edge of syphon car park.
- (9) Total no go no take zone for the proposed FHPA
- (10) No

ADDITIONAL COMMENTS

The interesting thing about the group was that we had at least 2 people who enjoyed crayfishing in the Blue Holes and they were for the proposal 100% with discussion turning to how our children who spent their childhood summers snorkelling and swimming in the Holes and are now Open Water Divers with a great respect for the marine habitat.

Group 2

- (1) Yes
 - (2) Snorkeling, swimming, looking at the fish, walking, beer o'clock sundowner social area.
 - (3) Accessibility, from car park, some sheltered waters, suitable for children & poor swimmers, highly diverse ecosystem, range of species (this will encourage) only area that you can swim when the river is blocked, safety – it is comparatively safe.
 - (4) Our children will be able to see what we can see now, The number & range of species will improve, we'll increase our appeal as an eco friendly location, sense of pride from locals, show case for our area & improve education of ecosystem, the economic benefits as ecotourism rises (it's free)
 - (5) It could make the people problem worse, overcrowded, road in & out, parking is a problem, rubbish, dog poo, There could be negative backlash from people who resist rules, the distance to the nearest fisheries officer for enforcement (after our nice warnings don't work) We need a fisheries officer attached to the town.
 - (6) Swim, snorkel, education- guided tourism, sunbathing, surfing, family activities, managed reef walking, No dogs in the water, controlled dog usage (some say NO) No fishing, shell collecting , no abalone collecting.
 - (7) Fishing (commercial or amateur) jet ski, no boating, no shell collecting (below high water mark) no marine specimen collecting, netting, spearfishing, craypots, uncontrolled dog access, public fish feeding.
 - (8) The group was happy with the yellow dotted area marked the outer reef where the abalone are. The group was happy to extend to boundary right to the point for NO TAKE zone for anything. Perhaps have a designated OK fishing area.
 - (9) Not really as we've set fair rules. One zone If we have two zones see above – have the total protection area & a No take zone (except tailor)
 - (10) I abstained more anti some of the enforcement of the fishing rules, Need a far greater fisheries presents in the area.
-

Group 3

- (1) Yes
- (2) Abalone and crayfish collection, snorkeling, swimming and fishing.
- (3) Marine life diversity, protected easy access. Tourist attraction, - beaches etc, pristine environment, safe snorkeling.
- (4) Replenish flora & fauna, recover flora & fauna, sustain for future generations, promote public awareness (locals & visitors) tourist attraction, protection of foreshore, educational signage to assist enjoyment & promote public awareness.
- (5) None
- (6) No fishing of any kind, take photo's and leave footprints ONLY, No boats & jet ski, take nothing live or dead.
- (7) Passive observation only, No take zone, No vehicle access allowed.
- (8) As per yellow dotted line, however only to reef edge on west boundary, east boundary high water mark, north & south boundary as per yellow dotted line.
- (9) Zoning within boundaries not required, as it is complete no take area.
- (10) No unanimous support.

Group 4

- (1) Yes
- (2) Walk (dogs along) snorkel, swim, fish, surf, kids beach, recreational use.
- (3) Beach marine area, natural asset of reef platform structure & living organisms, safe beach – marine area for kids / adults, education & conservation potential, source of territorial fish breeding area.
- (4) Habitat protection, stop further degradation, maintain uniqueness – safe place to explore & learn for children, look & enjoy = passive marine appreciation, No take area of most things – live things protected.
- (5) Ability to control, maintain interest & signs, ability to inform public need simple signs, easy seen at entry spots, ability of none incorporated body to attract funds, signs, car park, walkways etc.
- (6) Look & enjoy tourism / use, no take of anything living besides limited take of pelagic tailor, swim, snorkel passive recreational use, surf, no take of living things besides limited take of pelagic tailor, since boundary extended north to include tailor hole.
- (7) NO rocklobster pots, no spearfishing – spearguns, no take of territorial species, No boats or jet skis (motorized vessels) No take of shell fish (live) No take of living things – besides limited pelagic fish take,
- (8) Police able boundaries N/S & E/W boundaries, Markers out of impact (surf) zone, extend north to include tailor hole.
- (9) Diagram draw (expand)
- (10) NO

