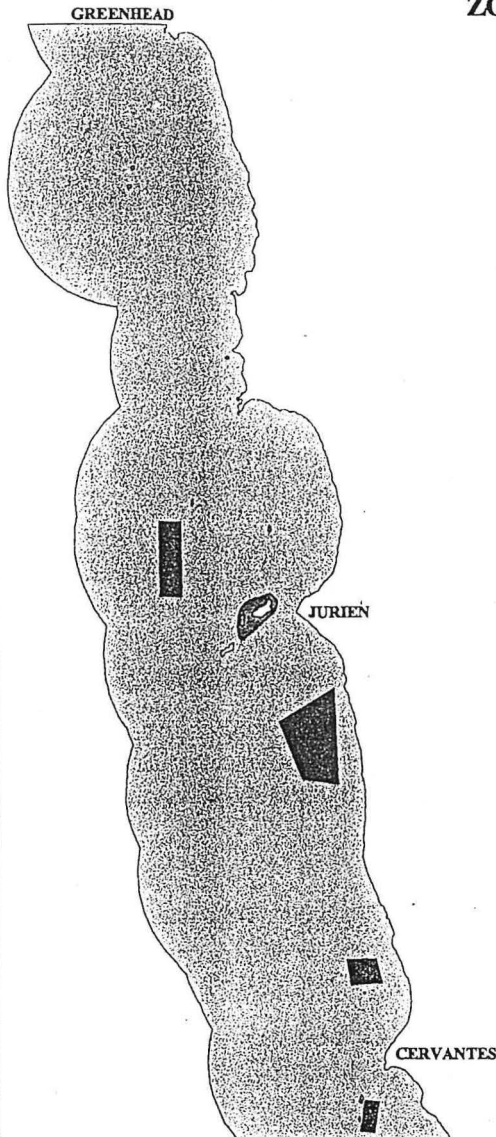


PROPOSED JURIEN BAY MARINE RESERVE

ZONING AND BOUNDARY OPTIONS

AQUACULTURE



Explanatory Notes

The development of the Jurien marine finfish industry is set in the context of the world's increasing demand for fish as a source of protein for direct human consumption, industrial agents, specialist health foods, recreation, and for ornamental purposes. There is documented evidence to support the development of aquaculture as a reliable source of protein, based on the inability of traditional supplies to satisfy this demand. In addition, the Resource Assessment Commission recognises that mariculture offers the promising attributes that: pressure on wild fish stocks is lessened; it is space and energy efficient; maintenance of water quality is imperative for success; and it involves the opportunity for regional development through creating business, investment and employment potential in non-metropolitan areas. For these reasons, the Jurien mariculture industry is well placed to take advantage of the current global demands whilst providing associated benefits to regional economic development.

The importance of marine finfish farming in Jurien may be highlighted by considering, at a broad scale, other potentially suitable locations around the world for the production of temperate water finfish that occupy an important section of the market. Environmental constraints present limitations of the ability of operations in the Northern Hemisphere to contribute to production in this area. Of potential temperate latitudes in the Southern Hemisphere, the east coast of Africa has deep coastal waters without protection from strong currents which would preclude mariculture development. The east coast of Australia is highly developed which limits opportunity for aquaculture development.

Thus, based on its comparative advantages, Jurien Bay is strategically placed for the development of a sustainable mariculture industry, and it is for these reasons that the pilot project was located at Jurien. Planning for mariculture must consider the most appropriate locations for the development to occur based on both environmental and social factors. Mariculture should be encouraged in those areas that are environmentally and socially appropriate, economically viable, and directed away from unsuitable areas. The Central Coast Regional Strategy identified the area south of Island Point and extending to Cervantes, as having potential for mariculture development, and its recommendations reflect this. The appropriateness of further development of the marine finfish industry in Jurien has been assessed by a recent Fisheries WA report, which stated that 'it is prudent to proceed with the development of mariculture in the inshore waters of Jurien Bay, as the track record of the industry, research and monitoring to date, indicates that there is an acceptable level of risk'.




