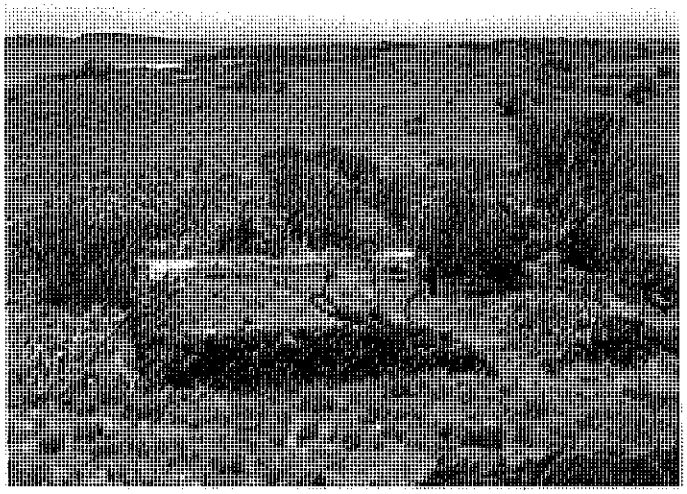
Pilbara Development Commission

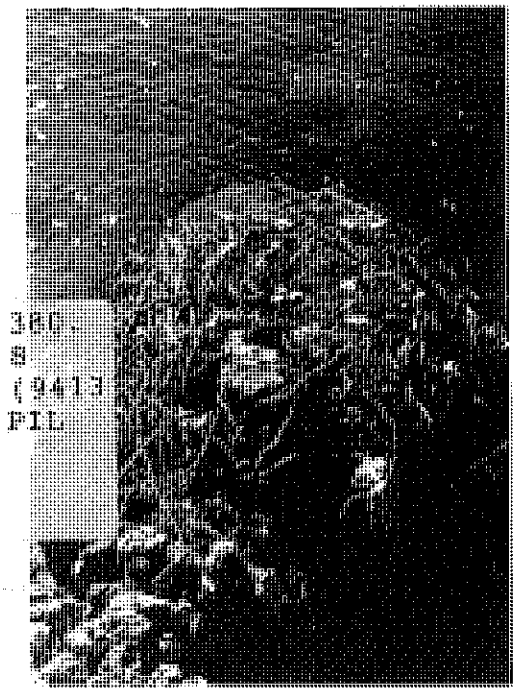
Pilbara / Gascoyne Islands Ecotourism Management Strategy

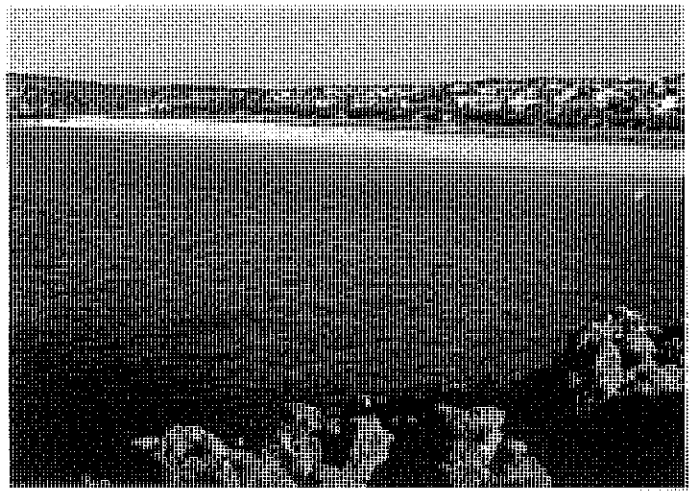


Volume 2
Technical and Detail Papers

(A companion document to
Volume 1
- Review of Study and Public Response
- Implementation Recommendations)

by
Higgins Wood & Associates
1995





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GLOSSARY OF TERMS

AAD	Aboriginal Affairs Department
ABS	Australian Bureau of Statistics
AIMS	Australian Institute of Marine Science
ATC	Australian Tourist Commission
ATSI	Aboriginal and Torres Strait Islander
ATSIC	Aboriginal and Torres Strait Islander Commission
ATU	Aerated Treatment Unit
CALM	Conservation and Land Management (Department of)
DEP	Department of Environmental Protection
DOLA	Department of Land Administration
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
GDC	Gascoyne Development Commission
GTA	Gascoyne Tourism Association (currently called GRTA)
LARP	Local Approvals Review Program
NPNCA	National Parks and Nature Conservation Authority
PDC	Pilbara Development Commission
PTA	Pilbara Tourism Association
RCC	Regional Co-ordinating Committee
RPC	Regional Planning Committee
SCUBA	Self Contained Underwater Breathing Apparatus
VCL	Vacant Crown Land
WAPC	Western Australia Planning Commission
WAPET	Western Australian Petroleum
WATC	Western Australian Tourism Commission
WTP	Waste Treatment Plant (Exmouth)

1.0 ACKNOWLEDGMENTS

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The study steering committee has also given generously their time as have individuals and communities in the Pilbara, the Gascoyne and Perth in workshops and private discussions.

Steering Committee Members

Graeme Stephens	Chairperson	Pilbara Development Commission
Tonia Swetman	Project Superintendent	Pilbara Development Commission
Doug Bathgate		Gascoyne Development Commission
Tony Medcraft		Exmouth Tourist Association
Heather Midgely		Pilbara Regional Tourist Association
Chris Muller		Conservation & Land Management
Guy Parker		Aboriginal & Torres Strait Islander Commission
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Charlie Thorn		Fisheries Department of WA

2.0 INTRODUCTION TO THE REPORT

2.1. Preamble

The broad aim of the Strategy is to promote ecotourism activities in the Pilbara/Gascoyne coastal offshore islands. This is because interest in the natural environment has increased rapidly during the last decade, to the extent that ecotourism (globally) is regarded as the fastest growing segment of the tourism market.

> *The fundamental motivations for travel to and in Australia are the beauty and variety of the landscape and wildlife, Aboriginal culture and the general perception of an unspoilt environment.*
>
> . Queensland, 1994: 6

The Pilbara/Gascoyne coastal islands are a valuable asset to the region, the State, and the world. The conservation of this natural resource is essential to the planning, development and management of ecotourism. Thus, an evaluative framework that can address the key concept of sustainability is required. This involves consideration of the "natural capital" of the islands as well as their "resource capital" (Australia, 1991: 37).

The Strategy has adopted a long term implementation timeframe. By the year 2001 it will be appropriate to expect a sustainable ecotourism industry to be in place. Thus, the Strategy is not about licensing arrangements for ecotourism developments in the short term.

2.2. Defining Ecotourism

Ecotourism serves to present the natural environment to visitors in a manner which maintains its integral natural and cultural values, while providing the visitor with an enjoyable and educational experience. Thus, it places an emphasis on the conservation of the national environment and on visitor education.

The Strategy Report adopts the Commonwealth Department of Tourism's definition of ecotourism:

> *Ecotourism is nature-based tourism that involves education and interpretation of the natural environment and is managed to be ecologically sustainable. This definition recognises that "natural" environment includes cultural components and that "ecologically*

sustainable" involves an appropriate return to the local community and long-term conservation of the resource.

Australia, 1994b: 17

Within the above definition, ecotourism includes both active pursuits (diving, caving, bush walking, or carrying out scientific research) and passive pursuits (looking at scenery). This definition encompasses the travel aspirations of the largest travel markets in the world. It is also the prime motivation for more than 80% of travellers to the Pilbara who, while motivated by natural and cultural values, appear to tolerate or even derive satisfaction from activities which are the antithesis of nature-based tourism, that is, extractive industries.

Within the above definition of ecotourism, there is a niche market which will be referred to as wilderness ecotourism. Wilderness ecotourism is:

Tourism that involves travelling to relatively undisturbed natural areas with the objective of admiring, studying, and enjoying the scenery and its wild plants and animals, as well as any cultural features found there.

Ceballos-Lascurain 1991 in Australia, 1994b: 15.

Two definitions are necessary because the diversity and environmental sensitivity of the study area dictates an approach which offers different opportunities to different markets. Wilderness ecotourists will consume tourism product on islands which is costly because of their isolation but may abhor the economic mainstay of the region while nature based tourists, as stated above, will accept other economic activities as part of the life of the regions. It is also important to draw the distinction between these travellers because the WATC appears to classify nature-based tourism, per se, as a niche market because of a lack of differentiation between nature-based tourism and wilderness ecotourism. It will be shown in this Strategy Report that nature-based tourism is what both the world and domestic travel markets desire.

2.3. Purpose of the Strategy

The overall purpose of the Strategy is to ensure that the natural assets of the islands are preserved through sensitive and careful management. There are two underlying principles that are fundamental to ecotourism management of the islands.

- Sustainability/Stewardship

  The islands are a valuable natural resource and should be preserved for their own sake, particularly those islands that are relatively untouched. The

islands are important for their bio-diversity and conservation values, the Aboriginal cultural heritage, as well as their immense appeal to visitors. As with other land uses, ecotourism if not properly managed can result in detrimental environmental and social impacts. The impacts of increased tourism numbers on the islands must be carefully managed if the industry is to be sustainable.

- Education/Interpretation

  Ecotourism activities can lead to positive management action in conserving the islands by fostering greater awareness of their "natural capital". Education can influence:

  - tourist behaviour;
  - local community behaviour;
  - extractive/other industries behaviour toward better management of the islands.

Education and interpretation can actually be used as management tools in addressing the impacts of ecotourism.

2.4 *Objectives of the Strategy*

According to the Project Brief the objectives of the Strategy are to:

- Document areas of conservation significance.
- Identify constraints to development.
- Prioritise zones for tourism development.
- Identify off-shore tourism opportunities such as coastal cruising, boat charter operations, accommodation, Aboriginal interpretation, historical, cultural and environmental significance ie selective product development.
- Provide opportunities for linking offshore tourism with adjacent regions ie Exmouth-Gascoyne Region.
- Anticipate impact of marine traffic between islands in study area.
- Establish a management plan for the identified offshore island relevant to the project objectives.
- Suggest solutions where industry, tourism and conservation have apparently competing interest which could lead to areas of conflict.

- For those islands considered appropriate for sustainable ecotourism development, and consistent with the above objectives, provide for their sustainable recreational and education use.

2.5 *Approach to the Project Brief*

The approach to the Project Brief has been to focus on environmental and cultural values as well as the potential economic returns from ecotourism. This has involved the local community as a stakeholder, and recognition of the rights of the local community to achieve sustainable returns from the ecotourism industry. In other words, the natural and cultural environment provides opportunities for community development and environmental protection as well as economic growth and employment.

Consultation has been an important vehicle for achieving this, and for reconciling the (inherent) conflicts and claims over land use. By including the main stakeholder groups in development of the Strategy, we have achieved a better informed, comprehensive and achievable management regime, that can now be set in place.

Development of the Strategy has involved the following stages:

Stage 1: Development of position papers which included desktop reviews of the published literature on tourism, environmental and planning issues and the Aboriginal cultural heritage of the area.

Stage 2: Field work, site visits and public meetings throughout the study area.

Stage 3: Development of a Draft Strategy, followed by a period of public submissions and comments, and regional seminars to further develop the Strategy

Stage 4: Presentation of a final, endorsed Strategy.

2.6. *Methodology*

2.6.1. Desk-Top Research

Much of the Strategy Report was prepared as a result of an extensive desk top study that included:

- bibliographic searches of on-line catalogues in a number of academic libraries;
- Department of Environmental Protection library research for relevant industry derived EIA documents;
- CD-ROM searches for relevant journal and magazine articles;
- incorporation of the CALM database of vertebrate fauna records from the islands of the study area;
- AAD/Sites Department library research;
- consultants library research.

2.6.2. Consultation

Consultation has included:

- liaison with relevant government agencies and government employees with publications and specific knowledge of use to the study;
- liaison with industry groups and employees with publications and specific knowledge of use to the study; and
- liaison with ATSIC Regional Councils, Land Councils, resource agencies and key individuals.

In addition to drawing upon the wealth of available documented work in the compilation of this Report, relevant experts and authorities in their respective areas were personally consulted (see Appendix B). This ensured that the most up to date knowledge of the area and its natural resources as well as local knowledge and perceptions could be incorporated into this document.

2.6.3. Workshops

A number of public workshops were conducted to enable the community to have input to the development of the Strategy. Workshops were held in Exmouth, Onslow, Karratha, and Port Hedland, and the outcomes of these public workshops have been incorporated into the current assessment.

2.6.4. Site Visits

Site visits were also conducted during the preparation of the Strategy, with locations visited including:

- Exmouth, Cape Range National Park, Ningaloo Marine Park;
- aerial surveys and site visits to the Muiron Islands, Serrurier Island and the Exmouth Gulf Islands;
- aerial surveys of Thevenard, Barrow, the Montebello Islands, and the Dampier Archipelago;
- site visits to Dampier, Karratha, Onslow, Roebourne, Cossack, and Port Hedland;
- site visits to the islands of the Dampier Archipelago (including Dolphin, Enderby, Malus, Rosemary, Goodwyn, East and West Lewis); and,
- aerial surveys of the remaining island groups in the study area (Regnard, Mary Anne, Passage, Mangrove, etc.).

The information and observations collected during this site work has been incorporated into the findings and strategies presented in this document.

3.0 TOURISM MARKET

3.1. Introduction

The tourism industry is a function of peoples' desires to experience something different from their everyday life and the provision of consumable tourism product to meet these desires. The key to tourism growth, therefore, is to identify desires, provide product to meet desires and market product to potential travellers.

Offshore islands developed tourism product in the study area is minimal and will be developed from natural and cultural assets. The Strategy identifies assets which are suitable for tourism and suggests levels of use for individual islands.

A sustainable tourism industry must also operate within the context of other activities and uses from conservation of resources to exploitation of resources. Choices between different activities and uses may have to be made on the basis of costs and benefits implying the need to assess competing activities/uses.

This part of the Strategy examines existing and potential tourism markets, existing tourism product and activity/use compatibilities/conflicts. It draws on recent reports on Pilbara tourism (Market Equity, 1995 & Tourism Co-ordinates, 1995) and parts of this Strategy Report.

3.2. Tourism markets

Identifying Opportunities for Increasing Tourism to the Pilbara (Market Equity, 1995) provides valuable market information on current tourism visitation to the regions and potential intrastate and interstate markets. The key findings of the report relate to traveller motivations, awareness of the region, market segmentation, movement patterns, accommodation type, experiences, future travel intentions and opportunities for growth. Considering that there is substantial overlap in travellers visiting both the Pilbara and the Gascoyne, the report is considered relevant to both regions.

3.2.1. Traveller Motivations

Most travellers are motivated to visit the Pilbara by natural attractions (Market Equity, 1995). Existing Pilbara and Gascoyne travellers from

Australia and overseas are the same as the biggest potential markets world-wide (Market Equity, 1995 and ATC, 1994)

Market Equity found that while the prime motivation to visit places is the natural environment, most travellers were "just passing through". However, it is considered that the response is one which is symptomatic of most respondents being on a northern holiday. For while they are "just passing through" travellers are staying for prolonged periods and are staying in the Pilbara for the same period as the Kimberley.

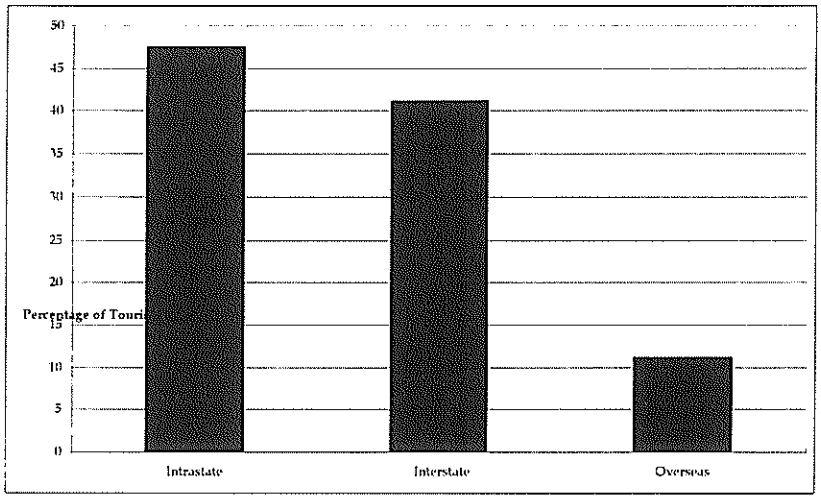
3.2.2. Awareness of the Regions

While travellers are primarily motivated by natural assets, they are more aware of Pilbara industry related towns than they are of the Pilbara's natural assets. Awareness of industry carries through to activities with many travellers visiting mining and hydrocarbon operations. This is an important factor when defining ecotourism and supports the need for two definitions which relate to tolerance of other economic activities.

3.2.3. Market Segmentation

One of the most striking findings of the Market Equity (1995) report is the proportion of interstate and overseas travellers in the Pilbara:

- 47.6% are from WA;
- 41.2% are from Interstate;
- 11.2% are from overseas.



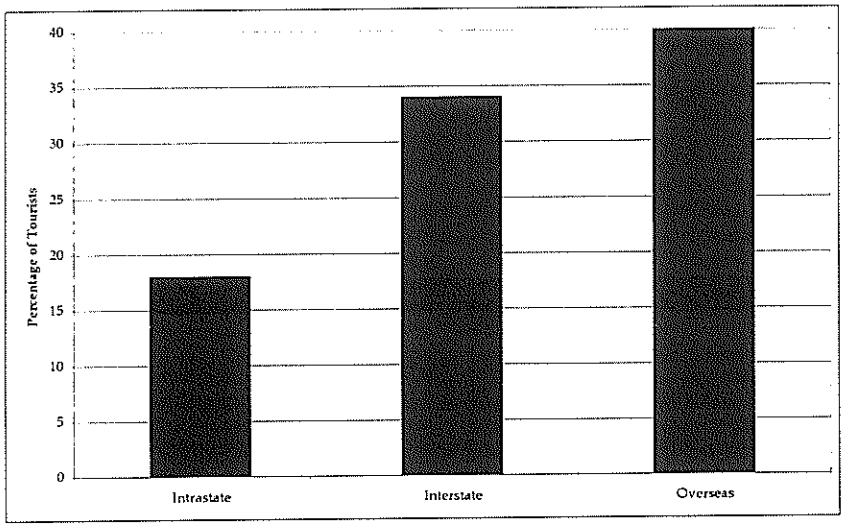
Pilbara tourist origins (Market Equity, 1995)

These figures differ dramatically from those of the 1991/92 WATC Tourism Monitor and confirm suspicions that in the Monitor interstate and overseas traveller numbers were probably understated.

3.2.4. Movement patterns

Almost 80% of travellers drive themselves through the Pilbara in their own vehicles (Market Equity, 1995) and most use the coast road because of its direct north-south linkage. Inland travellers are more inclined to "look around" while most coastal travellers are "passing through". However, even transit travellers stay for a reasonable amount of time. This anomaly is particularly evident amongst intrastate coastal travellers, 82% of whom consider themselves to be in transit.