Group 5

- (1) Yes
- (2) Snorkel, swimming, (indicate where activities occur): fishing: all areas, reef walking: all areas, beach walking: all share, bird watching: all areas.
- (3) Sheltered waters for swimming – snorkeling.
Accessibility of unique habitat e.g. corals.
Diversity of habitat & flora and fauna
Quality tailor fishing,
- (4) Maintain & improve ecosystem.
Enhance education resource
Enhance community stewardship
Increase diversity of tourism activities
- (5) Community friction banning tailor fishing in tailor holes
- (6) Snorkeling,
Swimming,
Beach walking
Tailor fishing in tailor hole
Bird watching
Dog walking
- (7) No taking of marine life from within dotted line on map.
- (8) Northern boundary moved south to exclude tailor fishing.
Western boundary on reef edge.
- (9) No zoning
- (10) No for blue holes
All group does not support inclusion of tailor holes because (1) conflict
(2) Less accountability

Group 6

- (1) Yes
- (2) Snorkeling, walking, meditating, wading, scuba diving, swimming, family activities, whale and dolphin watching, school visitations, rubbish collection/dune rehabilitation and research, bird watching and sightseeing.
- (3) Easily accessible, safe swimming and snorkeling, good recreational area, clean, cultural aspects, natural features of area, tourism value-economic value(draw card)
- (4) Marine life increase if breeding area could contribute fish stock to whole area (nursery area also) Preservation for future generations. As an educational tool.
Good link marine/land conservation.
- (5) Commercial opposition-potential conflict with amateurs also. Management
- (6) Depending on boundaries e.g. some inside reef area no take zone. Swimming-see question 2. Information signage, improved car parking, considers shelter construction.
- (7) All inside reef area no take zone (proposed area)
- (8) North of Shypon carpark to northern end of Blue Holes carpark. To accessible and workable area off the reef platform
- (9) Commercial fishing may need to be considered (lobster fishing) in the area.
- (10) No answer to no 10

**APPENDIX 4 List of attendance at the Kalbarri Blue Holes
FHPA workshop**

Brett Jolley	Resident
Bronte Grant	Coastcare
Dee Margetts	MLC Greens
Barb Green	Facilitator
Martin Heller	Coastwest
J M Dunlop	Sust. Fisheries
Eve Bunbury	Department of Fisheries WA
Russell Dyson	Department of Fisheries WA
J & P Harris	Resident
Ann Gordon	Resident
Judy Taylor	Resident
Rex Seaton Smith	Resident
Linda Moore	Kalbarri District High School
Mike Moore	Kalbarri District High School
Jon Jessop	Tourism Midwest
M Burgess	Townscape
M & J Anker	Residents
J & S Wolczyk	Residents
C White	Resident
Indre Kirsten	Murdoch University
Colin Chalmers	Department of Fisheries WA
Vicki Payne	Visitor
Mic Payne	Friends of the Blue Holes
Wendy Payne	Friends of the Blue Holes
Peter Stock	Resident
Garth Sutherland	Resident
Pascale Dellaire	Friends of the Blue Holes
Barbara Bellair	Resident
Paul Wheatfill	Resident
Keith Eacott	Resident
Jan Verbaant	Friends of the Blue Holes
Mal Scott	Resident

P Normington	Tourist
Jamie Waite	Friends of the Blue Holes
Alison Glass	Friends of the Blue Holes
Paul Robb	Tourist
Eliz Pett	Friends of the Blue Holes
L Pratt	Friends of the Blue Holes
D Pratt	Friends of the Blue Holes

APPENDIX 5 Questionnaire and responses obtained from the public

Responses to “Have your say form”

A total of 36 responses were received, some were filled out by couples and represent a joint view.

Nature of respondents

91.6 per cent of feedback was received from residents of Kalbarri (33 out of 36). Of the residents only one person in 33 (Three per cent) did not regularly visit Blue Holes. Of the residents surveyed who regularly visited Blue Holes only one out of 32 did not agree or disagree with having “the Blue Holes protected in some form”.

Three non-residents also responded, who did not regularly visit the Blue Holes. One did not agree or disagree with having “the Blue Holes protected in some form”.

Objectives for the proposed FHPA listed by Friends of Blue Holes

None of the 36 respondents disagreed with any of the objectives. Twenty seven of the 33 residents who responded, “agreed” with all objectives (82 per cent). Of the 33 residents surveyed only five chose not to answer one question with either agree or do not agree.

Of these respondents five chose not to tick either agree or disagree to the following questions:

Question 2 (Manage activities ...to ensure sustainability of the marine habitat)

One respondent who choose to comment “as yet unsure”.