Deep Water Site

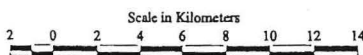
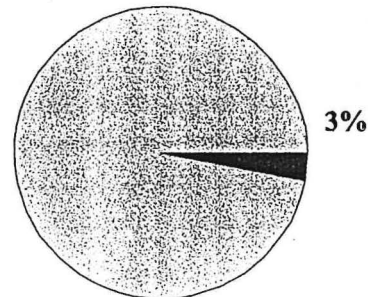
- The Deep Water Site is located over a sand bottom. Transects have been completed in an east-west and north-south direction.
- The site does not present a navigational hazard.
- There is no recognised conflict with any other stakeholders.
- Water temperatures appear suitable with excellent flushing of surrounding waters.

Extension of Existing Aquaculture Licensed Area (Jurien Fish Farms)

- The site must offer flexibility in changing the location of pens.
- Sensitive benthic habitats have been identified.
- The area is away from recreational use.
- The site has relatively strong surface currents and meets DEP guidelines on minimum water circulation.
- Four years of environmental monitoring of development sites has shown that there is an acceptable risk for these extensions within the lagoon system.

LEGEND

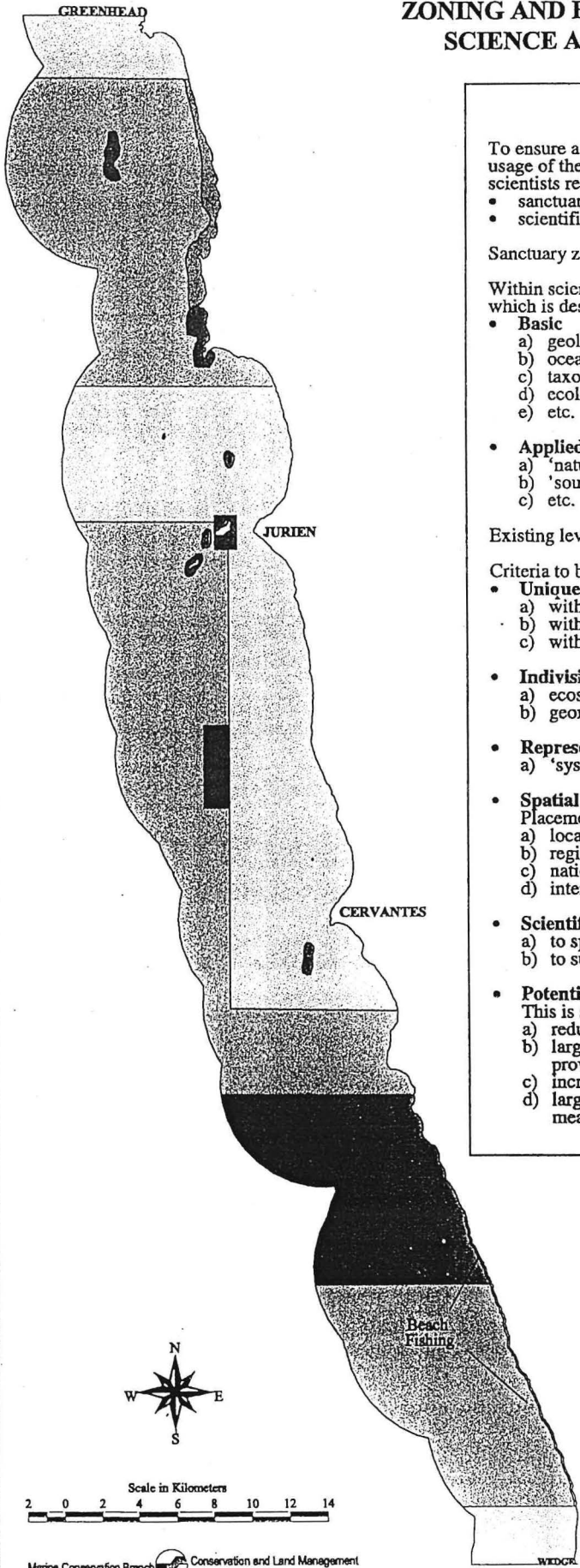
-  General Purpose
-  Sanctuary
-  Special Purpose-Aquaculture



PROPOSED JURIEN BAY MARINE RESERVE

ZONING AND BOUNDARY OPTIONS

SCIENCE AND EDUCATION (A)



Explanatory Notes

To ensure a minimum level of understanding, of both the environment and of human usage of the environment, and to establish a scientific framework for management, scientists require two zone types;

- sanctuary zones
- scientific reference zones.