Whatever anomalies are raised between length of stay and motivations to be in the region, it is significant that of all travellers in the Pilbara, fewer want to "look around" than "travel straight through" for even if they spend time in the region, they are less likely to spend money on tourism product if they consider themselves to be in transit. Of all travellers to the region, overseas travellers are most likely to "look around":

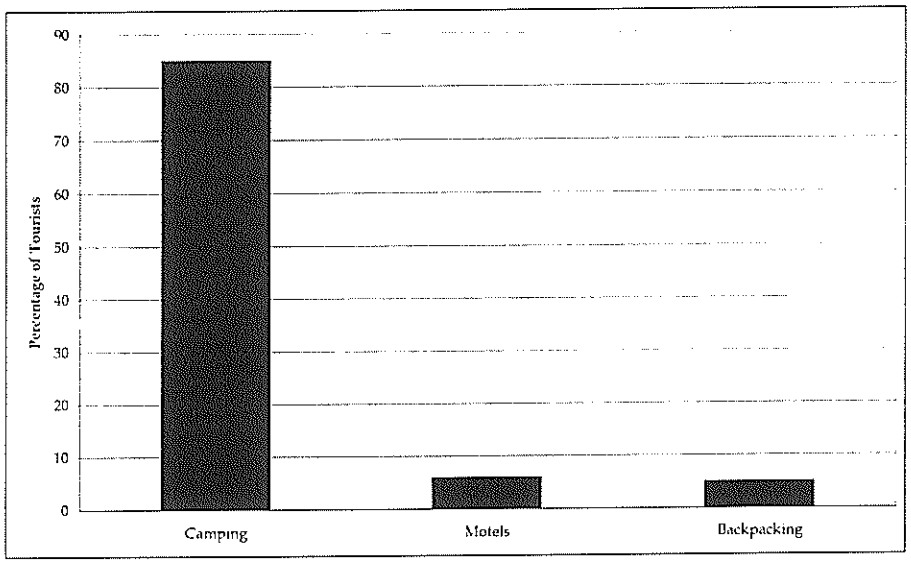


Travellers "looking around" by origin (Market Equity, 1995)

3.2.5. Accommodation

Most tourists in the Pilbara are caravaners (including campervaners) or campers. In fact, motel accommodation only caters for 4% of recreational travellers. Tourists from overseas are the largest users of backpacker

facilities but the availability of backpacker accommodation in the Pilbara is limited. It is believed that the following figures are similar in the Gascoyne, although, the Gascoyne may have larger numbers of travellers in built accommodation as a function of supply. The following are the percentages of travellers using different types of accommodation:



Accommodation type by origin (Market Equity, 1995)

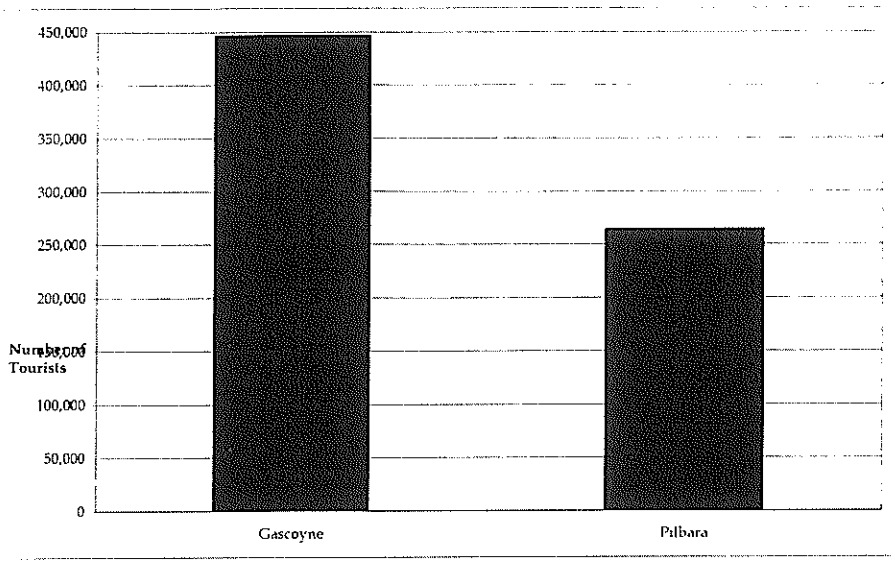
3.2.6. Experiences

Travellers are generally satisfied with natural assets and many visitors are satisfied with mining and hydrocarbon infrastructure and sites (Market Equity, 1995). They are, however, "dissatisfied with the cultural tourism opportunities available such as Aboriginal attractions, genuine Aboriginal artefacts and historic early settlements" (Market Equity, 1995: 26). They are also dissatisfied with the lack of availability of other tourism product, certain types of accommodation, directional signs, the cost of travel and above all, the lack of information to plan a trip from outside the region.

The lack of information is believed to a primary reason for Australia's failure to convert dreams about Australia into visitation. This holds true for domestic and overseas travellers to the Pilbara. It is interesting to note the lack of recall of advertising promotions, printed and visual, amongst travellers.

3.2.7. Future Travel Intentions (domestic markets)

Market Equity surveyed households in Perth, Sydney and Melbourne to gauge travel intentions to the Pilbara and Gascoyne regions of Western Australia. An extrapolation of the surveys shows that nearly 447,000 people intend visiting the Gascoyne and about 264,500 intend holidaying in the Pilbara.



Domestic traveller intentions (Market Equity, 1995)

The above figures do not include overseas travellers or business travellers. The figures should also be treated cautiously as a quantitative indicator.

3.2.8. Opportunities for growth

The Market Equity report suggests that there are three key ways of achieving growth in tourism:

- targeting markets;
- tourism product;
- information dissemination.

3.2.8.1. Targeting markets

Based on market segmentation and spending patterns, Market Equity suggests that key markets are intrastate and interstate caravaners, campers, and high spending young families.

However, the Offshore Islands Strategy suggests that international markets desire similar experiences to local markets, are enormous and should be tapped.

The Market Equity report also suggests that a key to growth is capturing travellers who are "just passing through".

3.2.8.2. Tourism product

Travellers need tourism product to enjoy experiences and support local enterprises. The Market Equity report finds strong demand for the following potential tourism innovations (Market Equity, 1995):

- trekking through gorges;
- experiencing mountain ranges and plains;
- quality accommodation in National Parks;
- open space in mountains & plains;
- snorkelling & diving;
- Aboriginal culture.

There is a low demand for:

- mining operations;
- 5 star hotels;
- sporting events;
- nightlife.

These findings are consistent with international market research (ATC, 1994).

3.2.8.3. Information/Interpretation

Clearly, information is a key factor in achieving growth and must be available outside the regions and within the regions. The Market Equity report supports the need for non-commercial information in the form of documentaries and printed information. This point is consistent with international research (ATC, 1994) which points to Australia's poor information base as a major factor in our failure to convert dreams about Australia into visits.

While advertising material is available, Market Equity reports on low recall rates of promotional material at tourist bureaux outside the region. Information, therefore, must be seen as an integral part of marketing the regions.

Signs are clearly important as they make travellers feel secure and are a factor in increasing visitation to particular sites.

It is also true that information will be a key factor in educating local people, tourism operators and tourists to respect the natural and cultural environments of the regions. It is essential, therefore, that interpretation/information be presented at stepping off points for islands in towns and at launching ramps/marinas and on the islands themselves. Careful planning is required to avoid information signs becoming visually polluting.

3.3. Marketing

The key to successfully marketing offshore islands ecotourism is to target markets which will consume tourism product. The Australian Tourist Commission focuses its marketing on the markets which are suitable for the region's assets and tourism product and provides avenues for the regions to participate. However, the WATC views nature-based tourism as a niche market and gives it a lower priority than other markets.

The above implies that while the regions will gain support from the WATC, they may receive greater benefits through ATC promotions and programs. It also implies that the regional tourism associations will have to mount their own marketing campaigns, a point supported by the Tourism Co-ordinates report. Intra regional and inter regional co-operation will be crucial to the success of marketing programs aimed at achieving growth from potential markets.

3.4. Tourism Product

Marketing and information reaches potential travellers and if successful, entices them to visit. Travellers arrive with expectations about the experiences they are about to have. Amongst international markets, Australian Tourist Commission advertising raises high expectations about contact with Aboriginal culture and pristine environments. When travellers arrive, they consume tourism product be it accommodation, access to sites or accompanied trips. They find out about product inside and outside the regions and plan trips accordingly. The

consumption of tourism product either does or does not meet the expectations of travellers. If tourism product fails to meet traveller expectations, they become dissatisfied. If dissatisfied, travellers will not return and will tell friends not to come to the regions.

To achieve growth, tourism product on the offshore islands must meet demands and should range from scenic flights through to visits, overnight stays, diving/fishing trips and involvement in scientific expeditions. This product depends on assets, access infrastructure, compatibility with other activities and the sustainability of resources.

This Strategy identifies four primary zones of opportunity for tourism to the offshore islands on the basis of assets, access, infrastructure, sustainability and compatibility with other activities. The zones of opportunity radiate from Exmouth, Onslow, Dampier/Karratha and Port Hedland. The following is an appraisal of existing tourism product in the three zones of opportunity.

The Strategy provides a detailed assessment of individual islands and suggests ceilings for use of and development on the islands. Some islands are not suitable for visitation while others could support accommodation, probably in the form of wilderness lodges. Tourism product should be developed on the basis of the assets and suggested uses in this Strategy. However, the ongoing use of islands must be managed and continuation of a licensing system for operators using the islands is recommended.

3.4.1. Exmouth

Operators in Exmouth offer diving trips to the Muiron Islands, less frequent trips to Flat and Serrurier Island and fishing trips on demand. They are capable of providing greater access as demand grows and infrastructure needs are minimal. Overnight stays on these islands require permission.

The proposed development of the new marina in Exmouth is likely to lead to greater visitation to islands particularly amongst private boat owners. The marina, which has been approved by Cabinet, is to be built on the southern side of Exmouth and will accommodate fishing, charter and pleasure craft.

CALM has also operated scientific expeditions to islands on a participant pays basis and could be expected to continue this practice.

3.4.2. Onslow

Operators in Onslow provide stays on Thevenard Island and occasional trips to and houseboat stays on, the Montebello Islands. There is capacity to cope with increasing demand, however, the suitability of ecotourism on Thevenard Island is dubious given the existence of oil storage tanks.

3.4.3. Dampier/Karratha

Fishing charters operate from Point Samson and there are two small scale operations accessing the Dampier Archipelago by boat for fishing and diving trips. Only one of these operators provides consistency at present and has difficulties meeting demand.

One helicopter operator and a fixed wing aircraft operator offer scenic flights on demand.

CALM has field stations on Enderby Island and the Montebello Islands. These buildings accommodate CALM staff working on the islands and sometimes, visiting research scientists.

Chalet/shack owners provide very limited tourist access to their facilities on the islands.

In short, the Dampier Archipelago offers great tourism opportunities but seriously lacks developed tourism product.

3.4.4. Port Hedland

Port Hedland has boat charter operations and is about 100 kms from Depuch Island. Port Hedland is also a potential access point for Rowley Shoals. Although Rowley Shoals is outside the study area, its proximity to Port Hedland and its recognised qualities as a dive location provides an opportunity for Port Hedland tourism operators.

Port Hedland has fortnightly scheduled flights to and from Bali and is currently the only airport in the North West with regular international flights.

3.4.5. Outside Operations

Boat operators from Perth and Broome currently offer access to all zones of opportunity on an occasional basis in prime seasons.

3.4.6. Recommendations

1. The Development Commissions should be committed to assisting with information dispersal as a means of raising regional profiles and assisting economic growth through tourism.
2. The PTA and GTA should establish access to the Internet and provide for information dispersal by the tourism associations.
3. CALM should continue its commitment to information and interpretation as a key management tool in the region and allocate part of all tourism licensing fees to an ongoing interpretation/information program.
4. This Strategy supports the Tourism Co-ordinates recommendations for marketing and industry co-operation and funding.
5. The executives of the PTA and the GTA should meet to develop a co-operative approach to marketing tourism in both regions.
6. The PTA & GTA should actively seek participation in ATC marketing promotions.
7. The PTA & GTA should seek access to ATC mailing lists for information based promotions and commence information dissemination based on existing tourism product on islands and the adjacent coast.
8. PTA & GTA should lobby the WATC for recognition that nature-based tourism markets are the largest potential markets in the world and that the regions provide what these markets want.
9. PTA & GTA should develop, through operator participation, marketing policies which provide information as well as advertising to target markets.
10. PTA & GTA should seek assistance from government agencies to obtain information for dispersal.

4.0. ENVIRONMENTAL ASSESSMENT

4.1. Project Background

This section of the Draft Strategy is the documentation of the natural resources present within the study area, including observations on the sensitivity, conservation significance, and sustainable use of these resources with respect to ecotourism. Potential site requirements for ecotourism operations have also been addressed, with detail provided as to the possible environmental impacts associated with such ventures, and an outline of management strategies to address these.

4.2. Previous Studies

The documentation of the natural resources of the North-west Shelf has been a gradual process that has taken place over several decades. Studies with varying aims ranging from academic research to industrial application have investigated the islands and their surrounding marine habitats.

Some of the categories of relevant past studies include:

- oil and gas industry scoping studies, Environmental Impact Assessments (EIA), and Environmental Management Plans (EMP);
- heavy industry port and infrastructure related scoping and EIA studies;
- Department of Conservation and Land Management (CALM) and Western Australian Museum (WAM) biological surveys;
- surveys carried out by or on behalf of other government departments; and,
- academic research conducted by independent researchers and tertiary institution-based scientists.

A considerable number of studies have addressed part or all of the study area. Of these, perhaps those most generally relevant to the current environmental assessment include:

- A Representative Marine Reserve System for Western Australia (Marine Parks and Reserves Selection Working Group, 1994);
- CALM Management Plans for:

- Ningaloo Marine Park (May et al., 1989);
- Cape Range National Park (CALM, 1987); and,
- Dampier Archipelago (Morris, 1990);

- Distribution of Coastal Marine Habitats from North-west Cape to Dampier (Hadson Energy Pty Ltd, on behalf of participating Oil Industry Companies, 1994);
- North-west Cape Tourism Development Study (Jones Lang Wootton, 1993);
- National Ecotourism Strategy (Allcock et al., 1994);
- several oil and gas Industry formal environmental review documents; and,
- The BHP Atlas.

4.3. Methods

4.3.1. Desk-Top Research

Much of this document was prepared as a result of an extensive desk top study that included:

- bibliographic searches of on-line catalogues in a number of academic libraries;
- searches of the library of the Department of Environmental Protection (DEP) for relevant industry derived EIA documents;
- CD-ROM searches for relevant journal and magazine articles;
- liaison with relevant government agencies and government employees with publications and specific knowledge of use to the study;
- liaison with industry groups and employees with publications and specific knowledge of use to the study; and,
- incorporation of the CALM database of vertebrate fauna records from the islands of the study area.

In addition to drawing upon the wealth of available documented work in the compilation of this report, relevant experts and authorities in their respective areas were personally consulted. This ensured that the most up to date knowledge of the area and its natural resources could be incorporated into this document.

4.3.2. Workshops and Site Visits

A number of public workshops were conducted to enable the community to have input to the development of this management strategy. Workshops were held in Exmouth, Onslow, Karratha, and Port Hedland, and the outcomes of these public workshops are provided in, and have been incorporated into the current assessment.

Site visits were also conducted during the preparation of the management strategy, with locations visited including:

- Exmouth, Cape Range National Park, Ningaloo Marine Park;
- aerial surveys and site visits to the Muiron Islands, Serrurier Island and the Exmouth Gulf Islands;
- aerial surveys of Thevenard Island, Barrow Island, the Montebello Islands, and the Dampier Archipelago;
- site visits to Dampier, Karratha, Cossack, Onslow and Port Hedland;
- site visits to the islands of the Dampier Archipelago (including Dolphin, Enderby, Malus, Rosemary, Goodwyn, East and West Lewis); and,
- aerial surveys of the remaining island groups in the study area (Regnard, Mary Anne, Passage, Mangrove, etc.).

The information and observations collected during this site work have been incorporated into the findings and strategies presented in this document.

4.4. Study Area

4.4.1. Physical Environment

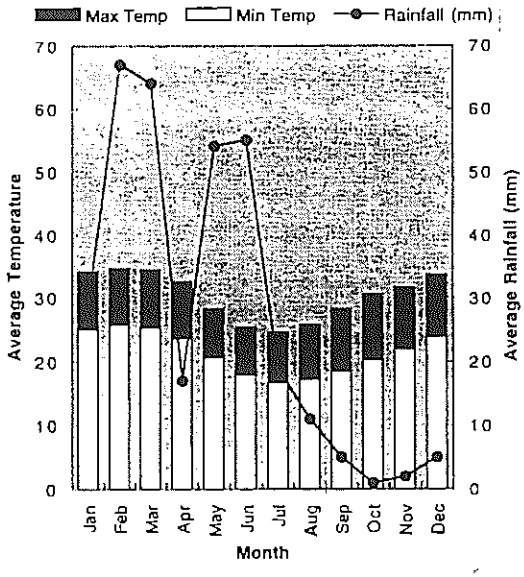
4.4.1.1. Climate

The northern portion of the study area is regarded as having a hot desert climate with low annual rainfall concentrated in the summer months (Beard, 1990; Pilbara 21 Group, 1992). The climate of the islands is equally severe, with evaporation typically exceeding rainfall throughout the year (Chittleborough, 1983). Cyclones occur sporadically during the summer months, and may

bring intense storm events that generally have a greater effect on offshore islands than the mainland.

The southern part of the study area encompassing the Exmouth Gulf. In this area the climate is moderately tropical, with the most notable feature being the high number of fine days per year (Dowling, 1993). Summer temperatures can still be extreme however (often exceeding 40°C) and cyclonic events also affect this part of the coast (Dowling, 1993). A typical profile of average annual rainfall and temperature range is given for the weather station on Barrow Island which lies roughly in the centre of the study area. As can be seen, temperatures are consistently high throughout the year, rainfall is practically nonexistent for 6 months of the year, and evaporation rates are high. Climate considerations have traditionally limited the primary tourist season from April to November (West Australian Petroleum Ltd, 1991). The monthly patterns of change in temperature and cyclone activity relative to the availability of natural assets are depicted below.

As a result of the prevailing weather pattern, freshwater is a scarce commodity throughout the region, and little or no freshwater exists naturally on any of the islands addressed by this study.



Above Figure: Weather profile for Barrow Island showing average annual rainfall (mm), minimum temperature (°C) and maximum temperature (°C) (source: Bureau of Meteorology Perth, 1995).

4.4.1.2. Geology and Soils

The major geological formation of the study area is the Rowley Shelf (CTRC, 1974; Lasmo Oil, 1990). This is comprised of marine and terrestrial sediments ranging in age from Silurian to recent. Natural gas and oil producing formations are dispersed throughout the area, and are the basis of major oil and gas industry. The extent of these resources is so great that the area may well become the largest oil and gas producer in the country over the next decade (Power, pers. comm., 1995).