Question 3 (Ensure that the local community can continue to receive the economic benefits of the such a unique area as the Blue Holes)

Four responses did not agree or disagree. Two responses included these comments: “Irrelevant” and “Do you mean tourism? No more please!”

Outcome: “Would you like the Blue Holes to be protected in some form?”

No one circled ‘no’, suggesting that no one thought the area did not warrant protection. Two of 36 respondents chose not to agree or disagree, one being a resident the other, a visitor. 94.4 % agreed the site should be protected. No one said it did not warrant protection.

Comments

Of the 33 residents, 14 made comments in the designated area. None of the visitors made a comment.

Summary of comments submitted:

- Area needs protection from spearfishing mainly. Ban spearfishing and police regularly. Crayfishing should still be allowed (not many places were pots can be worked on reef areas for people without boas).
- No spearfishing, no crayfishing, fishing from shore is OK, No boats, Dead shell removal from beach OK, Dog walk OK
- No take zone
- Hard to read, but map depicts a larger area....
- No spearfishing in the Holes, No taking of shellfish out of the Holes.
- Blue Holes ONLY i.e. south of carpark to end of rock pools ONLY
- No take zone, moorings as markers to be placed west of the swell zone. These will perhaps give a safe area for different types of flora and fauna, to those inside the impact zone/ barrier reef. (Map indicates that area should be smaller... i.e. not outside the reef platform)
- Would be a great idea because it will help build up marine life in this area, therefore contribute to tourism. Map: No take zone inside reef platform and rest of reef platform. Also marked to north point near river mouth as “Professional only” on reef platform.
- Support no take zone and extended area of managed zoning: No take zone near area as marked, but north and south have a managed zoning extending from the river mouth (including Chinamens) to Jake’s point: reduce bag limits, proper rigging, no Cray pots.
- Kalbarri marine reserve, e.g. 200m out to sea. It will do the marine environment a lot of good and in turn fishermen will benefit and local economy will benefit. Ecotourism is the GO ! Map: Bigger area, out to sea and extended north and south to include Jake’s and the Rivermouth/Chinamens comment: Rivermouth and Chinamens should be protected.
- Depending on boundaries and how far out it is going. Showed smaller area on map (reef platform only) Blanket the whole lot as not fishing, no crayfishing, no abalone, No net, no spearfishing. I think the boundaries will be the issue. Talk in depth in meters from Blue Holes. Also showed no Cray pots at river mouth.
- Map marked, further inshore than survey but well outside surf zone, made area bigger north and south, extending: from river mouth until just south of the turn off to Rainbow Jungle.
- Signage, education at school, shopping centres, tourist bureau. You are doing OK – keep on the same way!

- Must be policed – or a waste of time really. Commented that map was too indistinct (photocopy).

Boundary system (map showing benthic survey area)

Summary of people who commented on a proposed FHPA encompassing the whole area surveyed during the marine benthic survey:

69.4 per cent of respondents supported the area covered by the proposed FHPA.

30.6 per cent of respondents wanted the boundary system adjusted from the area surveyed during the benthic survey. It must be noted that this area extends about 200m into the ocean. 5.6 per cent of respondents suggested it should be bigger in west, south and north direction. The rest of the responses suggested that the westward extend of the area should be reduced. Half of these conceded that the area could be increased north and south along the shore, in both continuous and discontinuous nature.