Sanctuary zones need to be strictly 'no take' for all activities including science.

Within scientific reference zones, activities should be limited to 'sustainable' science which is designed to improve knowledge

- **Basic**
 - a) geological
 - b) oceanographic
 - c) taxonomic
 - d) ecological
 - e) etc.
- **Applied** ('successful multiple-use, ecosystem-based management')
 - a) 'natural' baseline
 - b) 'source'
 - c) etc.

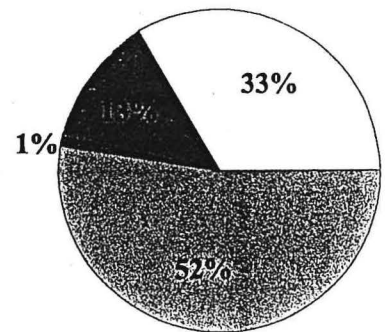
Existing levels of crayfishing are acceptable in a subset of scientific reference zones.

Criteria to be applied to the selection of sanctuary and scientific reference boundaries

- **Uniqueness**
 - a) within bio-region
 - b) within designated park area
 - c) within potentially extended park
- **Indivisibility connectedness**
 - a) ecosystem function (including ecological community)
 - b) geomorphology component
- **Representativeness**
 - a) 'system' composite to ensure representation of process, i.e. Strips
- **Spatial scales**
Placement, size and number of zones to be considered relative to all spatial scales
 - a) local
 - b) regional
 - c) national
 - d) international
- **Scientific replication**
 - a) to spread risk
 - b) to support 'rigorous' inferences about the success of management
- **Potential southern extension**
This is supported because;
 - a) reduction of risk of not including particular aspects of ecosystems
 - b) larger area may incorporate management problems linked to resource provision and access
 - c) increased flexibility to allocate no-take areas and scientific reference zones
 - d) larger geographic scale makes whole reserve ecologically more valuable and meaningful