The islands themselves include sand cays of various size (which are mostly mobile Pleistocene sands of marine origin), small rocky islets, and larger islands with marine sands interspersed with strata of limestone and granite outcrops. The Dampier Archipelago has a somewhat different geological makeup from the more southern of the offshore islands, with many of the islands composed of Precambrian granite and volcanic rocks (Morris, 1990). The largest rock outcrops of this nature occur on Dolphin and Enderby Islands.

4.4.1.3. Bathymetry and Oceanography

Water depths in the study area are relatively shallow, generally being in the order of 10-15m at the deepest points, and usually around 5m in the vicinity of the shores of most islands. Gradual increases in depth occur until the edge of the North-west Shelf is reached.

A detailed assessment of the oceanography and current patterns of the study area is beyond the scope of this study, but several studies provide accurate documentation of annual prevailing wind patterns (Wesminco Oil, 1985; Lasmo Oil, 1990; Western Mining Petroleum, 1990; West Australian Petroleum Ltd, 1991) and water current movement (Wesminco Oil, 1995; Western Mining Petroleum, 1990). Tides in the study area are typically semi-diurnal (i.e. two high and low tides per day) and low tides can leave people stranded in islands and make boat launching difficult (in the order of 5m) until the north-eastern limit of the study area (in the vicinity of Port Hedland) is reached. Tidal flux will need to be taken into account by future ecotourism operators to avoid difficulties with boat launching from both the islands visited and mainland ports. The potential effects of storm surge

and the limits of predicted surge zones will also need to be considered in relation to the location of infrastructure on both islands and the coast as part of the planning for ecotourism ventures that require such construction.

4.4.2. Island Groups and Single Islands

There are several main groups of islands recognised within the study area, and a number of larger islands within these groups which are important in their own right.

From Exmouth Gulf to Port Hedland, the major island groups identified by the study are:

- Exmouth Gulf Islands (Several small islands: including Eva, Y, Tent, Roberts and Doole)
- The Muiron Islands (2 islands: South, North);
- Serrurier Island group (Serrurier and several other small islands);
- Thevenard Island;
- Mangrove Islands (3 islands: South, Middle, North);
- The Great Sandy Island Nature Reserve (26 islands in total, including the Mary Anne Islands (5 islands: False, West, Large, Middle, and East) and the Passage Islands (10 islands: South, Fortescue, Mardie, Steamboat, Passage, Angle, Middle, Long, Round, and Sholl);
- Barrow Island (and several smaller surrounding islands);
- The Lowendal Islands (3 main islands: Varanus, Abutilon, Bridled);
- The Montebello Islands (3 main islands, Hermite, North, and Trimouille, and a great number of interconnected limestone and sand cays);
- The Dampier Archipelago (11 main islands and 31 smaller islands and islets. Main islands include Angel, Delambre, Dolphin, Enderby, Gidley, Intercourse (West and East), Legendre, Lewis (West and East), and Rosemary); and,
- Depuch Island (and several small islands scattered along the coast to Port Hedland).

In the instances where particular islands within groups have varying natural resources to offer, the individual islands have been identified and discussed. For some of the groups however (eg. the Mangrove Islands), the features present are essentially the same for all islands in the group.

In the latter case the natural resources and ecotourism potential are discussed for the island group as a whole.

4.5. Natural Resources

4.5.1. Introduction

The islands of the study area, and their surrounding waters, support a rich array of natural resources. Many of the areas support internationally recognised coral reefs, major turtle rookeries for protected species, and marine mammals of high conservation significance such as the dugong and several species of whale. There are a number of important seabird breeding colonies, and some of the islands support terrestrial vertebrates that have been rendered extinct or endangered on the mainland.

This diverse range of natural features means that there is great scope for potential ecotourism developments. However, a clear understanding of the biology of the natural resources is required prior to any assessment of the possible viability of future ecotourism initiatives, and to make realistic predictions of the likely impacts of tourism upon the existing environment.

4.5.2. Turtles

4.5.2.1. Species and Distributions

There are four species of marine turtle which occur within the study area, namely:

- Green turtle *Chelonia mydas;*
- Loggerhead turtle *Caretta caretta;*
- Flatback turtle *Natator depressor; and,*
- Hawksbill turtle *Eretmochelys imbricata.*

Of these species, the loggerhead is currently of special conservation status, appearing on the Schedule One list of rare and endangered fauna as "fauna which is rare or likely to become extinct" (Government of Western Australia, 1994). The species has been awarded this protection due to the serious decline in numbers world-wide including WA. Green turtles nest in large numbers in Australian waters where they are protected under the *Wildlife Conservation Act* 1950, but are

harvested overseas. The hawksbill is similarly hunted in Indonesian waters where its polished shell is highly valued.

The leatherback turtle *Dermochelys coriacea* may also be an occasional visitor to the open waters of the study area, but is not normally recorded utilising island habitats. *D. coriacea* is also listed on the WA Government's Schedule. One as "rare or likely to become extinct", for reasons similar to *C. caretta*. The species is rarely sighted within the study area and has not been considered in this document.

4.5.2.2. Foraging Activity

Diets and associated foraging behaviour varies from species to species. Green turtles are exclusively herbivorous as adults, but are omnivorous when younger. Loggerheads, flatbacks, and hawksbills are all carnivores, with dietary items including crustacea, coelenterates, sponges and molluscs (Lasmo Oil, 1990; Western Mining Petroleum, 1990; Prince pers. comm., 1994).

During daylight hours, green turtles are by far the most commonly sighted species in the study area. Individuals are frequently seen grazing in seagrass beds and over algal-turfed reefs. This species may also be commonly found basking in the shallows or even beached on many of the islands where there is little or no human disturbance.

4.5.2.3. Migration Patterns and Timing

The turtle populations that occur within the study area undertake annual patterns of migration which are only now beginning to be documented. A tagging programme operated by CALM over the last several years at Cape Range and on several of the islands of the study area has yielded a range of information on the biology of the species, and provided preliminary patterns of migration.

Green turtles first begin appearing in West Australian waters around September, and numbers gradually increase as the species enters its breeding/nesting season. Mating takes place over the next 3-4 months, and egg-laying continues from October-November through to February-March. Adults then begin their migration northwards, spending the winter months foraging in the tropical waters of Indonesia (Prince, pers. comm.,

1994). The large scale movement patterns of the other species are not fully described but are thought to be similar to those of the green turtle.

4.5.2.4. Nesting Activity

Turtle nesting behaviour has been fairly well documented in recent years (Cogger, 1983), and the green turtle is the most prolific in the study area and consequently the best known with respect to breeding biology.

Mating normally occurs offshore or occasionally in the shallows. Females typically select nesting sites based on the presence of broad sandy beaches and ease of access from the water (ie. no fringing reefs). Individuals normally begin leaving the water several hours after sunset, and may continue to do so for much of the night. Nesting behaviour basically consists of the female making her way up the beach to the foredunes, and proceeding to construct a body hole with her front and rear flippers. Once this shallow depression is complete, the hind flippers excavate a far narrower deeper hole in the floor of the body hole to act as the egg chamber.

Egg laying can continue at a gradual rate for up to an hour, with the clutch size ranging from a dozen to near a hundred (Prince, pers. comm., 1994). Once egg laying is complete, the female begins a series of stereotyped movements with her flippers to cover over the egg chamber and partially fill the body hole. After this the turtle will return to the water. An individual may return to shore and lay several clutches of eggs over a number of nights during a breeding season, and turtles will often excavate a body hole and then return to the water without laying any eggs. Hatchlings normally emerge 8-12 weeks later, and rely upon moonlight to orient themselves toward the water. Sand temperature is a determining factor in the sex of the hatchlings. The average survival rate from the egg stage to adulthood is in the order of 1%, primarily due to hatching failure, and predation by birds, foxes, ghost crabs, and fish (Prince, pers. comm., 1994). Other species present in the study area appear to have a smaller clutch size, but hatchling size is greater than for greens (Cogger, 1983). Ongoing management problems exist at Cape Range with foxes excavating turtle egg chambers to consume the eggs and predating hatchlings. This is an example of the potential

management problems that may arise from the introduction of such feral fauna to other nesting sites on the islands of the study area.

There are already ecotourism activities in the Exmouth area based on the annual nesting activity of turtles in the region. To date these have not appeared to have any discernible impact on turtle behaviour , but this may be attributed to adherence to guidelines being developed by CALM for such operations (CALM, 1992). The guidelines consist of a number of measures designed to minimise the disturbance to breeding individuals and to ensure that recruitment and use of particular breeding sites is not affected.

The essence of guidelines for approaching nesting turtles includes the following general procedures:

- small groups only;
- experienced guide;
- hooded lights and lowered voices at all times;
- not to approach turtles making their way out of the water or up the beach;
- approach turtles from the rear after they have established body hole and remain quiet until laying begins;
- take an egg count;
- record all available information (behaviour, species, tag no. if tagged, etc.);
- pass any collected data on to CALM.

4.5.3. Whales and Other Cetaceans

4.5.3.1. Species and Distributions

A range of marine mammals occur in the waters of the study area, some being seasonal visitors, while others occur at low density all year round. The most commonly observed species in the study area include:

- Humpback Whale *Megaptera novaeangliae;*
- Blue Whale *Balaenoptera musculus;*

- Sperm Whale *Physeter macrocephalus;*
- Killer Whale *Orcinus orca;*
- False Killer Whale *Pseudorca crassidens;*
- Minke Whales *Balaenoptera acutorostrata;*
- Bottlenose Dolphin *Tursiops truncatus;*
- Common Dolphin *Delphinus delphus; and,*
- Rough-toothed Dolphin *Steno bredanensis.*

All cetaceans are protected by the *Whale Protection Act* 1980, which prohibits the capture, killing, injuring or otherwise interfering with, of cetaceans within the Australian Fishing Zone (ie. to the 200 nautical mile limit). The same act also prohibits any similar actions by Australian citizens anywhere else in the world (Tucker and Puddicombe, 1988). In addition to this legislation, whales off the west coast of Australia are afforded further protection by the International Whaling Commission's Indian Ocean Sanctuary as an area where commercial whaling activity is prohibited until 1999 (Tucker and Puddicombe, 1988; Osmond, pers. comm., 1995). The humpback, blue and sperm whales also appear on Schedule One of the West Australian Government's rare and endangered fauna protection legislation (Government of Western Australia, 1994).

4.5.3.2. Migration Patterns and Timing

Whilst a number of species of whale occur along the north West Australian coast, the most commonly sighted is the humpback whale *Megaptera novaeangliae*. This species undertakes a cyclical annual migration that passes along the north-west shelf twice a year. It is around this species' migratory habits that a significant whale-watching industry has developed in Perth metropolitan waters, and it is this species that is primarily addressed here.

Humpbacks forage and breed in Antarctic waters during the summer and autumn months, then begin migrating north along the coast during the winter, heading to warmer tropical waters where calving takes place (Winn and Reichley, 1985). During this northerly journey adults are not thought to feed, but rather subsist on fat reserves accumulated in southern waters. The peak of this northerly migration occurs around June-July, while the southerly return migration seems to peak around September-October (Western Mining Petroleum, 1990), but whales could be

seen along the coast any time from April to December (Jenner, pers. comm., 1995; Osmond, pers. comm., 1995). It is thought that calving generally takes place in August to the north of the study area, in an area roughly bounded by Cape Leveque, Adelie Island, and Collier Bay (Jenner, pers. comm., 1995). The commencement of the migration can vary annually by as much as two weeks, and the animals seem to travel in "pulses", with a large pod passing through an area, followed by a drop in numbers, then a subsequent large group (Osmond, pers. comm., 1995). Pregnant females seem to be the last to leave Antarctic waters.

The humpbacks do not appear to follow any strictly defined route through the islands of the study area, but they tend to occur further off shore than they do closer to Perth waters (Jenner, pers. comm., 1995). The whales are not inclined to travel into deeper waters during these migrations however, and generally stay over the north-west shelf. The passage of the animals seems to consist of a 15-20 km north-south band through the study area, as far out as the Montebello Islands, and tending to appear closer in to the outer islands of the Dampier Archipelago during the southern migration (Osmond, pers. comm., 1995). Whales and other cetaceans are also often seen off the coast of Barrow Island (Butler, 1989).

Current estimates place the size of the population that passes the West Australian coast in the order of 4000 individuals (Jenner, pers. comm., 1995). The abundance of the passing whales is certainly sufficient to support whale-watching ventures of the type currently operating in the Perth metropolitan area, but such ventures are costly to establish, and the extent of the demand in the Pilbara/Gascoyne region has been questioned (Osmond, pers. comm., 1995). It should also be noted that whale-watching operations in the Dampier Archipelago would likely require an initial journey of approximately 2 hours to reach the waters where the whales are most common (Jenner, pers. comm., 1995), and so full day or several day excursions may be more practical than the half-day tours run in Perth waters. Excursions to the islands further offshore, such as Barrow or the Montebello Islands, would certainly require extended trips to ensure whales are seen and to allow for satisfactory viewing time.

The whale-watching ventures currently active in Perth metropolitan waters operate subject to a number of regulations laid down by CALM regarding the minimum distance that they may approach whales, number of vessels in the vicinity of a pod, and other constraints. These are based on the guidelines recommended by the National Parks and Wildlife Service (ANPWS, 1989). Some concern is already being expressed as to the affect that whale-watching excursions may be having on the behaviour of the animals (Dalton and Isaacs, 1989). If gradual behavioural modification could be demonstrated to be taking place a result of the proximity of whale-watching vessels, then additional future restrictions may well be put in place.

4.5.4. Dugongs

The dugong *Dugong dugon* is a marine mammal that belongs to the order Sirenia. They have the general appearance of a rotund dolphin, and occur along several stretches of the Western Australian coast. The species has a distribution that covers the tropical and sub-tropical waters of the Indo-Pacific region (Nishiwaki and Marsh, 1985). The dugong is listed on CALM' s Schedule of Rare and Endangered Species as Schedule 4 as "...otherwise in need of special protection." (Government of Western Australia, 1994), and is regarded on an international scale in the IUCN Red Data Book as "vulnerable to the point of extinction" (Thornbeck and Jenkins, 1982).

Dugongs are exclusively herbivorous, and spend much of their time grazing on dense beds of seagrass. Preferred species appear to include *Halophila* and *Halodule* spp., and other seagrass with comparatively small blade morphology (Marsh, 1988; Kendrick, pers. comm., 1994), but the species also commonly grazes on *Amphibola, Zostera,* and *Thalassia* (Nishiwaki and Marsh, 1985; Marsh, 1988). Dugongs grazing in areas where the smaller-leaved seagrasses dominate exhibit a tendency to uproot the entire plant, resulting in a distinctive sediment plume which can be used to locate foraging groups (Nishiwaki and Marsh, 1985; Marsh, 1988; Prince, pers. comm., 1995).

The behaviour of dugongs is poorly described, primarily due to the difficulties associated with viewing them underwater (Marsh, 1988). They tend to be found in silty water and can be reluctant to let humans approach too closely (Kendrick, pers. comm., 1995; Prince, pers. comm., 1994). However, other reports indicate that dugongs that have not been harassed or hunted exhibit curiosity towards divers and swimmers and

can be readily photographed underwater (Henisohn, 1985; Anderson, 1979). While dugongs can attain speed of up to 18km/hr, most movement is at a far more leisurely pace, roughly equivalent to that of a fin-equipped swimmer (Anderson, 1979). Greatest underwater visibility in the waters of the study area typically occurs during neap tides (Kendrick, pers. comm., 1995), which is also likely to coincide with dugong foraging peaks.

The only social behaviour that is accurately documented is the bonding of mother and calf, which normally lasts for at least 12 months after the calf's birth (Nishiwaki and Marsh, 1985; Heinsohn, 1985). It is not known whether the herd formations are a cohesive social unit, or are simple feeding driven aggregations. There is anecdotal evidence from Aboriginal hunters that large, old males act as "whistlers" keeping the herd together, but these reports are yet to be substantiated (Nishiwaki and Marsh, 1985; Marsh, 1988). Females usually only give birth to one calf, and the gestation period is in the order of 12 months, so recruitment is a slow process.

Local movement of dugongs appears to be governed mainly by tidal flux (daily movement), weather conditions, and levels of human activity. The preferred habitat of the species is comparatively shallow waters supporting the dense beds of seagrass needed as a foraging resource. Dugongs appear to forage diurnally in areas where there is not consistent human disturbance, and they prefer more sheltered bays over exposed areas (Anderson, 1979; Nishiwaki and Marsh, 1985). There is some evidence of seasonal movement within Shark Bay (Anderson, 1986), but if there is any such movement within the study area it has not to date been documented. Exmouth Gulf is recognised as supporting a significant dugong population, with one survey recording 138 individuals in the area (Prince et al., 1979; Marsh, 1988). Dugongs are also sighted regularly around a number of other islands in the study area (Butler, 1970; Butler, 1989; Hadson Energy, 1990; Hadson Energy et al., 1994; Kendrick pers. comm., 1995).

To date, the dugong does not appear to have been the focus of any specific ecotourism ventures. The species has innate appeal with its unusual appearance and placid nature, but may prove difficult to exploit for tourist excursions due to its preference for waters of varying visibility, and occasionally timid behaviour. Nonetheless, it is a species of international conservation significance, and the populations present along the Australian coast are regarded as the largest and best protected remaining in the world (Marsh, 1979). In addition, they are typically

observed near to shore or just off the coast of islands within the study area, so extended periods of travel would not be required to reach the most likely locations for dugong sightings (cf. humpback whales in Section 4.5.3). Issues relating to the current rights of indigenous people to hunt dugongs by traditional methods may have to be considered in relation to any future ecotourism activities.

While the species may not be likely to represent a major ecotourism drawcard in its own right, it is relatively common and widespread in appropriate habitats within the study area, and certainly increases the natural attraction of the islands near to which it occurs.

4.5.5. Whale Sharks

The Whale Shark *Rhinodon typus* is already the subject of a significant ecotourism industry at Ningaloo Marine Park to the immediate south-west of the study area. Whale Sharks aggregate on the periphery of the reef that fringes the park in March-June each year (Taylor, 1990b; May, et al., 1989; Hadson Energy, et al., 1994), and are popular with tourists due to their great size (up to 13 m in length), placid nature, and slow speed. CALM granted conditional licences to 15 charter boat operators in 1994 (Thomson and Stevens, 1994), to enable visitors to the area to view and dive with individuals of the species. In Australian waters, *R. typus* is a protected species under the *Wildlife Conservation Act* 1950.