**APPENDIX 6 List of stakeholder groups contacted during
preparation of the draft plan of management**

Kalbarri Fishing Club

Kalbarri Professional Fishermen's Association

Recfishwest

Perth Metropolitan RFAC

Shire of Northampton

West Coast Abalone Divers Association

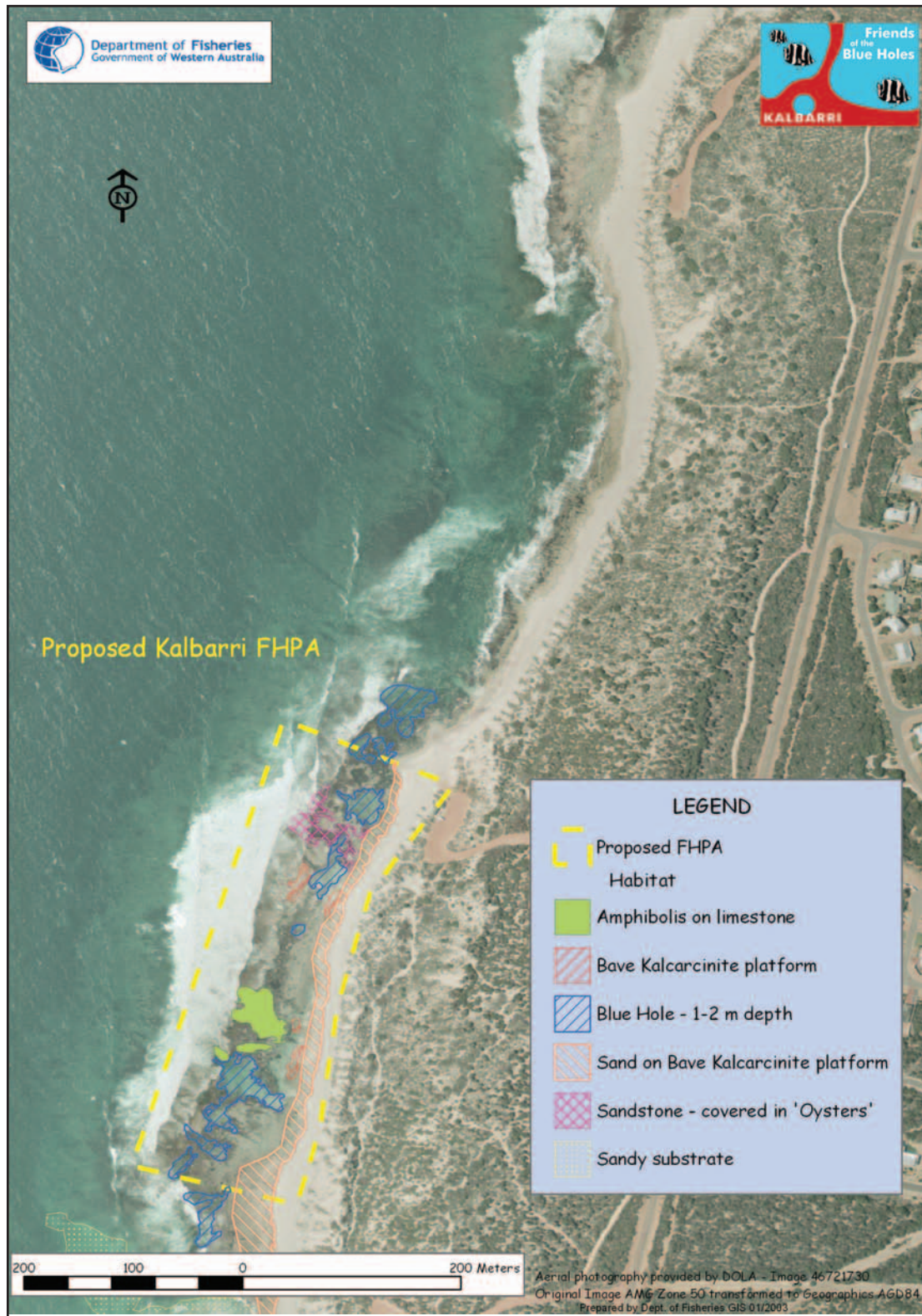
Yamatji Land and Sea Council

Friends of the Blueholes

Figure 1 Map of the Kalbarri Blue Holes Fish Habitat Protection Area in relation to the Kalbarri townsite



Figure 2 Map of the Kalbarri Blue Holes Fish Habitat Protection Area



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, Rottneest 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, Rottneest 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** Pearlring 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 Overall (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 (July 2003)
- 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 (August 2003)
- 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 (August 2003)
- No. 174** Translocation of Golden Perch, Murray Cod and Australian Bass into and within Western Australia for the Purposes of Recreational Stocking, Domestic Stocking and Commercial and Non-commercial Aquaculture (December 2003)
- No. 175** Fish Stock and Fishery Enhancement in Western Australia - a discussion paper. By Jane Borg (*in press*)
- No. 176** Fish Stock and Fishery Enhancement in Western Australia - a summary report. By Jane Borg (*in press*)
- No. 177** Fisheries Environmental Management Plan for the Gascoyne Region (*in press*)
- No. 178** Draft Plan of Management for the Kalbarri Blue Holes Fish Habitat Protection Area (*in press*)
- No. 179** A Draft Policy for the Translocation of Brown Trout (*Salmo trutta*) and Rainbow Trout (*Oncorhynchus mykiss*) into and within Western Australia for the Purposes of Recreational Stocking, Domestic Stocking and Commercial and Non-Commercial Aquaculture (*in press*)