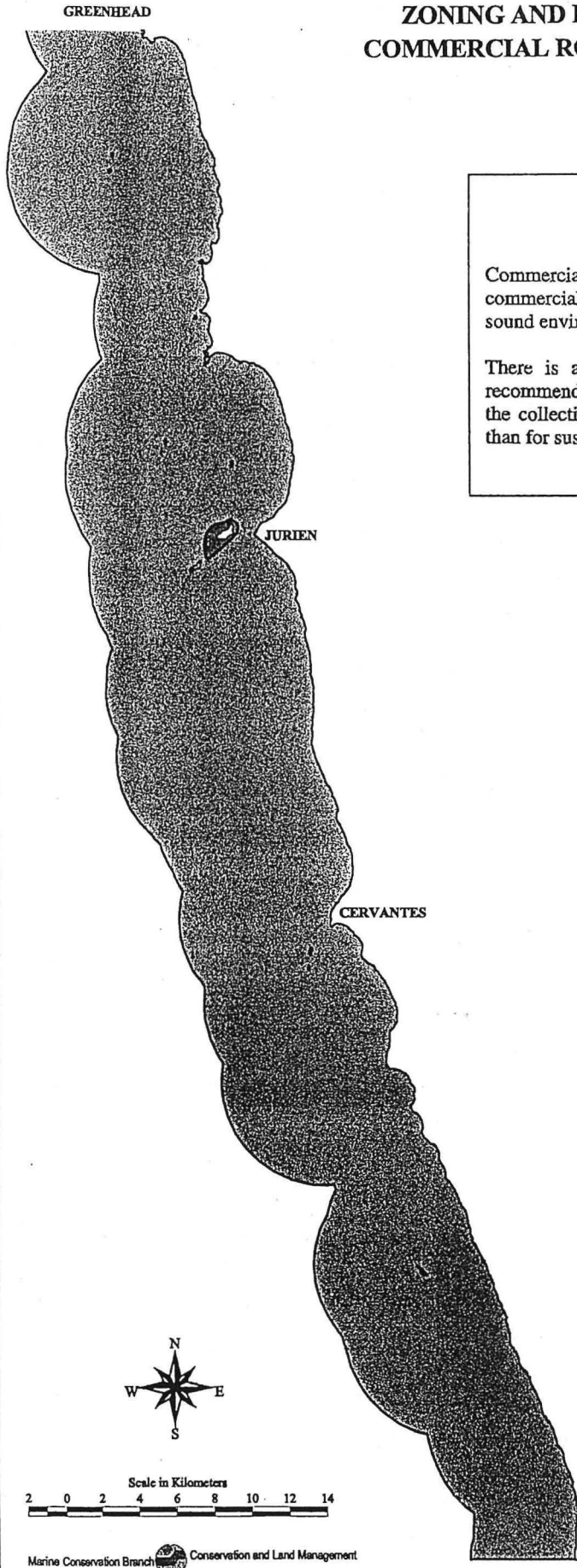
LEGEND

- General Purpose
- Sanctuary
- Special Purpose-Scientific Reference Area and Commercial Rock Lobster Fishing
- Special Purpose-Recreational Fishing
- Special Purpose-Scientific Reference Area & Beach Fishing
- Special Purpose-Scientific Reference Area, Beach Fishing & Commercial Rock Lobster Fishing



Zones as percentage of total area

PROPOSED JURIEN BAY MARINE RESERVE ZONING AND BOUNDARY OPTIONS COMMERCIAL ROCK LOBSTER FISHERS





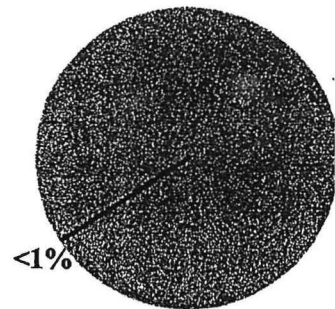
Explanatory Notes

Commercial rock lobster fishers have traditionally had access to the whole area. The commercial rock lobster fishery is already managed on a sustainable basis and has a sound environmental track record (i.e. negligible by-catch and impacts on habitats).