Most aspects of the biology of this species are not fully understood, and much of the information presented here relies on current beliefs on the species' behaviour and ecology. There seems to be a strong link between the appearance of the whale sharks, and the occurrence of the coral mass spawning phenomenon in mid-April and the associated surge in biomass of reef organisms (Taylor, 1990a; Thomson and Stevens, 1994; Stevens, pers. comm., 1995). Whale sharks also appear to aggregate in areas of upwelling or gaps in the reef (Osborne pers comm., 1995; Kendrick pers comm., 1995). Thus it is currently thought to be primarily foraging requirements and related stimuli that are responsible for the annual aggregation. The movement patterns of the whale shark during the remainder of the year are also poorly understood. Current research has included the tagging of several individuals in the autumn of 1994 with data loggers to measure diving depth, water temperature, and take periodic satellite position readings (Stevens, pers. comm., 1995). It is hoped that this and further research currently being conducted by

Murdoch University and CALM, will refine the patchy state of the knowledge of whale shark biology.

From available information, it appears that the whale shark is at best an infrequent visitor to the study area. The only existing records are of an anecdotal nature from occasional sightings in Exmouth Gulf. There is however, no reason why the species might not occur in the area (Stevens, pers. comm., 1995), but lack of comprehensive survey work to date means that the species' regional distribution and abundance is not well documented. Individuals have been recorded as far north as the Montebello Islands (Power, per. comm., 1995). It seems unlikely though, that there are aggregations of sufficient size and predictability occurring within the study area to support ecotourism ventures similar to those currently active at Ningaloo.

4.5.6. Coral Reefs

Almost all of the islands of the study area have some degree of coral reef associated with them. The geological origin of the vast majority of the islands is from Pleistocene reef deposits, and fringing reefs of varying extent and condition are extant in the vicinity of most groups. Specific compositions of the coral communities are discussed in detail in a number of documents (Veron and Marsh, 1988; Lasmo Oil, 1990; Western Mining Oil, 1990), including hard and soft corals, macroalgae, a range of soft-bodied invertebrates, and numerous marine molluscs and reef-associated fish species. The better reefs support diverse coral communities, with the Dampier Archipelago boasting 216 species of hermatypic coral (MPRSWG, 1994).

Given the widespread nature of coral formations within the study area, an effort has been made to focus on the areas of greatest diversity, largest extent, best condition, and recognised excellence for diving or snorkelling.

The best reefs in the study area are at least the equal of those present in the Great Barrier Reef Marine Park on the east coast of Australia. Like Ningaloo Marine Park, to the immediate south-west of the study area, the reefs are in some respects a superior resource for ecotourism than the reefs of the Great Barrier as far less travel is typically involved in reaching them.

Good condition, high diversity, extensive reefs occur off the shores of:

- Montebello Islands (Burbidge, A.A, 1971; Power, pers. comm., 1995);
- Barrow Island (Butler, 1971; Burbidge A.A., 1985);
- Ashburton (Hadson et al., 1994);
- Delambre (Dampier Archipelago) (Morris, 1990);
- Eaglehawk (Dampier Archipelago) (Woodside, 1992);
- Legendre (Dampier Archipelago) (Woodside, 1992);
- Conzinc (Dampier Archipelago) (Morris, 1990);
- Enderby (Dampier Archipelago) (Morris, 1990);
- Direction (West Australian Petroleum, 1991);
- Locker (West Australian Petroleum, 1991);
- Muiron Islands (Lasmo Oil, 1990);
- Serrurier (Lasmo Oil, 1990; Western Mining Petroleum, 1990);
- Thevenard (Lasmo Oil, 1990; West Australian Petroleum, 1991); and,
- Tortoise (Hadson et al., 1994; Wesminco, 1990).

4.5.6.1. Mass Coral Spawning

Mass coral spawning occurs over a period of approximately 3 nights after the full moon in March (Simpson and Masini, 1986). Other marine organisms on the reef have been found to also coincide their spawning with that of the coral. Large numbers of low and higher order predators are usually present in high numbers to take advantage of this synchronous spawning and the resultant glut of food.

Good potential exists for dive charters in a number of places to observe this phenomenon, and several operations area already active at Ningaloo. Mass spawning of coral has also been documented in the Dampier Archipelago (Simpson, 1985), and serves as a highlight for potential ecotourism ventures centred around coral reef snorkelling and diving. It should be noted that spawning activity by coral and other marine invertebrates can also take place at a much lower level during the remainder of the year.

4.5.7. Shipwrecks

The waters of the study area have been the scene of numerous maritime disasters during the history of European activity in Western Australia. This has primarily stemmed from the summer cyclone and tropical storm activity that still results in the loss of vessels today. The locations of

many of these shipwrecks are not known, and the remains of many have been scattered over wide distances. Wrecks form an ideal habitat and settlement resource for marine communities, and make for attractive dive locations with both natural history and cultural interests.

The shipwrecks known to have gone down in the waters of the study area include:

- *Tryal* (1622): this is the oldest known shipwreck in Australia. The British cargo vessel *Tryal* ran aground in 1622 on the reef now known as Trial Rocks to the north of the Montebello Islands.
- *Ariel* (1867): a pearl lugger- wrecked in the vicinity of Locker Island and the Ashburton River in 1867.
- *Wild Wave* (1873): ran aground on reefs off the southwest of the Montebello Islands in 1873.
- *Sea Spray* (1873): this was the largest pearling vessel in WA at the time and was wrecked in 1873, northwest of Port Hedland, due north of Downes Island. There is also the wreck of an unnamed pearling boat immediately north of Port Hedland that went down at about the same time.
- *Melanie* (1870) 133 ton schooner lost during storms in 1870 off the west coast of Depuch Island. Depuch has been the scene of several wrecks, with the pearling vessels *Chip* and *Young Victorian*, both lost there during a cyclone in 1878. Two other vessels the *Crown of England* (1912) and the *SS Edystone* (1894) also went down in the waters off Depuch.
- There have been many wrecks in Exmouth Gulf, mostly pearl luggers that sunk during severe cyclones in 1875, including the *Lily of the Wake, Ariel, Fairy Queen, Blossom*, and the *Wild Wave*. There is also a relatively recent wreck of a prawn trawler on the south side of Y island.
- *Minny* (1872): a pearling vessel wrecked on Fortescue Island in 1872.
- There have been numerous wrecks in the vicinity of Cossack and the Dampier Archipelago, mostly of pearling vessels that went down during a severe cyclone that hit the northwest in 1879. Wrecks known from the area include *Industry* (1879), *Nautilus* (1868), and *Rosette* (1879). There are also two war time wrecks of a catalina flying boat and a 30 ton yacht on Enderby Island, and other war time artefacts in the waters surrounding Malus Island. The wreck of a barge off the west tip of Eaglehawk Island is a known spot for good diving.

(Sources: Henderson, 1980; Henderson, 1988; Morris, 1990; Woodside, 1992; WA Maritime Museum, 1995).

All shipwrecks in Australian waters are protected under the State *Maritime Archaeology Act* 1973 and the Federal *Historic Shipwrecks Act* 1976, making it an offence to disturb them.

There was also a flying boat base at Malus Island and there are remains of one craft.

4.5.8. Recreational Fishing

The tropical and sub-tropical coastal waters of the North-west Shelf are rich in fish life, and are well recognised as being of excellent amateur and game fishing potential. Near shore fishing, from small boat or the beach, yields a wide range of species, while most game fishing expeditions typically take place further out to sea (Lasmo Oil, 1990). Game fishing expos are organised annually, operating out of the coastal towns of the study area.

4.5.8.1. Common Species

An exhaustive inventory of all the fish species that may be found within the study area is beyond the scope of this document. However, there some excellent guidebooks available that detail identification of the many species of fish occurring in the region (see Woodside, 1986, 1989 and 1992; Allen and Swainston, 1988).

Some of the fish species that are commonly caught while shore fishing in the study area include:

- North-west Schnapper, several species of Trevally, Flathead, Dart, Thread-fin Salmon, Red Emperor, Bluebone, several species of trout and cod, Mangrove Jack and Flounder (Woodside, 1986; Lasmo Oil, 1990; Western Mining Petroleum, 1990; Woodside, 1992)

Some of the fish species that are commonly caught while deep-water or game fishing include;

- Barracuda, Sailfish, Cobia, several species of Marlin, Bluefin Tuna, Barramundi, Spangled Emperor, several species of

Shark, and Spanish Mackerel (Woodside, 1989; Lasmo Oil, 1990; Western Mining Petroleum, 1990),.

The existing game fishing ventures operating in the region revolve around a season that runs from late October to early February, with a peak in December-January (Western Mining Petroleum, 1990; Woodside, 1992).

4.5.8.2. Established Recreational Fishing Areas

The situation with respect to fishing in the study area is somewhat similar to that for coral reef snorkelling and diving. The waters of almost all of the islands within the scope of the study could yield good results from recreational fishing. Again, only a selection of the better known and best locations have been discussed here.

There are several excellent fishing locations in the Dampier Archipelago, particularly in the area between Rosemary, Kendrew and Goodwyn Islands, around Eaglehawk Island, in the area around Brigadier and Lady Nora Islands, and in and along Searipple Passage out to the vicinity of the natural gas pipeline (Woodside, 1986 and 1992). Other recognised areas for good fishing include off the Murion Islands, and further out to sea where extensive game fishing ventures currently operate out of Exmouth. The near-shore waters off Onslow, and around Thevenard Island are also well exploited for recreational fishing (Lasmo Oil, 1990). Exmouth Gulf is another common area for recreational fishing activities.

It should be noted that several areas within the region have been identified as proposed marine parks (MPRSWG, 1994), and the status of these areas, and regulations relating to fishing, may be subject to future change.

4.5.8.3. Fishing Regulations

Regulations apply to recreational fishing in West Australian waters as per the recommendations of the Recreational Fishing Advisory Committee and new regulations are detailed in July 1995 Fisheries Department brochures. This committee has the ongoing role of advising the Minister for Fisheries on matters

relating to recreational fishing such as bag limits, licence fees, and how management funds should be spent (Woodside, 1992).

There is no requirement for a licence for amateur line angling, but a licence is required for the taking of fin fish by netting ($15). Tropical Rock Lobsters are also available on many of the reefs within the study area, but their collection is also subject to fisheries licence requirements. All other recreational fishing is still subject to the bag limits, closed seasons, and size restrictions for each individual species as defined by the Western Australian Fisheries Department (Fisheries Department of WA, 1989). There are specific bag limits for Ningaloo Marine Park and domestic freezer limits in Exmouth.

Increased visitation to the study area is likely to mean increased pressure on fish populations that are already under exploitation. Ongoing monitoring by the Fisheries Department will be need to assess any depletion in stocks, with a view to revising licensing, closed seasons, and bag limits.

4.5.9. Commercial Fishing Zones

There are a number of commercial fisheries operations currently active in different parts of the study area, but these should have little bearing on the majority of future ecotourism ventures. Increase in fishing pressure from recreational level fishing is likely to be minor on the scale of tonnage of commercial fin fishing operations involve. Considerations may need to be given to the location of prawn and fish nurseries in the planning and environmental impact assessment of any future proposals however, to ensure that the long-term sustainability of the fishery industry in the area is not adversely affected. The life cycle of commercially important prawn species is documented in detail in a number of other publications (Wesminco Oil, 1985; Western Mining Petroleum, 1990; Lasmo Oil, 1990).

There are commercial Prawn Fishery and Wetline Fishery Zones defined in the vicinity of Onslow and Exmouth Gulf and modest size prawning and fin fishery fleets operate out of both ports. There are also a number of aquaculture operations active in the area (see Section 4.5.10).

4.5.10. Aquaculture

There are a number of locations within the study area where aquaculture ventures are established and there are several more proposed. The primary areas of importance with respect to aquaculture within the study area are:

- Exmouth Gulf

  There are several existing pearl culture operations in Exmouth Gulf, and a number of proposed new aquaculture ventures on the eastern margin of the Gulf (eg. adjacent Tent Island).

- Dampier Archipelago

  The Dampier Archipelago is the site of the highest concentration of aquaculture activity in the study area. The particular areas of focus for current and proposed aquaculture ventures within the Archipelago are in the vicinity of West Lewis Island, in the channel between West and East Lewis Islands, and off the shore of Enderby Island. There is an existing pearl culture operation in Flying Foam Passage with support infrastructure established on the " B" Class Nature Reserve Dolphin Island. Another aquaculture venture has been granted a licence for infrastructure on West Lewis Island.

- Montebello Islands

  There are two existing pearl culture operations in the sheltered bays of the Montebello Islands, but this area does not appear to be the focus of any imminent increases in aquaculture activity. One pearl culture operation has infrastructure on Hermite Island.

These areas have the greatest likelihood of supporting aquaculture operations because they have the physical requirements that favour such ventures. ie. they are well sheltered from high wave energy at all times of the year, have relatively shallow water, and constitute a favourable natural environment for the species to be cultured.

There are several other aspects of the operation of aquaculture ventures in the study area that may have implications for future ecotourism in the area.

Some aquaculture operations may be able to justify land-based support facilities for their activities. This may be more likely to be pursued in areas of higher concentration of aquaculture activities (eg. the Lewis Islands). There is the possibility that an area might be set aside on some of the less sensitive islands to provide infrastructure needs to support both aquaculture and future ecotourism operators. It should be noted however, that islands that have been identified as being too ecologically sensitive to be open to ecotourism activities should also be excluded from use by aquaculture ventures.

Some aquaculture operations (eg. pearl culture) have to operate within certain geographical exclusion buffers. This is related to the risk of parasite and disease spread amongst cultured species, and should not have any real bearing on ecotourism operations.

Currently, aquaculture operators receive a renewable licence to conduct their operations in a certain area of water on a specific species. Legislative changes that are currently in process may alter this to allow the option for a 21 year lease hold arrangement to be taken up over the waters where the operation is to be carried out, similar to a pastoral lease. This may give the aquaculture operator the authority to exclude anyone else from the waters of the lease (including adjacent or visiting ecotourism operators), as the water effectively becomes their property under lease. As such, aquaculture operations may well represent a constraint to ecotourism as a competing land/water-use. It should also be noted that any new aquaculture proposals will initially be subject to clearance under the *Native Title Act* 1994.

4.5.11. Seabirds

4.5.11.1. Species

Twenty-nine species of seabird regularly breed on the islands of the study area, 20 of which breed on islands only (Burbidge, 1985). There are numerous other species that are transitory visitors and migrants, including a number of waders protected by international conservation agreements (Simpson and Day, 1984; CALM, 1994). The islands of the study area represent an essential breeding and habitat resource for these species.

Bird watching has long been a popular past-time for those interested in ecology. The islands of the study area have great

potential for 'photo-safaris' and bird spotting expeditions, as well as casual bird watching whilst visiting islands. However this must be tempered with the consideration that many seabird species are particularly sensitive to disturbance during breeding periods. In light of this, a number of major seabird breeding sites, such as Goodwyn Island, Lady Nora Island, Brigadier Island and Elphick Knob in the Dampier Archipelago, are Special Conservation Zones, and access is not permitted at any time (Morris, 1990).

Careful management and well planned operational guidelines will be required to ensure that seabird breeding or foraging behaviour is not altered by any future ecotourism ventures focussing on them. Measures that might be included in such guidelines include:

- limiting number of observers and commercial operators;
- education of visitors and operators;
- licensing of operators;
- utilising revenue from licensing of operators to support management and policing of management guidelines;
- imposing "closed seasons" for bird watching, and retaining no access conservation areas; and,
- ongoing monitoring of bird populations to ensure that disturbance is not affecting recruitment.

4.5.11.2. Nesting and Foraging Activity

The breeding season of the seabirds of the study area varies somewhat from species to species, but most have a breeding season that commences in August-September and continues through until January-February (Simpson and Day, 1988). A detailed breakdown of the breeding activity of the major seabird species occurring in the study area is presented in Table 4.1. During this period birds may be very sensitive to human presence, with species such as fairy and bridled terns, pied cormorants, and the Australian pelican being particularly flighty. Continued disturbance can result in increased chick mortality or potential displacement of species from optimum breeding sites.

Table4.1: Breeding seasons for various species of seabirds utilising islands in the study area (sources: Simpson and Day, 1984; Morris, 1990; Todde and Tiddeman, 1984).

Legend

: non-breeding period

: some breeding activity

: peak breeding season

Species		January	February	March	April	May	June	July	August	September	October	November	December
Wedge-tailed Shear	*Puffinus pacificus*												
Australian Pelican	*Pelecanus conspicullatu*												
Masked Booby	*Sula dactylatra*												
Brown Booby	*Sula leucogaster*												
Pied Cormorant	*Phalacrocorax varius*												
Little Pied Cormoran	*Phalacrocorax melanole*												
Least Frigatebird	*Fregata ariel*												
Eastern Reef Egret	*Ardea sacra*												
Osprey	*Pandion haliaetus*												
Brahminy Kite	*Milvus indus*												
White-bellied Sea Ea	*Haliaeetus leucogaster*												
Pied Oystercatcher	*Haematopus ostralegus*												
Sooty Oystercatcher	*Haematopus fuliginosus*												
Silver Gull	*Larus novaehollandiae*												
Caspian Tern	*Sterna caspia*												
Roseate Tern	*Sterna dougallii*												
Fairy Tern	*Sterna nereis*												
Bridled Tern	*Sterna anaethetus*												
Crested Tern	*Sterna bergii*												
Common Noddy	*Anous stolidus*												

Ground-nesting species such as wedge-tailed shearwaters can be particularly prone to impact from human visitors to breeding sites, with collapsed burrows, egg destruction, and chick death likely to occur. Human presence on islands can also result in unnatural increases in the abundance of some seabird species, particularly silver gulls (see Section 4.5.11.1), resulting in other seabird species being displaced from preferred breeding sites by super-abundant gull populations.

The foraging behaviour of seabirds can be very interesting to observe, including the power-diving behaviour of several tern species, ospreys and white-breasted sea-eagles capturing large fish with their talons, and the shoreline foraging of pied oyster-catchers. Such bird behaviour observations may be facilitated by measures such as the construction of bird hides, walkways through mangroves, and bird-watching expeditions with an experienced guide.

4.5.12. Other Fauna

4.5.12.1. Terrestrial Fauna

The islands of the study area are good examples of the outcomes of island biogeography. Many of the islands have fauna populations that have differentiated significantly from populations of the same species on the mainland. Several of the islands support species that are endangered, or even extinct on the mainland. As such they are regarded as "last refuges" or "possible last chance" holding pens for species under threat on the mainland. Seabird populations in the study area are addressed in Section 4.5.11, so only wildlife of the islands' interiors will be discussed here.

Barrow Island is the outstanding example from the islands of the study area (see Table 4.2). The island supports no less than 14 species of mammals, 5 of which are subspecies that only occur on Barrow or the small islands adjacent, and is the most mammal rich island off the coast of Western Australia (Butler, 1970).

Table 4.2: Fauna species of interest occurring on the islands of the study area.