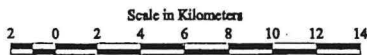
There is a continuing requirement for the collection of puerulus larvae. We recommend that the current puerulus collection area be extended to encompass all of the collection sites, and that it be zoned for scientific reference with no-take other than for sustainable scientific experimentation.

LEGEND

-  Special Purpose-Commercial Rock Lobster Fishing
-  Sanctuary

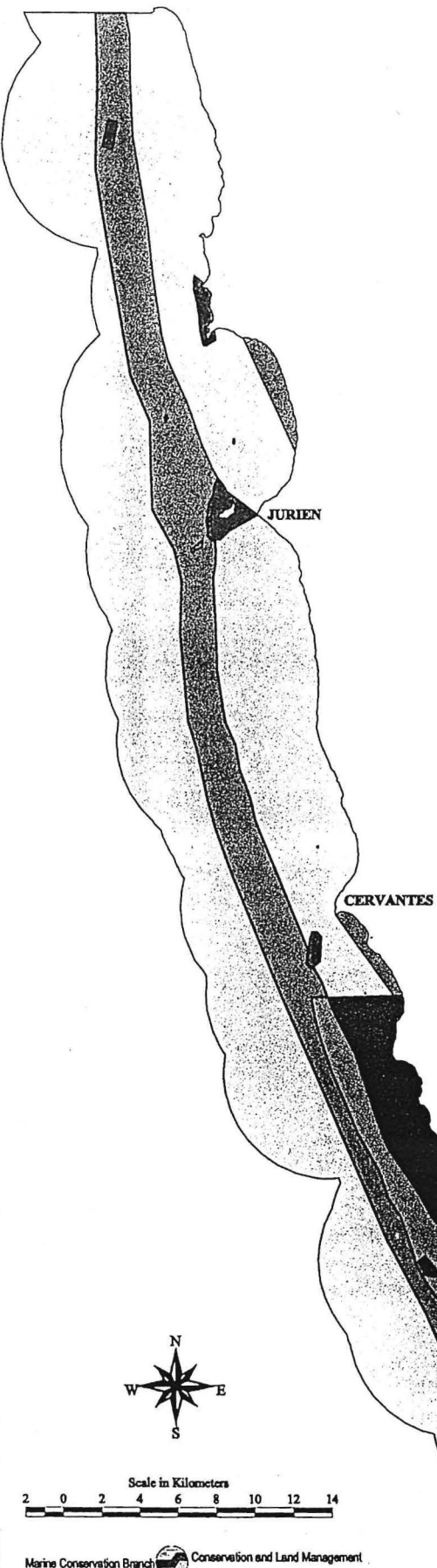


Zones as percentage of total area



PROPOSED JURIEN BAY MARINE RESERVE ZONING AND BOUNDARY OPTIONS DANDARAGAN LGA

GREENHEAD



Explanatory Notes

The Shire seeks a balanced outcome that protects the environment, provides security to commercial rock lobster fishers, and allows for sustainable development.