Island	Species	Common Name
Airlie	*Ctenotus Angusticeps*	
Alpha (Montebellos)	*Hydromys chrysogaster*	Water Rat
Angel (Dampier Arch.)	*Rattus tunneyi*	Pale Field-rat
Barrow	*Bettongia lesueur* *Hydromys chrysogaster* *Isoodon auratus barrowensis* *Lagorochestes conspicillatus* *Macropus robustus isabellinus* *Malurus leucopterus leucopterus* *Petrogale lateralis* *Planigale maculata* *Psuedantechinus macdonellensis* *Psuedomys nanus* *Trichosurus arnhemensis* *Zyzomys argurus*	Burrowing Bettong Water Rat Golden Bandicoot Spectacled Hare wallaby Barrow Island Euro Black&white Fairy-wren Black-footed Rock wallaby Common Planigale Fat-tailed Antechinus Western Chestnut Mouse Northern Brush-tail Possum Northern Rock Rat
Boodie (Barrow Group)	*Bettongia Lesueur*	Burrowing Betong
Boomerang (Barrow Group)	*Bettongia lesueur* *Hydromys chrysogaster* *Trichosurus arnhemensis*	Burrowing Bettong Water Rat Northern Brush-tail Possum
Depuch	*Hydromys chrysogaster* *Petrogale lateralis*	Water Rat Black-footed Rock Wallaby
Dixon	*Macropus robustus* *Pseudomys hermannsburgensis*	Euro Sandy Inland Mouse
Dolphin (Dampier Arch.)	*Dasyurus hallucatus* *Morelia olivacea barroni* *Petrogale rothschildi* *Rattus tunneyi* *Zyzomys argurus*	Northern Native Cat Pilbara Olive Python Rothschild's Rock Wallaby Pale Field-rat Northern Rock Rat
Doole (Exmouth Gulf)	*Psuedomys fieldi*	Shark Bay Mouse
East Lewis (Dampier Arch)	*Rattus tunneyi*	Pale Field-rat
Enderby (Dampier Arch.)	*Petrogale rothschildi* *Rattus tunneyi* *Zyzomys argurus*	Rothschild's Rock Wallaby Pale Field-rat Northern Rock Rat
Fortescue	*Rattos Tunneyi*	Pale Field Rat
Gidley, Hauy, Keast, Malus (Dampier Arch.)	*Rattus tunneyi*	Pale Field-rat
Hermite (Montebellos)	*Aprasia rostrata rostrata* *Hydromys chrysogaster*	Legless Lizard Water Rat
Kendrew(Dampier Arch)	*Zyzomys argurus*	Northern Rock Rat
Middle (Barrow Group)	*Isodon Auratus*	Golden Bandicoot

Island	Species	Common Name
Rosemary (Dampier Arch.)	*Petrogale rothschildi* *Hydromys chrysogaster* *Zyzomys argurus*	Rothschild's Rock Wallaby Water Rat Northern Rock Rat
Sholl	*Psuedomys Nanus* *Tiliqua Multifasciata*	Western Chestnut Mouse Northern Blue-tongue Lizard
Simpson (Exmouth Gulf)	*Macropus robustus*	Euro
Thevenard	*Leggadina lakedownensis*	Thevenard Mouse
West Lewis (Dampier Arch.)	*Petrogale rothschildi* *Rattus tunneyi*	Rothschild's Rock Wallaby Pale Field-rat

(Sources: Burbidge, 1985; Morris, 1990; CALM, 1994)

The fauna of special significance on Barrow Island includes:

- Golden Bandicoot *Isoodon auratus barrowensis;*
- Spectacled Hare-wallaby *Lagorochestes conspicillatus;*
- Burrowing Bettong *Bettongia lesuer;* and,
- Barrow Island Black-and-white Fairy-wren *Malurus leucopterus leucopterus.*
- Barrow Island Euro *Macropus robustus isabellinus;*

All of the above are listed on Schedule One of Western Australia's rare and endangered fauna legislation (Government of Western Australia, 1994). In addition to these species of particular note, the island also supports several other mammal species, a diverse bird (Johnstone, 1972) and reptile (Johnstone, 1974) fauna, and cave fauna of international significance (see Section 4.5.12.2)

While none of the other islands of the study area can claim such a diverse community of terrestrial vertebrates, several of the islands still support terrestrial wildlife of particular note (see Table 4.2).

Feral cats, rats and mice have invaded many of the islands, in most cases resulting in the decline or extinction of native species present there (Burbidge, 1971; Burbidge, 1985; Morris, 1990). They have been subsequently eradicated in a number of islands (CALM, 1994), and this is an essential first step if existing native fauna populations on these compromised islands are to be preserved and re-introductions of other species contemplated. Prevention of feral fauna establishing themselves on islands in the first place is preferable to after the fact management (see Section 4.7.4.9)

4.5.12.2. Cave Fauna

Recent research work conducted by the W.A Museum has uncovered the existence of a cave fauna of international conservation significance and academic interest in caves beneath Barrow Island. A number of species of vertebrate and invertebrate troglobitic fauna have been recorded, several of which represent not just only new species, but unique classes (Humphries, pers. comm., 1995). The cave fauna in general is a relict rainforest fauna that had its origins some 60, 000 years ago when rainforest existed over the study area. Similar troglobitic West Australian species have already been placed on Schedule One of rare and endangered fauna, and it is only a matter of time before the species identified from Barrow are also similarly protected.

Two varieties of cave exist beneath Barrow: those with connections to the ocean, and freshwater caves linked only to groundwater. The latter are normally totally inaccessible, due to up to 30 m of intervening rock strata, but some of the sea-linked caves have better access. There have been similar finds of troglobitic fauna in caves on the mainland within the Cape Range National Park (Humphries et al., 1989), and there is no reason why such fauna might not exist in caves beneath any of a number of other islands within the study area (Humphries, pers. comm., 1995). However, lack of survey work to date means the distribution of this unusual fauna is very poorly known. It has been noted that the only known island with potential access to cave fauna populations is Barrow Island, and that practical difficulties are likely to exist with respect to restricted visitor access to the island due to the oil industry activities operated there by WAPET (see Section 4.8.3).

4.5.12.3. Dangerous Fauna

There are a variety of fauna species that occur in the study area which have the potential to be dangerous to people. For the most part these are marine organisms such as Rays, the Blue-ringed Octopus, Lion Fish, Cone Shells, Sea Snakes, Stonefish, and Sharks. Several species of venomous land snakes occur in the study area, but many of the offshore islands are snake free.

All future ecotourism ventures should be well informed with respect to these potential threats, and take the possibility of encountering dangerous fauna into account by providing for adequate first aid and emergency communications facilities.

4.5.13. Mangroves and Other Flora

There are small stands of mangroves on the Montebello Islands (Kendrick pers. comm., 1995; Power, pers. comm., 1995), and extensive areas on the Mangrove Island group. These are typically composed of a *Rhizophora stylosa* and *Avicennia marina* association. Mangrove communities are otherwise scarce on islands in the study area, but are relatively common along the adjacent coast. Mangrove stands are of importance in local ecosystems due to their role of nutrient contribution, and they provide a habitat resource for many species (such as Mangrove Golden Whistlers, Brahminy Kites, Mangrove Robins, and Mud Crabs), some of which rely exclusively on mangroves to survive. The ecotourism appeal of mangroves may be somewhat limited. The normally high humidity and temperature combined with biting midges and deep mud can make them unpleasant environments to visit. Nonetheless, the provision of bird hides or walkways to minimise impacts on the local ecosystems, in conjunction with educational displays may increase the visitor's appreciation of the value of this plant community. The Mangrove Bay bird watching/observation platform (near Exmouth) is very popular.

In general, vegetation associations and the floristic composition of plant assemblages on the islands of the study area reflect the dominant vegetation types of the region. The vegetation of the islands is primarily comprised of *Triodia angustifolia* and *Triodia pungens* spinifex/*Acacia* dominated associations in the interior of the islands (Beard, 1990), and more coastal elements near to shore. Several species of *Eucalyptus* occur on the larger islands, particularly in the Dampier Archipelago (Morris, 1990), and some of these support much more diverse plant communities. Most of the smaller and sand cay islands within study area are dominated by coastal associations including species such as *Spinifex longifolius*, *Myoporum acuminatum* and *Acanthocarpus preissi*. Two weed species have become naturalised on many islands (buffel and Kapok bush).

Dolphin Island has the most species rich flora of the Dampier Archipelago, with over 157 species recorded (Morris, 1990). The flora of Barrow Island is species rich also, consisting of coastal and arid elements (Buckley, 1983). Barrow has been affected by fires several times since settlement, but appears to recover relatively quickly after fire, with regeneration from root-stock, epicaudal shoots, or seed. However, the native vegetation of the island appears to be far slower in recovering from clearing (Buckley, 1983).

4.5.14. Palaeontology

Recent fossil finds on Barrow Island have highlighted the importance of this island for palaeontological research. The fossil deposits, found by the WA Museum, were of mammal remains from the late Tertiary period (some 60,000 years ago) (Aplin, pers. comm., 1995). Significant marine fossil deposits are also present. Similar finds have been discovered in caves in the Cape Range National Park to the south of the study area. Palaeontological deposits have also recently been recorded on the Montebello Islands. It is unlikely that similar finds could be made on most of the other islands of the study area, as they are largely Pleistocene reef deposits, not the tertiary limestones of Barrow in which the fossils were found (Aplin, pers. comm., 1995). Some of the islands north of Barrow, such as Legendre Island in the Dampier Archipelago, have significant tertiary limestone deposits, and may be possibilities for further fossil finds.

The only real potential for ecotourism presented by this natural feature would be for an "Earthwatch" style volunteer research expedition. The Earthwatch concept involved international volunteers contributing research funds to a scientific project in return for which they receive the opportunity to assist researchers with field data collection on site. However doubts have been expressed as to the feasibility of this, given that the fossils are very difficult to discriminate to the untrained eye, and the necessary access to Barrow Island may not be granted by Wapet (Aplin, pers. comm., 1995).

4.5.15. Resource Seasonality

The natural resources of the study area are not available for potential use in ecotourism activities at the same level all year round. Many are extremely seasonal in nature, the Whale Shark presence near Exmouth being a prime example.

This seasonality, along with the seasonality of the weather extremes of the study area, forms a key issue for the consideration of future ecotourism ventures in the study area (see Section 4.4.1.1). The seasonal occurrence of the natural assets of the study area has been detailed in the preceding Sections, and is summarised in Table 4.3 on the following page.

4.6. Site Requirements

4.6.1. Introduction

In order for any potential future ecotourism developments to use the wealth of natural resources present in the study area, there will be requirements for infrastructure, power and water, waste disposal facilities, and associated support.

Some assessment needs to be made of the likely levels of site requirements concomitant with different types of ecotourism operations. Three general levels of operations and associated scale of site requirements are considered in this section;

1. No requirement for island-based site facilities;
2. Minimal requirement for island-based facilities; and,
3. Extensive island-based site requirements.

Ecotourism ventures involving island-based accommodation will have far greater site requirements than day-trip operators. The majority of infrastructure requirements are only related to proposals that involve the need for substantial construction on the islands themselves. It should be noted that most of the islands of the study area are probably not suitable for this level of development (see Section 4.9).

Table 4.3: **Seasonal Timetable of Natural Resource Availability within the study area and other related factors (weather categories based on data from Barrow Island. Seasonal availability of natural resources should be considered in the context of prevailing weather conditions for that month).**

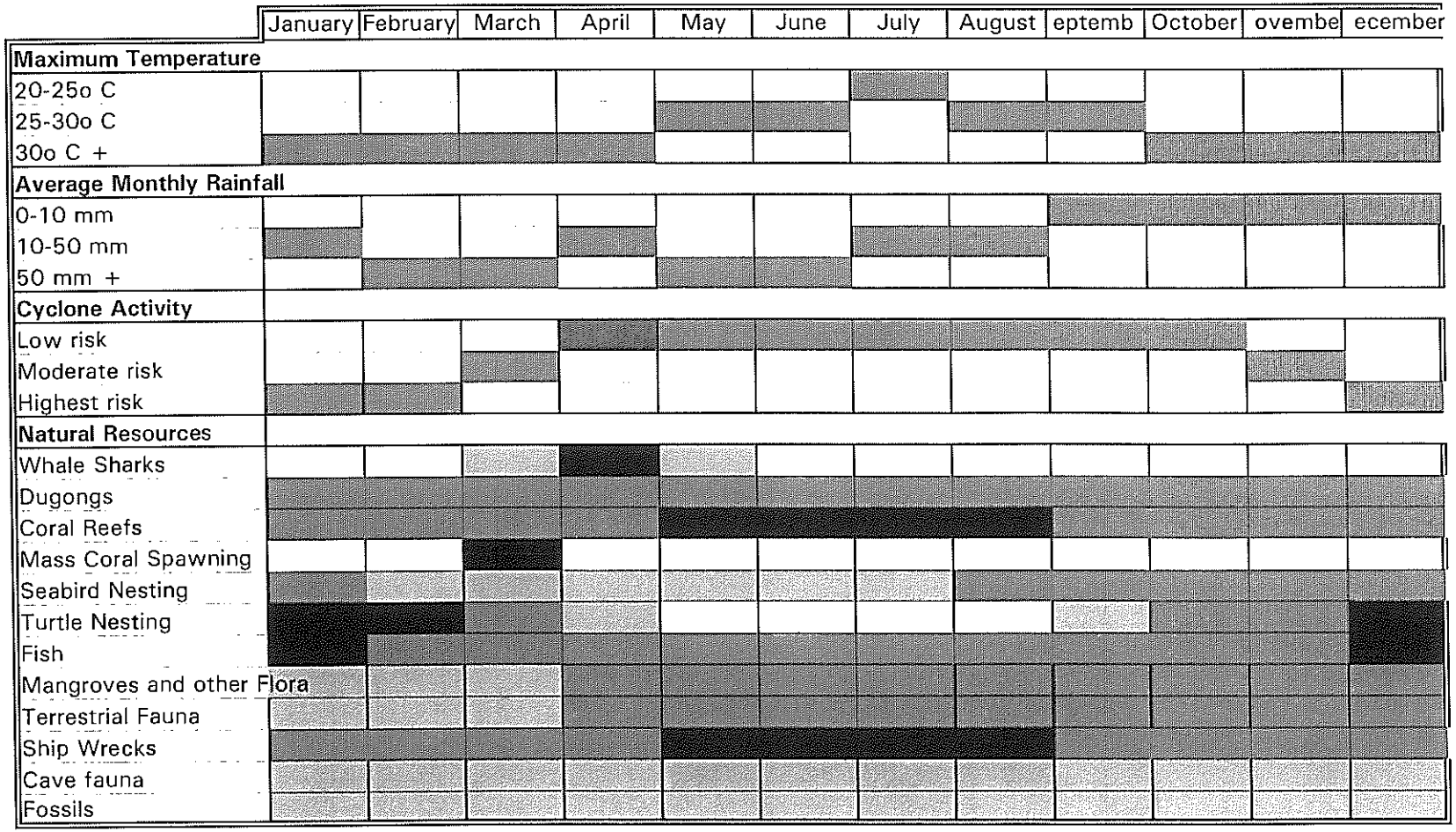
Natural Resources Legend

: not occurring within study area/unsuitable time for activity

: occurring at a low level of abundance/presence unreliable within study area

: reasonably common/good time for activity within the study area

: peak of activity/season within the study area - presence reliable and predictable



4.6.2. Infrastructure

4.6.2.1. Accommodation

Most ecotourism operations involving overnight or longer period stays on the island will have requirements for new buildings to be constructed. At the least level of impact, overnight visitors might undertake camping excursions, which have minimal infrastructure requirements. It is worth noting that under the *Conservation and Land Management Act* 1984, individuals wishing to camp overnight in nature reserves of any class must seek permission to do so from the CALM regional office. Where there is a management plan in place (such as the Dampier Archipelago) specific areas on island nature reserves are designated for camping, and these should be used.

This level of operation, and day trippers may however still need an interpretive or visitor information centre, perhaps incorporating a sealed vault composting toilet, to be constructed on the island. Sufficient visitor numbers to specific islands would need to be demonstrated to justify the use of limited funds and resources for the provision of such infrastructure. Operations catering for visitors for longer periods are likely to require further construction, including sleeping facilities, kitchens, toilets and bathing facilities, and associated pathways and open space.

An alternative to accommodate island visitors for more extended periods would be the use of houseboats. This is likely to need to be subject to careful management, since whilst houseboats may significantly lessen the impacts on the terrestrial island habitats, they have the potential to impact on the surrounding marine communities. Specific management guidelines would need to be established if islands become the focus of houseboat accommodation, addressing issues such as permanent mooring locations, waste disposal, fuel and oil spills, and numbers of vessels. Licensing might be considered for commercial operators visiting islands, with licence condition incorporating management guidelines, and revenue gained used to meet ongoing regional management costs.

4.6.2.2. Power

Power requirements for most island-based ecotourism operations should be minimal, due to the expected small scale of future operations. Diesel-fuelled and gas fuelled generators are currently used on several of the islands where oil industry operations are active, and this power source should be adequate to service any future ecotourism ventures. The use of such a power source brings with it the requirement for a reliable supply fuel, which is likely to be stored on the island.

Ecotourism ventures may wish to examine the possibility of other power sources such as gas for cooking, water heating, and lighting purposes. Solar and wind generated power may also be viable options for small scale operations, particularly given the prevailing weather patterns of the study area.

4.6.2.3. Water

Water is a scarce commodity in the harsh environment of the islands (see Section 4.4.1.1), and ensuring adequate supply will be very important for future ecotourism ventures. There is little or no potable water naturally available on most of the islands of the study area, and rainfall is of a low level and unpredictable. Island-based operations would need to ensure a reliable, well-stocked supply of freshwater, as cyclone events can potentially result in islands being effectively isolated for long stretches. Oil industry operations on several islands currently employ reverse-osmosis desalination plants to supply them with plentiful freshwater, and this method may be considered by ecotourism operations, although it is costly to install. Supply from mainland sources is not practical in most cases, but might be considered for some of the islands near to the coast. Rainwater storage tanks are another possibility, but may be dry for much of the year. Groundwater beneath the islands is not of sufficient volume to act as an ongoing supply (see Section 4.7.3.1), or likely to be potable without some treatment.

Day and short period visitors to the islands would be best served by bringing their own water supplies with them, ensuring adequate is carried to allow for emergencies. Emergency supplies might also be stored on the island by land managers/tourism operators.

4.6.2.4. Fuel and Oil

The need for fuel supply and storage on the islands arises when operations involve permanent and non permanent island-based facilities. Potential requirements include diesel to drive generators (including mobile plant) for power requirements and other possible uses such as compressors to fill SCUBA tanks, oil for maintenance of machinery and motors, and fuel requirements to meet the needs of touring boats.

4.6.2.5. Lighting

Lighting requirements should be minimal for most operations, largely being restricted to interior lighting in any buildings, and would only be required for overnight or longer period operations. Electrically powered lighting or gas mantle lighting could be considered for interior requirements. There should be no great demand for outside lighting other than for illuminating pathways and facilities within the bounds of the operation's buildings.

4.6.2.6. Waste Disposal Facilities

A number of options exist for waste disposal (see Section 4.7.3.2), and the disposal of food waste, waste water, sewage, and other rubbish would all need to be considered. Recycling of as much waste material as possible should be undertaken, and disposal of other material at a suitable site on the mainland would be the simplest measure. Construction of landfills on the islands is unlikely to be environmentally acceptable, and is probably impractical on all but the largest islands. Island based oil industry operations are currently reclaiming water from sewage and treating other waste water for use in irrigation purposes.

Waste disposal would have to be carefully managed to avoid any unwanted increases in pest fauna (see Section 4.7.4.11), aesthetic impacts, or deleterious effects on island groundwater (see Section 4.7.3.1).

4.6.3. Access

Access to the islands of the study area by boats will be a major consideration for most ecotourism operators. As this is likely to be the method by which the vast majority of visitors would reach the islands, the potential impacts of increased boating have been focussed on here.

4.6.3.1. Island Approaches and Safety Issues

Many of the islands of the study area have difficult access and many of the waters surrounding the islands are unchartered. Coral reefs are widespread throughout the region, and can be treacherous to boating as the many shipwrecks in the study area testify (see Section 4.5.7). Adequate investigation of marine charts detailing bathymetry and reef locations would be an essential part of planning for any future ecotourism ventures, and difficulties with access may preclude some islands from exploitation. Once safe access courses have been determined, standard navigational markers might be established at sea and on the island shore to guide vessels through a safe approach.

All boating activity within the study area would need to comply with Marine and Harbours regulations, and adequate, serviceable safety gear should be carried by all vessels. Standard boating safety procedures should be followed at all times by commercial operators and private craft, including aspects such as radio communications with Port Authorities and local rescue groups, obtaining accurate weather forecasts, and fuel system and seaworthiness checks. Adequate marina and harbour availability and support infrastructure would also be required in the coastal towns that vessels would be based in or visit.

4.6.3.2. Landings, Permanent Anchorage and Jetties

The coast line of most of the islands consists of rocky shoreline interspersed with flat sandy beaches. The sandy beaches often occur as part of sheltered bays on the mainland side of the islands, and it is these points that are the obvious choice for landing sites for day trippers and to install permanent mooring points for vessels visiting for longer periods to lay offshore. Any frequently visited island would require formalised mooring locations to minimise anchor impacts on coral.

The construction of jetties could only be justified for large scale, island-based operations with permanent infrastructure.

4.6.3.3. Aircraft Access and Support

Landing strips and helicopter pads are currently established on several of the islands of the study area, including Barrow, Varanus, and Thevenard. Some of these could be used to provide future island access to ecotourism operators. Barrow in particular is a ideal launching pad for aerial tours of the Montebello Islands or virtually any other part of the study area.

Airport or landing strip facilities exist at Exmouth (Learmonth), Onslow, Karratha/Dampier, and Port Hedland, so there is adequate scope of origin points for aircraft to service any island within the study area. Many of the coastal stations adjoining the study area also have light aircraft strips that might be utilised. There would need to be a demonstration of significant demand for new landing strip facilities on any of the islands of the study area before such construction could be justified. Suitable environmental impact assessment would also be necessary prior to the construction of new landing strips. The construction of helicopter landing pads is preferable to the airstrips required by conventional aircraft, as the area required to be cleared is dramatically less.

4.7. Potential Environmental Impacts and Management Strategies

4.7.1. Introduction

The type and scale of potential environmental impacts arising from future ecotourism developments, depends to a large extent upon the nature of the proposed ventures. Large scale operations that involve the need for island-based accommodation, boat moorings, and re-fuelling facilities will introduce a far greater range and intensity of potential impacts than would small ventures undertaking island cruises. Quarantine (weeds and feral animals) is a major issue whose importance cannot be under-stated.

At the level of the current study, environmental impacts and possible management strategies are discussed in broad terms. Thus this section is

in no way an exhaustive list of project-associated impacts and recommendations on how to manage them. Any future ecotourism operations would have to be subject to detailed environmental investigation to determine environmental impacts and how best to eliminate or ameliorate them. This is an essential component of ensuring that ecotourism activities in the study area are ecologically sustainable in the long term. The National Ecotourism Strategy (Commonwealth Department of Tourism, 1994) identified a number of key issues associated with the sustainable use of natural resources for nature based tourism. The major issues of relevance to the islands of the study area that relate to its use for ecotourism purposes include:

1. An emphasis on minimal impact and ecological sustainability in the design, planning, development and management of tourism operations.
2. Consideration of the broad scale management of natural resources, including resource constraints that could be imposed by increased use.
3. The development of appropriate, sensitively designed, support infrastructure (toilets, bins, walking tracks, carparks, etc.).
4. The need for the monitoring of impacts of ecotourism operations to assist with the effective management of local natural resources.
5. The potential for increased pressure arising from increased visitor numbers and tourist operations to have deleterious impacts, and hence;
6. The need for appropriate Environmental Management Plans to be developed and adhered to by commercial ecotourism operators. Similar guidelines should be disseminated to individual tourists visiting the area (information brochures, signs, displays, leaflets, interpretive centres, etc.).
7. Quarantine issues

These general issues provide guidance as to the types of issues that need to be addressed to sustainably operate nature based tourism in the area. Proposal specific management can then be developed within the general ambit of these guidelines.

It is also likely that any future proposals involving the construction of significant infrastructure on the islands of the study group would be referred to the DEP for determination of the level of environmental impact assessment.

Subsequent to the initial appraisal of planning feasibility, application for the proposed development is made to the Regional Planning Committee. That body may decide that there is a likelihood of significant environmental impact and refer the proposal to the DEP. The DEP will then assess the proposal and make a decision on the level of assessment. This may be an informal assessment (if there is minimal impact involved) or a formal environmental review. Formal environmental reviews involve the preparation of detailed assessments by the proponent and the incorporation of public submissions. Based on this the DEP will prepare a report and recommendations for use by the EPA. The EPA then deliberates on the proposal and advises the Minister for the Environment on its environmental acceptability, and the conditions that should be put in place if it is to proceed. Typically one of these conditions is that a project specific Environmental Management Plan (EMP) is prepared, approved by the DEP and any other relevant agencies, and implemented. The EMP must also be consistent with any CALM Management Plan applying to the area in question.

Note that the proponent for a development, or any other individual, may refer a proposal directly to the DEP if they so desire.

4.7.2. Infrastructure Related Impacts

4.7.2.1. Vegetation Clearing

The major and most obvious impact of construction on undisturbed islands is likely to be the loss of areas of native vegetation. The size of the development and the resultant area of vegetation to be cleared is likely to be limited by the total area of the island selected for the proposed infrastructure. Proponents should be aware that they will have to comply with the requirements of the *Soil and Land Conservation Act* 1945 that relate to vegetation clearing and its effects on soil. Proposals that involve the wholesale clearing of islands in the study area to enable accommodation construction will not only be likely to be rejected during the environmental assessment process, but would also serve to diminish the natural attractions available for the visiting ecotourist.

A variety of potential strategies exist to reduce this impact, including;

- assessment of the condition/conservation value of the existing vegetation and limit clearing to areas of low priority in preference to those of higher value;
- review of design parameters to minimise the area of vegetation required to be cleared to enable construction, and remaining strictly within the defined construction corridor;
- design of new infrastructure to naturally integrate with existing landforms and vegetation to as great a degree as possible;
- re-developing areas on islands that already contain cleared land; and,
- rehabilitating and regenerating surrounding areas with flora species native to the island using seed sourced from the island, and ensuring that vegetation or gardens associated with the new infrastructure are of native floristic composition.

It has been noted that the vegetation of islands in the study area recovers far more slowly from clearing than it does from other similar scale disturbances (eg. fire Buckley, 1983). The potential for introduction of alien flora, including undesirable weed species, is also heightened during construction. Thus careful planning and management would be required to ensure that the impacts of native vegetation removal is minimised.

The presence of regular visitors on an island can place further impacts on vegetation during the operation of ecotourism ventures. This can be minimised by the construction of walkways to reduce trampling, soil erosion, and long-term degradation of native vegetation by pedestrian traffic. Visitors and operators should be educated as to the importance of not bringing seeds or other exotic plant material on to the islands.

4.7.2.2. Building Construction

Once the required area of native vegetation has been cleared, the subsequent construction of the required infrastructure can have a variety of impacts. This can include the generation of noise and dust (with resultant impacts on flora and fauna), and deleterious effects on groundwater quality (see Section 4.7.3.1). The cave fauna present beneath Barrow Island, and suspected to exist beneath other islands in the study area, are known to be particularly sensitive to vibration (Humphries, pers. comm.,

1995), and may also be adversely impacted by construction activities.

4.7.2.3. Oil/Fuel Spills

Due to the nature of the study area, the use of boats is likely to be an inherent factor in the operation of most ecotourism ventures. This brings with it the consequence of potential spills of fuel and oil, both at sea and on the islands themselves. The risks associated with oil and fuel spills in the sensitive marine environment of the study area are well recognised (Department of Minerals and Energy, 1990), and all oil industry proposals for development must incorporate a comprehensive oil spill contingency plan prior to approval by the EPA.

Larger scale operations would have to develop an oil spill contingency plan to address the potential occurrence of marine oil spills and slicks, and their associated impacts on marine fauna and water quality. A code of practice should also be developed for small craft, to manage the uncontrolled cleaning of engines in the waters of the area with associated release of fuel and oil into the marine environment. Such activities should only be undertaken in an appropriate location on the mainland.

Management of any island-based re-fuelling and oil storage facilities would also be required to ensure that soil contamination, groundwater degradation, and terrestrial fauna and flora impacts are avoided. Impervious bund walls are likely to be mandatory prerequisites to any such development (there is already a recognised problem with some existing unlined bunds).

4.7.2.4. Construction Workforce

The workforce needed to carry out the construction of any required infrastructure will require support facilities of their own. Large scale constructions will likely require the building of temporary island-based workforce accommodation, bringing with it all the potential impacts of other, more permanent infrastructure (ie. further clearing of vegetation, waste disposal requirements, risk of flora and fauna pest introduction, etc.). Short term management strategies would need to be developed to address this, utilising similar tactics as for the corresponding

long-term infrastructure needs. Houseboat accommodation of construction team is an alternative that eliminates the need for terrestrial accommodation, and is likely to be both simpler and have lesser environmental impact than island based construction accommodation.

Education of the construction workforce on the importance of environmental safeguards and management procedures should also comprise part of any construction environmental management plans. In addition, quarantine measures are required to minimise the risk of introducing fauna and flora to islands.

4.7.3. Wastewater and Groundwater

4.7.3.1. Groundwater Contamination

The islands of the study area are all regarded as being hydrologically sensitive. A relatively shallow freshwater lens typically overlies deeper saline waters, and it is this shallow lens that is susceptible to changes in the hydrological regime of the island. Upsetting the existing hydrological regime is likely to have serious repercussions for island vegetation and fauna (particularly any cave fauna present) that are reliant upon this resource.

Human activity on the islands can affect the groundwater regime to a minor or major level dependent upon the scale and nature of development. Ventures requiring permanent infrastructure and ongoing human presence on the islands are likely to have the greatest degree of potential impact. Less intensive operations would be likely to have negligible impacts on existing hydrology.

All construction activities involving the use of water would have to avoid the use of saline water. The sand and limestone substrates present on most of the islands has a high degree of hydraulic conductivity, which would provide little barrier to the infiltration of saline water through the soil profile, with resultant contamination of the freshwater lens. Of equal importance is that the use of saline water during construction kills surrounding vegetation and inhibits regeneration. The use of saline water in the building of concrete building foundations on Rosemary

Island has been shown to have affected the island's groundwater quality. The mixing of concrete, construction of foundations, and other activities would have to be carried out using freshwater only, to ensure that a similar decline in groundwater quality does not occur on any other islands where future ecotourism infrastructure is to be established. Construction contractors would need to be educated on the importance of this practice.

On the mainland, groundwater is extracted and used for a variety of purposes ranging from irrigation to meeting demands for potable water. However, given the shallow nature and sensitivity of the freshwater lens present on the islands of the study area, it is likely that this resource would not be open to exploitation in such a fashion, except, perhaps, subject to stringent restrictions.

4.7.3.2. Sewage Disposal

Disposal of human waste is always an important issue in the consideration of island-based developments. Given the fragility of the groundwater regime of the islands, any future island habitation would have to incorporate sewage disposal systems designed to have negligible impact on groundwater. Sewage is nutrient rich, and uncontrolled disposal may also result in upsets to the natural nutrient balance and consequent effects on native vegetation.

For permanent island buildings, this would most likely involve the use of sealed concrete chamber sewage storage tanks. These would be periodically pumped clean, and the waste transported to the mainland for disposal at existing sewage disposal facilities. Alternative methods of waste disposal that have no significant impact on groundwater might also be considered for small operations, such as chemical-based toilets, or Aerated Treatment Units (ATUs). Larger scale operations may consider the use of primary treatment to remove solids followed by an ocean outfall pipe for sewage disposal. Oil industry operations on Barrow Island have employed this, and there is no evidence of nutrification of the waters near the outfall point (Power, pers. comm., 1995). There is, however, some indication of decline in coral condition in the vicinity of the sewage outfall near Thevenard Island. Small scale aerobic sewage treatment plants

are available that have been tailored to cater for small isolated communities, and such a design might be considered to cater for island based accommodation. The use of septic tanks would not be considered an acceptable option due to their potential to contaminate groundwater.

Houseboats and larger vessels typically employ pump toilets that dump human waste directly into the ocean. With the current low numbers of vessels in the area this has not resulted in a significant impact on marine communities. However, with potential future increases in numbers of houseboats, the use of chemical toilets and on-board disposal of waste may be required. This is likely to be of particular importance if specific islands become the focus of frequent houseboat visitation, and in this case on-board waste disposal could form a condition of license.

Smaller scale operations, such as island day-trips, would still be required to take waste disposal into consideration, either providing portable chemical toilets, or ensuring that all waste disposal is limited to on-board toilets. Education of ecotourists on the importance of this practice would be required. Regularly visited islands might have a sealed-vault composting toilet installed, similar to those present in Cape Range National Park.

4.7.3.3. Drainage

Water is the vector that enables the movement of excess nutrients, sewage and pollutants. As such, exercising proper control over drainage associated with an island-based development would help to ensure that no abnormal influxes of nutrients or pollutants to the groundwater occurs.

Possible options with respect to drainage control include the use of water treatment and recycling, water sensitive design aimed at minimising water consumption, and the monitoring of the quality of any water ultimately discharged. The issue of drainage is linked to a number of other potential impacts, and would have be considered in relation to construction activities, erosion, sewage disposal, food waste disposal, and irrigation practices.

4.7.4. Marine Impacts

Future ecotourism activities within the study area could potentially bring a variety of marine environmental impacts. These range from impacts arising from marine infrastructure construction, such as jetty and channel construction; to those stemming directly from marine activities, such as fishing, disturbance to fauna, and the increased risk of oil spills (see Section 4.7.2.3).

4.7.4.1. Jetty Construction

The construction of jetties and other permanent mooring structures would likely only be required for islands where permanent accommodation is constructed. Likely impacts arising from jetties would include those resulting directly from construction of the jetty, such as loss of intertidal habitat, coral damage through pylon installation, and local increases in water turbidity. During use, ongoing impacts are likely to include shading effects on seagrass beds and other intertidal flora, local increase in water borne pollutants from boat engines, and disturbance to local fauna.

Construction phase impacts would likely be managed by conducting marine survey work prior to construction to determine the sensitivity of marine habitats in the construction area, and ensuring that the most sensitive habitats are protected while lower value areas are assigned for construction use. Most ongoing use impacts are best managed by limiting the number and frequency of users of the jetty, and requiring all users to operate subject to suitable environmental guidelines.

4.7.4.2. Dredging

Due to the generally shallow depth of the water (see Section 4.4.1.3) and often difficult access to the islands (see Section 4.6.3.1), there is the possibility that access channels may have to be dredged to enable access to visiting vessels. The major impact arising from dredging activities is the generation of fine spoil, that may have deleterious impacts via sedimentation on coral in the area, and increase local water turbidity.

Possible management strategies to address this include the use of a geotextile curtain around the dredge to minimise spread of particulate spoil, and conducting dredging operations under suitable (ie. calm) weather conditions. Subsequent monitoring of the spoil bank may also be required in larger scale operations.

4.7.4.3. Coral Degradation

Reduction in condition and death of coral can potentially result from increased boating activity in previously undisturbed areas, as the impacts of tourist craft in Coral Bay clearly demonstrates. The usual mechanisms for this local decline in coral include direct losses during construction activities, deposition on corals of increased water column sediment loads, physical damage from anchor chain drag of moored boats and reef walking, and secondary effects resulting from decreases in local water quality.

Management strategies to address these problems include the provision of permanent, formalised mooring points, properly managed waste disposal, and appropriate education of visitors and operators.

4.7.4.4. Ballast Water Discharge

The discharge of ballast water from ships entering the study area from overseas can lead to the introduction of exotic marine organisms detrimental to resident communities. The majority of international vessels entering the area are not likely to be directly associated with ecotourism activities, but such craft should be made to comply with the Voluntary Guidelines for Ballast Water Discharge from overseas vessels entering Australian Waters or the Draft Australian Ballast Water Management Plan. This primarily entails the gradual exchange of ballast water prior to entering Australian waters.

Smaller vessels e.g. fishing, recreational and work boats may also discharge oily waste into the water which may cause problems in sheltered waters.

4.7.4.5. Fishing/Collecting Pressure

Whether future ecotourism operations are island-based or daily visitors, collection of marine fauna is likely to increase in local habitats. Fishing is a popular pastime in the study area, and

there are a variety of species regarded as high table quality available to shore and near-shore fishing (see Section 4.5.8.1). Additionally, many visitors to the islands may wish to harvest oysters and other shellfish which are often abundant, dive for crayfish, and beach-comb for shells (which is not permitted on Nature Reserves) and other marine invertebrate remains. The pressure placed by these activities on the local marine communities must be carefully managed to ensure long term ecological sustainability, and that local extinctions are not brought about as a result of human recreation.

Suitable management strategies to address this include the education of visitors to the islands, fishing/collecting guidelines, introducing licence requirements, and considering off-seasons when fishing and other activities are prohibited. Live shell collecting should be prohibited at all times. The Department of Fisheries has developed guidelines for these activities.

4.7.4.6. Disturbance

Increased levels and frequency of human activity in the vicinity of the islands has the potential to modify the behaviour patterns of local marine fauna. Typically, marine mammals, turtles, and seabirds are most prone to such prolonged disturbance, with changes in preferred foraging areas and breeding sites potentially taking place. In addition to having negative effects on fauna, with individuals being displaced into poorer quality habitats, this impact could also reduces the local natural attractions that visiting ecotourists came to the island for in the first place.

Possible management strategies to ensure that disturbance is minimised include limiting the number and frequency of visitors to islands, educating visitors as to the importance of not harassing or disturbing fauna in the area, and establishing parts of islands or entire islands where visitor entry is restricted or carefully controlled (such as in important seabird rookeries).

4.7.4.7. Terrestrial Fauna Impacts

Island terrestrial fauna communities are highly susceptible to the effects of the introduction of new agents (Williamson, 1981). Being of generally small size, frequently unusual species

compositions, and limited habitat resources, the introduction of a vertebrate predator to an island community that has had no such organism for thousands of years can be devastating. Similarly problems can arise with introduced competitors to native species, diseases, parasites, weed spread and degradation of native vegetation, and the breaking up of existing native species population structures.