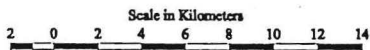
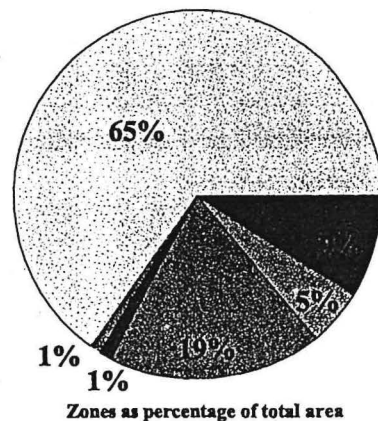
The Shire supports the proposed southern extension of the marine reserve because it provides an opportunity to establish zones for conservation without extensive social dislocation. A large finfish protection area south of Cervantes would provide a fish refuge, replenish adjacent stocks and would be of significant conservation value. Access should be provided for beach anglers near to development nodes along this section of coast, and the declaration of a large finfish protection zone should not disrupt the commercial rock lobster fishery.

The commercial rock lobster fishery would be more secure with the declaration of a special purpose zone over the outer reef. The declaration of this zone would not impact on other users unless their activities had significant impact on commercial rock lobster fishing.

Recreational fishing is a very popular activity on the central west coast. The declaration of recreation zones adjacent to the major town sites would cater for the requirements of this user group.

LEGEND

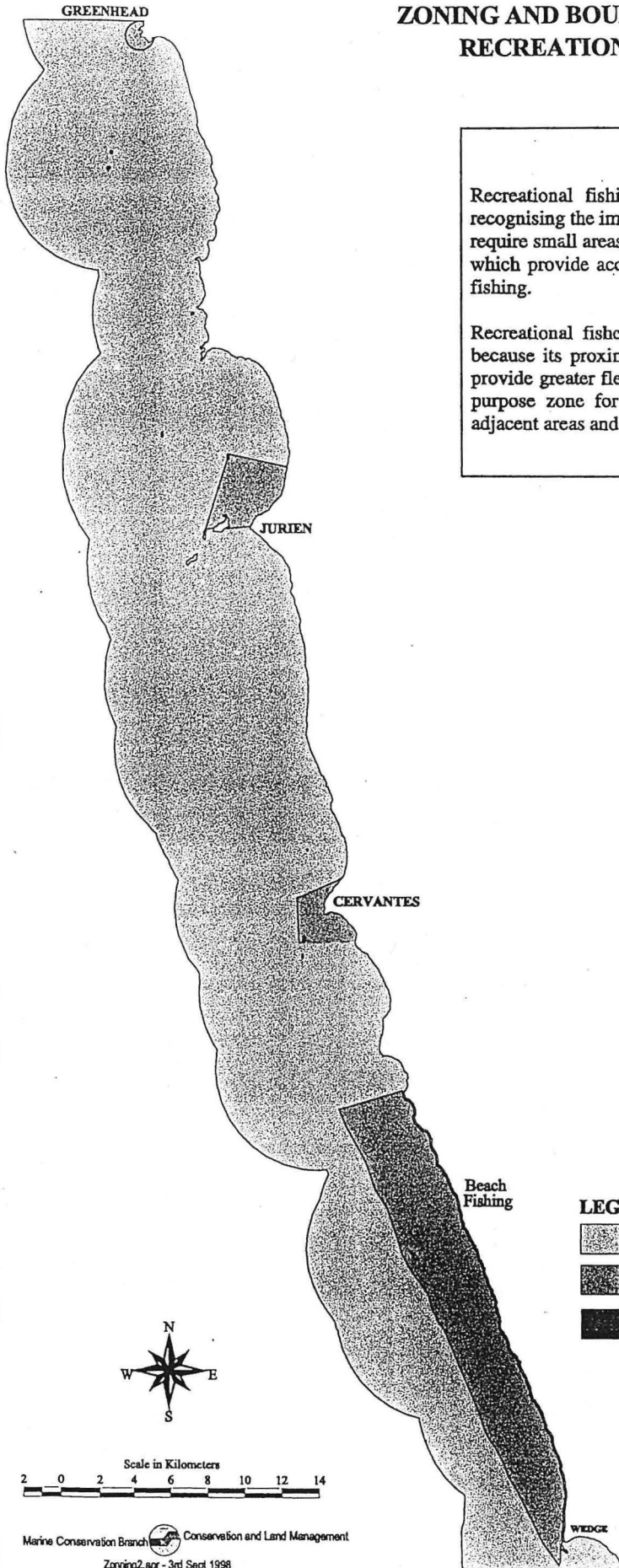
- General Purpose
- Sanctuary
- Recreation
- Special Purpose-Commercial Rock Lobster Fishing and Finfish Protection
- Special Purpose-Finfish Protection
- Special Purpose-Commercial Rock Lobster Fishing
- Special Purpose-Beach Fishing