4.7.4.8. Habitat Loss/Modification

Loss of native vegetation and strategies to minimise this has already been discussed (see Section 4.7.2.1). To a large extent, this corresponds to fauna habitat resources in the islands of the study area. Landforms are also important in determining whether an area can support certain fauna species, and within the study area these include sand dunes, and limestone and granite outcrops. In addition to direct removal of habitat during construction activities, ongoing human presence on the islands can result in gradual degradation and modification of fauna habitat.

Strategies to ensure that loss of important fauna habitat is minimised are similar to those outlined for the minimisation of vegetation loss (see Section 4.7.2.1). Fauna surveys should be conducted to determine what species are present on any islands proposed for ecotourism activities as the fauna of many of the island of the study area is poorly described. Habitat utilised by important fauna should be preserved, while poorer quality habitat may be selected for infrastructure requirements. Ongoing impacts of the presence of humans on natural fauna habitats can be reduced by adopting strategies similar to those outlined in Section 4.7.7.

4.7.4.9. Feral Fauna Introduction

The introduction and spread of feral fauna on to islands has been a long-standing problem off the coast of Western Australia. Feral fauna are typically introduced to island communities by visiting ships, but other historical events such as shipwrecks have occasionally been responsible for introductions (Armstrong, 1992). Other islands close to the coast have been found to support feral fauna, and mudflat links to the mainland that are

exposed at low tide are suspected to have enabled these invasions.

The introduction of feral predators such as cats and foxes to islands can devastate native mammal, bird and reptile populations, easily bringing about the local extinction of species. Other causes of decline include habitat modification (burning, erosion etc) and competition. Given that many of the islands support species that have become threatened on the mainland primarily due to the abundance of feral predators, ensuring that island populations are not similarly impacted is vitally important. As well as predator impacts, introduced species can act as competitors with native island species for the limited food and habitat resources available. Exotic rat and mice species are especially problematic in this regard, and are excellent colonists. Feral rodents have been recorded within the study area swimming distances up to one kilometre from one island to the next to establish new populations. Such distances have been recorded in New Zealand. It is likely in the warmer waters of the Pilbara, rats may be able to swim much further. (Kendrick, pers. comm., 1995). All introduced feral fauna tend to bring disease and parasite problems to native vertebrate island communities, and can create hygiene problems for human settlements.

Strategies to secure island populations from the deleterious effects of feral fauna include strictly prohibiting visitors from bringing pets with them to islands, ensuring that operating vessels are maintained free of feral fauna by ongoing baiting and trapping, quarantine measures for longer stays, and ensuring that foodstuffs, packaging, or any other possible vectors for feral fauna are not left on visited islands. Comprehensive quarantine procedures are currently in place at Barrow, Thevenard, Airlie and Varanus Islands to ensure that feral animals are not re-introduced. The prevention of feral fauna introduction, in addition to being ecologically sound, is in the best interests of ecotourism operators to ensure that the natural resources of the island are not diminished by their presence. All vessels operating onto islands should contain permanent rodent bait stations and monitoring devices (floor trays). CALM staff could carry out spot checks to ensure these are being maintained.

A number of the islands in the study area could benefit from programmes to bait and eliminate feral fauna already present,

and CALM currently has several such operations underway (Stanley, pers. comm., 1995). Feral animals, especially predators such as feral cats, can be notoriously difficult to eradicate, however, and ensuring islands are kept pest free is considered to be far superior management to attempting to remediate the results of poor control measures with aposteri eradication programmes.

4.7.4.10. Fauna Movement

In addition to the problems associated with the introduction and spread of feral fauna, there are also potential problems associated with the movement of native fauna from one island to another via human activity. Not all native species are present on all the islands, and the uncontrolled translocation of animals from one to another via human movement can upset the islands' balanced ecology. The introduction of native predators from an island where they occur naturally to one where they do not could potentially have disastrous consequences for small mammals and reptiles on the new island, and would certainly result in an unnatural shift in ecological relationships which would not have occurred but for human intervention.

In addition to disruption of natural ecological processes within islands, populations that occur on islands can differentiate genetically over time from their relatives elsewhere. Such processes are likely to have resulted in the development of the distinct subspecies present on Barrow Island. This may lead to populations becoming co-adapted, and having a genetic makeup that has evolved to complement and suit the physical and biological environment the population exists in (Ayala and Kiger, 1985). Translocating individuals, and their subsequent breeding, can result in the breaking up of complementary gene complexes, which in turn reduces the population's overall fitness and degree of adaptation to their environment. This phenomenon is known as outbreeding depression. Genetic resistance to disease and parasites can also be population specific.

Management practices to ensure native fauna are not spread from one island to the next involve appropriate education of visitors and ecotourism operators regarding the importance of not disturbing the natural populations, prohibiting "souvenir" hunters from taking fauna off islands, and ensuring fauna are not

accidentally taken on to visiting vessels in equipment and other cargo.

4.7.4.11. Pest Control

A number of introduced and some native fauna species have the potential to become pests if island-based operations are not properly managed. Gulls in particular have proved to be a problem to existing tourist facilities such as the one established on Heron Island in the Great Barrier Reef Marine Park (Armstrong, 1992). Gulls on Heron Island have reached plague proportions, largely due to problems associated with food waste and other garbage disposal. This has resulted in significant ecological impact on other bird species populations, with abnormal numbers of gulls predating chicks and eggs and competing for nesting sites (Armstrong, 1992). This impact has now extended beyond Heron Island, with marauding gulls making day trips to forage on other nearby islands. Gulls also predate turtle hatchlings and increased numbers of gulls will increase predator pressure on them. Poorly managed waste disposal can also encourage increases in numbers of rats and mice, which, in addition to placing pressure on native fauna communities (see Section 4.7.4.9), creates hygiene problems for human communities.

Control measures to help ensure that pest species are not encouraged include careful disposal of all food scraps and garbage, preferably exporting it from the island to a suitable disposal site on the mainland. Readily accessible freshwater also attracts pest species and promotes their population growth, and large numbers of lights burning at night tends to attract insects and subsequently gulls to an island (see Section 4.7.4.12.). In addition, gulls are attracted to fresh water and it is important to preclude their access to fresh water sources.

4.7.4.12. Lighting

The intensity, positioning, and periods of operation of lighting on islands with permanent infrastructure can potentially modify the ecology of the island. The most important effect is likely to be on nesting turtle species that utilise beaches on many of the islands (see Section 4.5.2). Hatchlings in particular rely upon the moon

to orient themselves toward the ocean enabling a quick entry to the water, and bright lights burning at night have been shown to disorient them (Armstrong, 1992; Peters and Verhoeven, 1994). Shorter than orange wave lengths of light may also have a lower direct affect on turtle hatchlings but will still affect them directly through the attraction of gulls. Mortality at this stage of the turtle" s life cycle is drastic under normal conditions, and further losses could result from light-induced disorientation. Uncontrolled lighting at night also tends to attract insects which can in turn bring numerous gulls to the island. The flare on the Harriet platform off Varunus Island has resulted in larger gull numbers due to the increase/attraction of food attributable to the light of the flare. Night light also changes feeding patterns from day to night and thus attracts gulls at a time when turtles are hatching.

Any permanent lighting on the islands should consist of the lowest practical intensity, and be restricted to a limited number of hours of use per night. Shielding of lights should also be used to minimise impacts on sensitive areas such as turtle hatcheries. Lighting should not be installed in the vicinity of important turtle nesting beaches, and visitors should be advised of the potential effects of lights (including torches) on turtles.

4.7.4.13. Disturbance

The regular presence of humans on previously undisturbed islands can have adverse effects on the fauna present there. Types of impacts might include behavioural modifications where some species avoid areas near human activity, while others are attracted to poorly managed foodstuffs and water. Some nesting seabirds species, particularly some species of terns and the Australian pelican are highly susceptible to disturbance, and should not be approached. Marine mammals such as dugongs may also exhibit behavioural changes if subject to ongoing disturbance and harassment, avoiding the areas of human use, and potentially the whole island.

Strategies to address this potential problem should include limitations on the numbers of people permitted on an island at any one time, ensuring that visitors are accompanied by suitably experienced guides, education of visitors and ecotourism operators, and defining areas of restricted access at times of their

greatest sensitivity. Ongoing disturbance to fauna will only serve to repel fauna that ecotourists come to see, so careful management will be required.

4.7.5. Weed Introduction

The issues associated with the introduction and spread of weeds on the islands involve similar arguments and considerations to the topic of feral fauna introduction (see Section 4.7.4.9). Native vegetation can easily be degraded, with native species being outcompeted and over-run by exotic flora. On Heron Island, exotic species outnumber natives, and are far more prolific (Walker, 1991).

The risk of weed introduction is probably greatest during construction and in areas of ongoing habitation or regular visitation. There are management problems with infestations of Kapok and other weed species on regularly visited islands in the Dampier Archipelago (Taylor, pers. comm., 1995).

All construction machinery brought from the mainland should be thoroughly cleaned of soil and other material. Visitors to the islands should be educated as to the importance of not bringing seeds on to the island in clothing or shoes, and only indigenous native species should be used for garden or landscaping use. Ongoing monitoring is likely to be of importance, with suitable weed eradication programmes to follow should the results indicate that weed species are becoming established. This would typically involve the establishment of permanent vegetation monitoring quadrats, and the establishment of an adequate baseline data set detailing floristic composition. Subsequent annual monitoring could then be used to monitor weed abundance, with rapid response once detected.

4.7.6. Fire Control

In the restricted, isolated habitat of an island, fire can be a potentially devastating agent. While the flora may have some degree of resilience to fires (Buckley, 1983), fauna populations may be severely impacted by fire.

The presence of humans on an island increases the risk of fires. Careless disposal of glass, paper, cigarette butts, the lighting or

incomplete extinguishing of fires, and the operation of machinery all serve to increase the probability of a fire starting. Careful management is required to ensure that this risk is minimised, including visitor education, prohibiting open fires at all times, proper waste disposal, and regular maintenance of machinery. Island-based operations should have an fire control emergency plan in place, and all operators should carry fire extinguishing apparatus. Control of weed species also serves to further reduce fire risk.

4.7.7. Human Pressure

The simplest way in which to minimise most of the potential impacts of ecotourism operations on the islands of the study area is to limit the number of visitors. Most of the environmental impacts are associated with the numbers of visitors to the islands and the types of activities they undertake while there. Disturbance to fauna, fishing pressure, vegetation clearance requirements are all directly correlated to the numbers of people the ventures are designed to accommodate.

Measures to further minimise the pressure placed on island habitats by visitors include comprehensive visitor education on all aspects of the island environment and how their presence there can affect it. The construction of walkways, waste recycling and management, and licensing of fishing and collecting activities will all serve to reduce human pressure on the resources of the islands.

A secondary consequence of ecotourism industries developing around the islands and their waters is that there will be an increasing demand for mainland-based support and infrastructure to service operations visiting the islands. This may include considerations such as upgrades and expansions to accommodation facilities, greater demand for limited freshwater supplies, harbour expansions or modifications, increased pressure on existing landfill and sewage disposal sites, or the need for the construction of new waste disposal facilities. All future developments arising from increased numbers of visitors to the study area must incorporate comprehensive environmental management and planning to ensure that the regional environment is not compromised.

4.7.8. Monitoring

Ongoing monitoring of the environmental impacts of any ecotourism operations will form an essential part of any future operations on islands in the study area. In order to determine whether the operations are having detrimental impact or modifying the existing environment, it will be necessary to carry out baseline survey work, as the natural resources of many of the island are not documented in detail at present.

Monitoring programmes should take into account such considerations as vegetation condition, weed infestation, the abundance of feral fauna, groundwater quality, coral condition, and marine water quality. The detailed aspects of monitoring programmes will vary depending upon the nature of the proposed operations, and can only be accurately defined after environmental impact assessment work is complete. With larger scale developments, such monitoring work would typically be undertaken by the proponent as a condition for environmental approval. Other aspects of the biological monitoring of the habitats study area is likely to be undertaken by CALM, Fisheries, and the Australian Institute of Marine Sciences (AIMS). Such information should be referred to the Regional Planning Committee for reference.

4.8 Islands and Island Groups of Particular Interest

4.8.1. Introduction

Many of the natural resources documented in Section 4.5 are widespread throughout the study area. Part of the role of this study is to attempt to identify the islands and surrounding areas where the individual resources are abundant, the superior examples of their kind in the region, and occur on a regular predictable basis. In the selection of islands of particular interest, consideration has also been given to those areas which boast a number of different natural features that may be open to ecotourism based exploitation.

4.8.2. Dampier Archipelago

The Dampier Archipelago is an obvious choice for nature-based tourism ventures to operate. The area consists of 42 islands and islets scattered within a relatively short distance of each other, that can offer:

- rich coral reefs for diving, or glass-bottomed boat tours;

- major marine turtle nesting sites;
- migrating humpback whales and regular sightings of other cetaceans;
- areas of high density dugong populations;
- major seabird rookeries,
- terrestrial flora and fauna of special interest;
- sites of European and Aboriginal heritage significance; and,
- excellent recreational fishing.

The islands are for the large part "C" Class Reserves for the Conservation of Flora and Fauna, with a number of specially defined conservation zones and required management practices (see Morris, 1990). Much of the waters of the Archipelago (all excluding the Port of Dampier waters) have been proposed as Marine Park (MPRSWG, 1994). Existing land-use in the Archipelago and adjacent coastline includes the oil and gas industry, heavy industry storage and port facilities, aquaculture, recreational shacks, and conservation purposes. Almost all the islands in the Dampier Archipelago have Aboriginal title on them, and some Islands have high values.

4.8.2.1. Dolphin Island

Dolphin Island is some 3200 ha in size, and is the second largest island in the Archipelago. It is separated by a short distance from the Burrup Peninsula and is currently vested as a "B" Class Reserve for Conservation of Flora and Fauna (EPA, 1994). A storage shed exists on the west coast of the island as a result of the pearl aquaculture operation present in Flying Foam Passage.

Dolphin Island supports the richest, most diverse flora of all the islands of the Archipelago, at 157 species, and the island supports a diverse community of vertebrate fauna, including 69 birds, 20 reptiles, and 6 mammals (Morris, 1990) (see Section 4.5.11 and 4.5.12). The Schedule One protected Species *Morelia olivacea barroni* the Pilbara Olive Python also occurs on the island, and green and flatback turtles nest on the beaches. Good fishing is to be had in Searipple Passage between the south coast of the island and the Burrup Peninsula. Foxes have spread from the adjacent peninsula to Dolphin Island, and there is an annual baiting program carried out to control them.

Dophin Island also has high Aboriginal heritage values.

Currently, day trip access is allowed to the interior of the island, and overnight camping is permitted on designated beaches between high and low water mark. Given the rich nature of its terrestrial flora and fauna, Dolphin island may lend itself to "Earthwatch" style research programmes operating in conjunction with ecotourists to improve information on the island" s ecology while increasing visitor awareness of the plant and animal species present. Turtle observation, snorkelling and fishing activities could also be sustainably undertaken. The current planned land-use for industrial development on the Burrup Peninsular is largely zoned as conservation area, with a small area (1.2 km^2) scheduled for industrial use at the northern end of Conzinc Bay (O'Brien Planning Consultants, 1994). Thus planned developments on the Burrup should not create dramatic visual or amenity constraints for the potential ecotourism use of Dolphin Island.

4.8.2.2. Enderby Island

At 3250 ha, Enderby Island is the largest island in the Dampier Archipelago, and is an "A" Class Reserve for the Conservation of Flora of Fauna. Existing conditions governing visits to Enderby island are the same as for Dolphin Island. CALM operate a field station on the island to provide accommodation to researchers working in the Archipelago. Enderby is sufficiently large to support sensitively designed infrastructure in carefully defined areas without compromising the integrity of the whole island. Such development would have to tempered with the fact that the island is an "A" class reserve, and would necessitate a suitable approved environmental management plan.

Enderby Island supports a substantial population of Rothschild's rock wallaby, there are particularly good reefs on the north-west side of the island, and dugongs are commonly sighted feeding in the shallows (MPRSWG, 1994). There are two wartime wrecks on the island (see Section 4.5.7).

Enderby Islands also has high Aboriginal heritage values.

4.8.2.3. Rosemary Island

Rosemary Island jointly forms part of "A" Class Reserve A36915 with Enderby Island, and at 1000 ha, is about a third of the area of the larger island (Morris, 1990). The island is bounded by extensive sandy beaches with a rocky interior. The North-west Game Fishing Club have a recreational shack on Rosemary Island under a DOLA special lease. This falls into the Norbill Bay section of the island which is zoned as a Recreation area for day trips and camping.

Natural features of note on Rosemary Island include extensive, good condition reefs, recognised fishing areas, a population of Rothschild's Rock-wallaby *Petrogale rothschildi*, important seabird nesting sites, and grazing areas for dugongs. All four species of turtle that occur in the region use the beaches on Rosemary for nesting activity, making the island a turtle rookery of great significance. Whales may also be seen in nearby waters during the appropriate months.

4.8.2.4. Malus Island

Malus Island is one of the smaller islands of the Archipelago (246 ha), and is comprised of three different zonings. A small bay on the island' s north shore is a recreation zone for day trips and camping, most of the rest of the area is a "C" class reserve for Conservation of Flora and Fauna, with the small band of the island being given over to Conservation and Recreation purposes. It is here that there are several recreational shacks, the King Bay Fishing Club, and the remains of an old Whaling station. The waters around Malus island are well recognised as excellent for coral reef diving and fishing.

4.8.2.5. West and East Lewis Islands

East and West Lewis are both "C" Class Reserves for Conservation and Recreation purposes. The islands are both relatively close to Dampier, and there are several recreational shacks on the two islands under licence from CALM. The islands are both relatively large, West Lewis (2082 ha) being about double the size of East (1018 ha) (Morris, 1990). There are the stone remains of a nineteenth century pastoral station built on West Lewis Island.

The islands are available for recreational use and are, technically, not subject to the management practices for Nature Reserves in the Archipelago (Morris, 1990). However, for all practical purposes the same conditions apply to their use including Wildlife Conservation Regulations. Several aquaculture proposals are in process for the immediate area of the Lewis Islands and one has been granted a licence for land based infrastructure. The future port facilities and industrial shipping channels may soon be put in places south of the Lewis Islands to service the planned Industrial Park on the adjacent coast.

4.8.2.6. Delambre Island

Delambre Island is an island of moderate size (320ha) that is currently vested as a "C" Class Reserve for Conservation purposes (Morris, 1990). The island is bounded largely by extensive sandy beaches, and supports a number of nesting seabird species.

Delambre Island is of particular note due to its importance as a marine turtle nesting site, with all 4 species (green, loggerhead, flatback, and hawksbill) having been recorded on the beaches of the island (Morris, 1990). The fringing reefs to both the west and east of Legendre are recognised as particularly diverse stretches of coral (MPRSWG, 1994), and are ideal for diving and snorkelling activity.