PROPOSED JURIEN BAY MARINE RESERVE

ZONING AND BOUNDARY OPTIONS

RECREATIONAL FISHERS






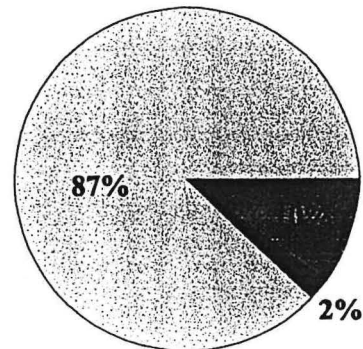
Explanatory Notes

Recreational fishing is a growing industry on the central west coast. While recognising the importance of the commercial rock lobster fishery, recreational fishers require small areas adjacent to the town sites of Greenhead, Jurien Bay and Cervantes which provide access for recreational fishing without competition from commercial fishing.

Recreational fishers support the proposal for a southern extension to the reserve because its proximity to terrestrial conservation reserves and limited human usage, provide greater flexibility to establish zones for conservation. The proposed special-purpose zone for finfish protection would operate as a finfish refuge, replenish adjacent areas and provide a large partial no-take area for conservation.

LEGEND

-  General Purpose
-  Recreation
-  Special Purpose-Finfish Protection



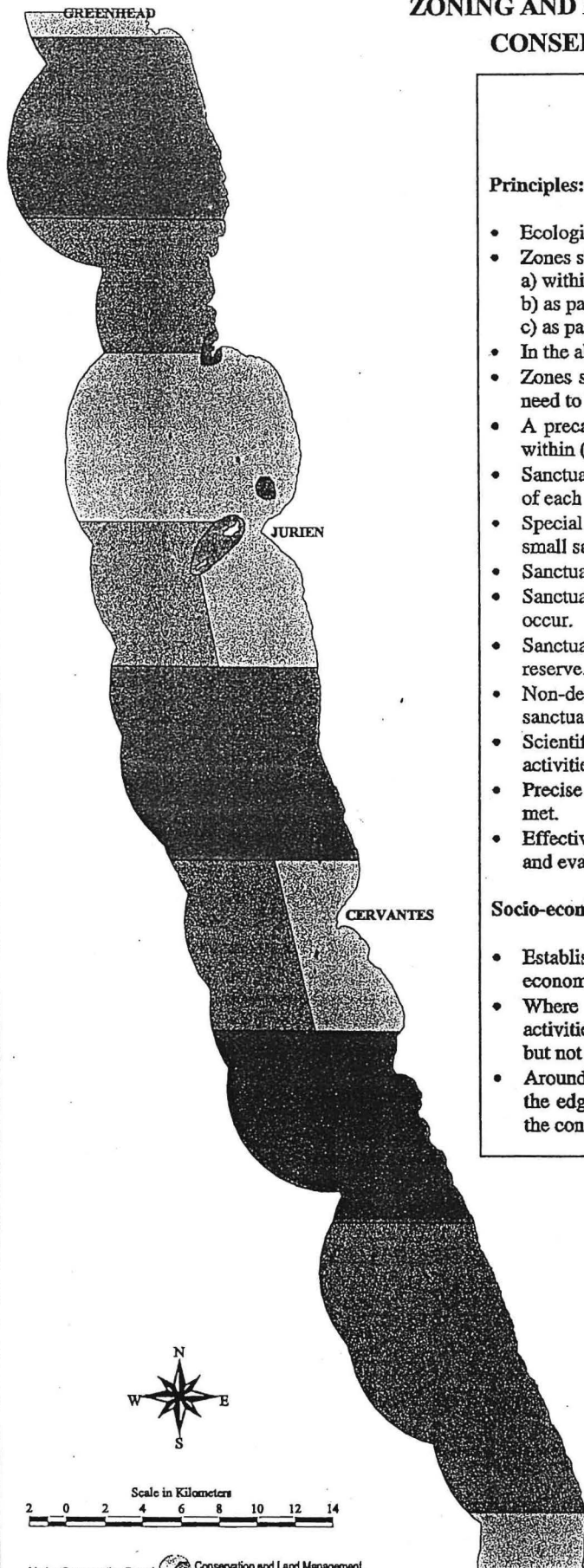
Zones as percentage of total area

Scale in Kilometers
2 0 2 4 6 8 10 12 14

Marine Conservation Branch Conservation and Land Management

Zoning2.apr - 3rd Sept 1998

PROPOSED JURIEN BAY MARINE RESERVE ZONING AND BOUNDARY OPTIONS CONSERVATION (A)



Explanatory Notes




Principles:

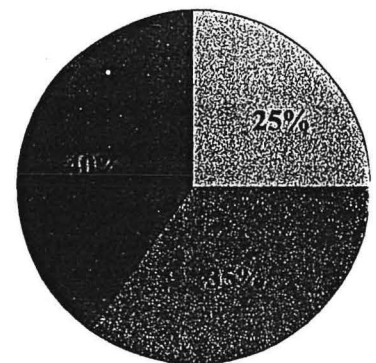
- Ecological criteria are paramount.
- Zones should reflect commitment to biodiversity protection
 - a) within the Jurien area
 - b) as part of a system covering CWC
 - c) as part of a structured network of reserves
- In the absence of knowledge, a precautionary approach is required.
- Zones should reflect a commitment to maintenance of ecosystem integrity (they need to be comprehensive and adequate).
- A precautionary approach will be reflected by large, replicated sanctuary zones within (and beyond) the Jurien Reserve.
- Sanctuary zones should encompass habitat types typical of the CWC, preferably of each replicated site.
- Special features should be included within large sanctuary zones or be set aside as small sanctuary areas (e.g. 'stands' and 'holes').
- Sanctuary zones should span the distribution of the reserve.
- Sanctuary zones should connect to important and protected features where these occur.
- Sanctuary zones should be adjacent to low impact activities elsewhere in the reserve.
- Non-destructive scientific reference sites are a sensible and compatible element of sanctuary zones.
- Scientific reference areas need to be buffered from the edge-effects due to activities in adjacent areas if they are to operate as 'zero disturbance' controls.
- Precise location of sanctuary areas should be flexible provided above criteria are met.
- Effectiveness of sanctuary areas need to be determined by research, monitoring and evaluation.

Socio-economic Principles:

- Establishment of sanctuary areas should not be compromised by social or economic counter-directives.
- Where establishment of sanctuary impacts on prevailing established human activities, mechanisms must be found to address any disadvantage which ensues – but not at the expense of the ecological criteria reflected by the sanctuary zones.
- Around all islands where people can land, there should be an area of sanctuary to the edge of intertidal reefs for reef appreciation, education, observation, and for the connection of terrestrial reserves with marine reserves.

LEGEND

-  General Purpose
-  Sanctuary
-  Special Purpose-Scientific Reference Area and Commercial Rock Lobster Fishing

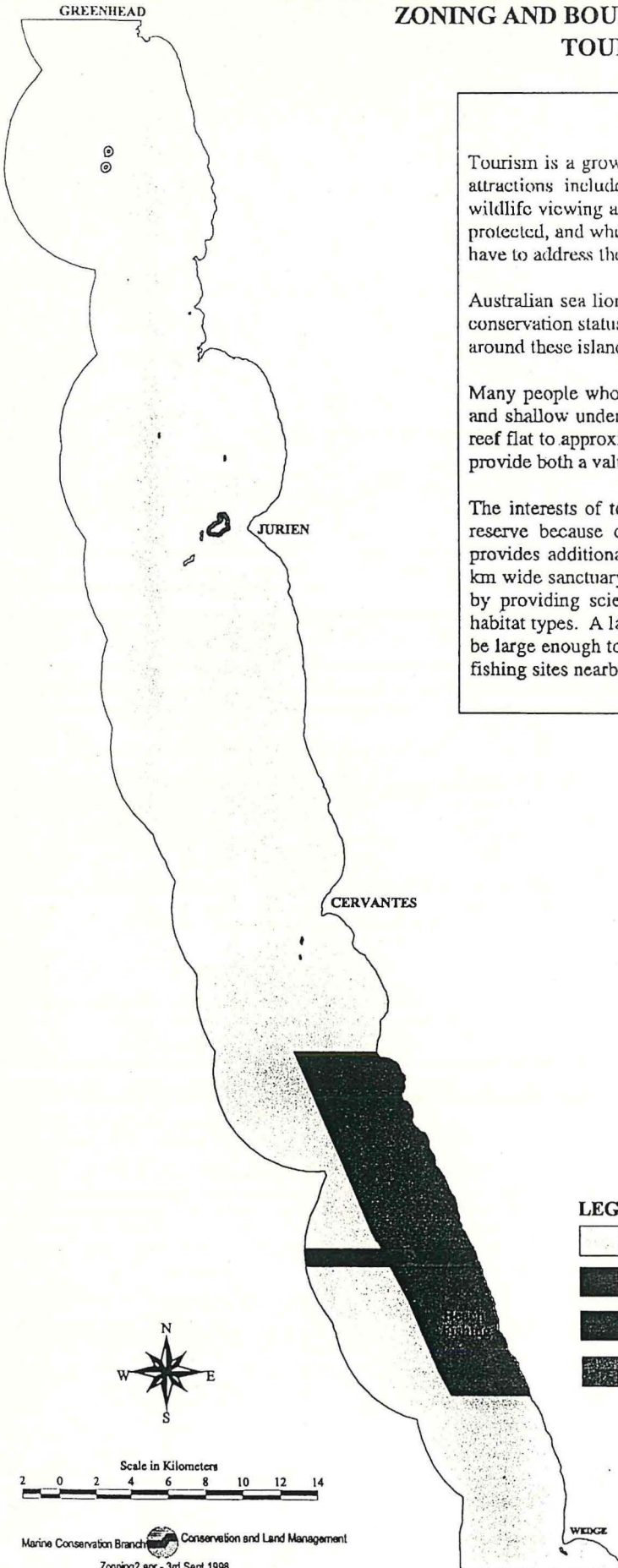


Zones as percentage of total area

PROPOSED JURIEN BAY MARINE RESERVE

ZONING AND BOUNDARY OPTIONS

TOURISM



Explanatory Notes

Tourism is a growing industry on the central west coast. The wide range of visitor attractions include the clean water and unspoilt coastal scenery, fishing, diving, wildlife viewing and surface water sports. This wide range of attractions needs to be protected, and where they conflict or potentially damage the environment, zoning will have to address these issues.

Australian sea lions use Fishermans Islands for breeding. In view of their uncertain conservation status and value as a tourist attraction, a special purpose zone is required around these islands for wildlife protection and viewing.

Many people who come to the central west coast value an opportunity to view fish and shallow underwater habitats in an undisturbed state. A sanctuary zone over the reef flat to approximately 200 m from the high tide mark of Boullanger Island would provide both a valuable tourism opportunity and conserve the area.

The interests of tourism are well served by the proposed southern extension to the reserve because of its proximity to existing popular terrestrial reserves. It also provides additional flexibility for the establishment of zones for conservation. A 1 km wide sanctuary zone which traverses the whole reef would facilitate management by providing scientific reference sites within representative portions of all major habitat types. A large finfish protection zone over much of the southern lagoon would be large enough to function as a fish refuge and a source of fish to replenish favourite fishing sites nearby.

LEGEND

- General Purpose
- Sanctuary
- Special Purpose-Finfish Protection
- Special Purpose-Wildlife Protection and viewing