4.8.3. Barrow Island

Barrow Island has long been recognised as having exceptional conservation importance (Butler, 1970; CTRC, 1974; Burbidge, 1990), and there are a number of natural features to justify this.

The Barrow Island Shoals, to the immediate south of the island, is an extensive area of rich marine life which supports diverse seagrass beds, coral reef, and is an important site for dugong and turtle grazing. Barrow's terrestrial environment is possibly even richer than the surrounding waters. Four species of rare and endangered mammals have populations on the island, and the remaining vertebrate community is rich and diverse (see Section 4.5.12). Cave fauna of

international conservation significance persist beneath the island, two species of turtles nest on the beaches, and fossil finds of scientific importance have also been made there. Six species of cetaceans have been recorded beached on the island (Butler, 1971; Butler 1989), and are often sighted offshore. It also supports a significant reptile community.

Some of the small islands adjacent to Barrow are also of conservation value. Boodie Island recently supported a population of the rare and endangered *Bettongia lesueur* (CTRC, 1974), until the introduction of *Rattus rattus* led to the species decline and extinction (Burbidge, 1985). Boodies have recently been re-introduced and appear to be thriving (1993). Boodie Island is the only known site where the plant species *Cordia subcordata* occurs in Western Australia (CTRC, 1974). Middle Island (between Barrow and Boodie) is an important turtle and tern nesting site, and Double Island supports a breeding colony of Wedge-tailed Shearwaters (CTRC, 1974). Some of the waters around Barrow (Bandicoot and Turtle Bays) have been recommended for consideration as marine reserves (MPRSWG, 1994)

There is a long history of oil industry operations on Barrow Island, and an extensive settlement is currently established there. Oil extraction processes have resulted in declines in groundwater quality, clearing of numerous access tracks, and soil contamination. However, long term environmental management has meant that some of the potential environmental impacts of this situation have been minimised, and recent management strategies have resulted in the eradication of rats from the island. Strict quarantine procedures are currently in place to ensure re-invasion of these feral pests does not occur. The presence of industry on the Island has restricted public access. Thus the ecotourism possibilities for Barrow Island may be limited at present, but the island is an excellent candidate for such activities either in the longer term, or if insurance and other issues can be resolved with industry. It has existing support infrastructure including large scale accommodation, desalination plant for fresh water, a sewage treatment plant, and an airstrip. Ultimate rehabilitation of other disturbed areas could eventually mean that the primary ongoing impact would be restricted to the small proportion of the island where the main settlement is.

4.8.4. Montebello Islands

The Montebello Islands are a picturesque group of islands that lie approximately 90 km offshore, and some 120 km from Dampier. The group consists of an extensive archipelago of sand and coral cays, with several larger islands including Hermite, Trimouille, Alpha and Northwest. The island group constitutes an "A" Class Conservation Park to high water mark and a "C" Class Conservation Park between high and low water marks. The waters around the Montebellos have been recommended for consideration as a Marine Park (MPRSWG, 1994).

The waters of the Montebellos are rich in sea life, with extensive coral reefs, manta rays, turtles, marine molluscs and fish. Whale sharks have been recorded in the area also (Power, pers. comm., 1995), and the annual migratory route of humpback whales passes close to the island and they can be sighted from shore. Surveys have recorded 457 species of fish and 633 molluscs from the waters surrounding the Montebello Islands (MPRSWG, 1994). Terrestrial fauna once included Spectacled Hare-wallabies and Golden Bandicoots, but these are now locally extinct, almost certainly due to the introduction of feral cats and rats to the island (CTRC, 1974). Two turtle species are known to nest on the beaches of these islands (greens and hawksbills), and 26 species of seabird breed in the area (MPRSWG, 1994). There are also mangroves on the Montebello Islands. Oil exploration is soon to be commence some 8 km to the southwest of Hermite Island (Ampolex, 1995; EPA, 1995). CALM currently has a program to eradicate cats and rats from the Montebellos and there are proposals to translocate native species onto these islands. (Trimouille, North West Hermite).

The islands have great visual appeal, but this must be tempered with consideration of the logistics of the area' s isolation, the amount of travel involved in reaching them, and the harshness and aridity of the climate.

4.8.4.1. Nuclear Testing

The Montebello Islands were used by the British Government for nuclear weapons testing in 1952 and again in 1956. The two islands where the devices were detonated, Alpha and Trimouille, still represent a potential radiation hazard. Extended visits and handling of artefacts are not recommended (Western Radiation Services, 1993). Advice should be sought from CALM on current

radiation hazards and visits to these islands. Biological surveys have found no discernible effects of the irradiation on the fauna and flora of the islands (Burbidge, 1971).

4.8.5. Muiron Islands

North and South Muiron Island are the nearest large islands to Exmouth, at the south-west corner of the study area and are both "C" Class Reserves for Conservation purposes (EPA, 1994). The islands and their surrounding waters are already a destination for charter boats operating out of Exmouth, where visitors can dive and snorkel on the rich extensive reefs fringing the islands. One survey recorded 330 species of fish on the reefs of South Muiron Island (MPRSWG, 1994). Other potential natural attractions presented by these islands include good shore and boat fishing (Red Emperor, Threadfin Salmon, and Bluebone amongst others), painted crays may be found under reef shelves, there are extensive sandy beaches and rocky shores for beachcombing, and there is also the possibility of ventures centred around turtles on the islands. A marine reserve area where fishing is prohibited has recently been established on the northwest coast of South Muiron Island. The Muirons are now recognised as one of the major Loggerhead rookeries in the region, and as such are a conservation area of great importance. Large numbers of green turtles also utilise the island for nesting, and many can be seen basking in the shallows and the wash zone during the day.

Possible future operations on these islands would have to take into account their ecological sensitivity, not only as a nesting site for rare turtle species, but also as one of the largest Wedge-tailed Shearwater breeding sites in the region. The interior of the island is largely sand dunes, and supports an extensive breeding colony of these birds. Due to their burrowing nesting behaviour, they are highly sensitive to the impacts of human visitors (see Section 4.5.11). Possible future ventures might include well managed overnight camping on beaches or sheltered bays centred around turtle observation, with marine-based activities during the day. Information signs detailing the ecology of the island and visitor walkways and shelters is likely to be the most infrastructure development the islands could safely support. The use of houseboats to provide accommodation might be considered at the Muiron Islands, to minimise impact on the sensitive ecology of the island's sensitive terrestrial habitats (see, however, Section 4.7.3.2).

4.8.6. Exmouth Gulf Islands

The islands within the Exmouth Gulf, including Y, Fly, Eva, Doole and Roberts, are generally small sand cays with fringing reef of varying size. Currently they are used by the Exmouth local community for recreation purposes and overnight camping. Fish and crayfish are available on the reefs surrounding some of the islands, dugongs forage in the waters of the Gulf, and Doole Island has been the focus of the re-introduction of a rare mammal species (the Shark Bay Mouse). Tent Island and several other adjacent islands are vested as an "A" Class Reserve for Conservation, while most of the other named islands are "C" Class, but under consideration for upgrading to "B" . Gnandaroo Island is an "A" Class Nature Reserve and supports a breeding colony of Pelicans. The waters surrounding the Exmouth Gulf islands have been recommended for upgrading to a Marine Reserve (MPRSWG, 1994).

Given the size of the islands, and the probable increase in general recreational use resulting from the future Exmouth marina, it is unlikely that any of the Gulf islands will be able to support any larger scale ecotourism operations. Most are not of sufficient size to sustainably entertain development greater than the level of day visitation with appropriate information signs and possible overnight camping.

4.8.7. Serrurier Group

Serrurier Island is vested as a "C" Class Reserve for conservation purposes, primarily due to it importance as a turtle breeding site and its rich fringing coral reefs (CTRC, 1974; Lasmo Oil, 1990). The reefs around this island have been described as "possibly the best in the Pilbara from a scenic point of view" (MPRSWG , 1994). It has been recommended for upgrading of its current conservation status to "A" Class (EPA, 1994). Serrurier Island is also an important seabird nesting site, supporting breeding populations of wedge-tailed shearwaters, ospreys, sea eagles, and terns, and green turtles nest there (MPRSWG, 1994). Serrurier Island is also the proposed site for the translocation of *Leggadina* from Thevenard Island. Recreational fishing is also known to be good in the surrounding waters. The island has several safe anchorages and landing sites for small craft, and is a relatively short distance from the mainland (MPRSWG, 1994). It is

currently a popular destination for day visitation by craft out of Exmouth and Onslow, but overnight camping is subject to normal nature reserve requirements (see Section 4.6.2.1).

4.8.8. Thevenard Island

Thevenard Island is currently a "C" class reserve for conservation purposes, but has been recommended as an "A" Class reserve (CTRC, 1974; EPA, 1994). Thevenard Island is one of the few islands in the study area where permanent tourism-based infrastructure is already present. Currently this consists of 8 buildings, an airstrip and associated roads. The island is also a popular destination for day trips from Onslow and Exmouth (West Australian Petroleum Ltd, 1991). There is a substantial oil industry presence on Thevenard, with several monopod oil rigs in the surrounding waters, and large storage tanks on the island itself. This may limit the potential of the island for ecotourism uses, as the average ecotourist could find the island experience lessened by the dominating heavy industry.

There is good fishing from the shores of Thevenard Island and the surrounding waters, with Mackerel, Queenfish, Red Emperor and several other species commonly caught (Lasmo, 1990). Fringing reefs around the island are also good condition and sizeable for snorkelling or diving activities, and tropical rock lobsters, may be collected there. The island supports a population of native rodents *Leggadina lakedownensis* that are of unresolved taxonomic status. It also has a significant reptile community (CALM, 1994), dugongs are sighted foraging offshore (West Australian Petroleum Ltd, 1991), and several species of seabird nest on the island.

4.8.9 Airlie Island

Airlie Island has hydrocarbon industry infrastructure and also has the only known population of *Ctenotus angusticeps*.

4.8.10. Great Sandy Island Nature Reserve

The Great Sandy Island Nature Reserve consists of 26 islands and includes the Mary Anne Islands and the *Passage* Islands. It is a "B" Class Reserve for the Conservation of Flora and Fauna, and several of

the islands (including Steamboat, Mardie, and Fortescue) are visited regularly by day trippers from Pannawonica (Stanley, pers. comm., 1995). The waters surrounding these islands have been recommended for consideration as a Marine Reserve (MPRSWG, 1994). Dugongs may be sighted from the shores of some of these islands, and recreational fishing is also good in the area.

Biological survey work is still being conducted to document the natural resources of these islands, but it seems unlikely that they will have an immediate potential for ecotourism. In addition, most of the islands are not as easily accessible as some of the others in the study area, with little mainland support infrastructure in the immediate vicinity. It is, however, worth noting that CALM is currently using volunteers for ongoing survey work, and these islands may have the potential for this scientific ecotourism in the future.

4.8.11. Lowendal Islands

The Lowendal Islands, including Varanus, Bridled, and Abutilon, are all vested in the NPNCA as "C" Class Reserves for Conservation of Flora and Fauna. The islands are important seabird nesting sites, with a large number of species having been recorded breeding there. Varanus Island is also one of the few locations in the region where four species of turtle come to breed.

Varanus Island currently has significant support infrastructure for the purposes of oil and gas exploration and production industry occupying about a fifth of the island's area. This island and surrounding smaller islands was recently subject to an intensive mouse eradication program by Apache. Facilities include accommodation, port infrastructure and helicopter landing pads. Similar to Barrow, Varanus Island may provide a longer term possibility for ecotourism ventures, as necessary support infrastructure is already in place. The Lowendal group is sufficiently close for Varanus to act as an accommodation base to service the other nearby islands for day trip activities.

4.8.12. Depuch Island

Depuch Island is of landscape and geological interest, consisting of a highly elevated mass of granite and meta-sedimentary rock. Depuch is surrounded by good fringing coral reef. Depuch Island may be a

site for the reintroduction of rock wallabies. Several ships have also gone down in the immediate vicinity of Depuch Island (see Section 5.5.7).. The island is listed on the register of the national estate for its engraved rock art, and is a protected area under the Aboriginal Heritage Act.

Similar to the islands of the Great Sandy Island Nature Reserve, Depuch's ecotourism potential may be somewhat limited by the lack of support infrastructure on the mainland. The only nearby accommodation is provided at Whim Creek, and the area has little in the way of facilities for boating requirements.

4.8.13. Downes and Weerdee Islands

Located approximately 100kms to the east of Depuch and adjacent to Port Hedland they are primarily sand and limestone islands. Downes contains important rock art engravings and other Aboriginal sits.

Downes Island has a good representation of coastal flora and fauna and Weerdee Island has good mangroves and landscape values

4.9. Management Strategy Considerations

4.9.1. Island Development Levels

A number of levels of island development and intensity of use can be considered for future ecotourism operations. It is important to realise that the levels of potential development discussed here are indicative only, and more detailed, project specific environmental impact assessment and management would need to be carried out prior to significant developments proceeding. Note that lower levels of development/use might be considered for each island other than the ceiling level identified here, within these broad categories 1-5, the Development Potential Matrix examines specific developments (see Appendix).

In broad categories, the levels of development considered are:

1) Scientific Research Only

Some islands in the study area are of ecological sensitivity sufficient to mean that they cannot be sustainably used for general ecotourism at all. Typically these are the islands that are very important seabird rookeries. Many species of seabirds are highly susceptible to disturbance whilst breeding, and a number of islands in the Dampier Archipelago (see Land Use Matrix, Appendix) have already been made no-access areas in recognition of this. A number of other islands have areas that are off limits to visitors for similar reasons. Access to these islands should be for CALM approved scientific research projects only.

2) Boat Visitation

Many of the islands of the study area could sustain this level of operation subject to suitable management guidelines and practices. The level of infrastructure required on the islands themselves would be minimal (shelters, educational signs, and perhaps toilet facilities in some cases) or none at all. Formalised mooring points would be required at frequently visited islands to minimise reef impacts. This level of operation is likely to be the most acceptable and sustainable for the majority of the islands in the southern part of the study area (see Land Use Matrix).

3) Overnight Camping (regulated)

Most of the larger islands in the study area would be capable of supporting this level of activity (see Land Use Matrix Appendix), if subject to suitable management. Permission must be sought from CALM before camping on those islands which are Conservation Reserves. The primary environmental impacts that need to be addressed in relation to camping activities include disposal of human waste, vegetation degradation, and increased risk of feral fauna and weed introduction. Given this, smaller islands which are "A" Class Conservation Reserves or support especially sensitive flora or fauna should probably remain largely excluded from overnight stays.

4) **Accommodation - Small scale**

A number of islands in the study area could potentially support sensitively designed accommodation (see Land Use Matrix). Potential candidates for this level of development include some of the larger islands in the study area where there are existing small scale buildings. Such islands include East and West Lewis, Malus, Enderby, and Thevenard. Other islands where this level of development may be suitable include the Montebello group, where there is a series of islands that effectively replicate the same array of natural resources. Such development on one of these islands could then act as a pilot study without placing a unique resource at risk.

5) **Accommodation - Large scale**

The only islands in the study group that are likely to be capable of sustainably supporting large scale accommodation are Barrow Island and some of the islands in the Dampier Archipelago (see Land Use Matrix). Barrow Island currently has large scale accommodation and the necessary support infrastructure, and is of such a size that a large proportion of the island could eventually be unused even with large scale accommodation. On the basis of natural assets, Barrow Island has perhaps the greatest nature-based tourism potential of any single island in the study area, but there are significant conflicts with the ongoing extractive industry presence there. Other possibilities include the larger islands in the Dampier Archipelago, such as Enderby, Rosemary, Dolphin or the Lewis Islands, but it should be borne in mind that most of these are also Conservation Reserves. Other longer term possibilities exist where larger scale infrastructure is already present on other islands (such as Varanus Island) due to the industrial activities. The opportunity may exist to convert this infrastructure to ecotourism oriented accommodation when industrial activity is complete. As a general rule, the category of small scale accommodation is likely to be the ceiling for almost every island in the study area. Most are probably not suitable for even this level of development. While it would be possible to construct a larger development on some of the bigger islands of the study area, it should be borne in mind that the larger the scale of development, the greater the initial environmental impacts and the more stringent the ongoing environmental management must be. In addition to this, part of what the average ecotourist wants is an "isolation" type experience (Figgis, 1993; Maiden, 1993), which is

probably derived more from a small scale island hideaway rather than a large, luxury hotel.

4.9.2. Ecological Significance and Sensitivity

At the initial stage of considering a proposed ecotourism development, a number of factors relating to the conservation value and environmental sensitivity of the island and surrounding waters involved must be taken into account.

The following should be considered during such an appraisal:

- Purpose of the Reserve ("A", "B", or "C" Class Reserve for Conservation of Flora and Fauna, Conservation Park, Marine Reserve, Marine Park);
- Sufficient concentration of natural assets present in the immediate area?
- Level of ecological sensitivity;
- Unique ecological or cultural attributes.

The Land Use Matrix provides a summary of these considerations for the named islands in the study area. Some of the islands of the study area are poorly known or not investigated at all, and no information appears for these in the Land Use Matrix. This reflects the ongoing change in the knowledge of the islands and waters of the study area, and future information should be added to the summary prepared here.

The purpose of the Reserve is an important initial consideration as this can provide a constraint to the type of activity that might be undertaken in the area in question. Secondly, there needs to be sufficient, reliably predictable, natural assets in the area proposed for an ecotourism development, and their sensitivity to impact must be considered.

It should be noted that the assessment of ecological sensitivity provided here is in broad terms, and only constitutes a preliminary assessment. Detailed environmental impact assessment studies and management plans would have to be undertaken for proposed developments of any significant scale.

4.9.3. Environmental Management Strategies

A number of strategy level recommendations arise from the overall synthesis of the environmental aspects of this study.

These management recommendations are:

1. CALM should continue its licensing system, and incorporate environmental management requirements, for all tourism activities on offshore islands under its management.
2. Revenue gained from licences should be appropriately deployed to CALM for monitoring, management, and policing activities.
3. All tourist charter and other boats accessing islands should be subject to frequent inspections by CALM for vermin.
4. Consideration should be given to the concept of an annual ticket that private individuals must obtain from CALM to access the islands, with revenue accrued similarly used to support active management of the study area.
5. An Environmental Code of Practice should be developed by the PTA, GTA and CALM (the Ecotourism Association of Australia Code of Practice in a suitable model) for the operation of private vessels in the waters of the study area and when visiting the islands.
6. With proposed larger scale developments, the approach be considered whereby a pilot study development is carried out on an island that is one of a similar group with a similar array of natural assets (such as the Montebellos), with all environmental management in place. Ongoing monitoring can then be used to determine the levels and nature of impact and assess sustainably, without placing an island with unique resources at risk. If monitoring demonstrates that the environmental management is sufficient, then other more unique islands might be considered for developments; and,
7. Education of private visitors and ecotourism operators as to the significance of the natural assets of the study area, potential environmental impacts, and necessary management practices to be undertaken. Consideration might be given to the development of visitor interpretive centres at major town ports or on larger islands, with displays providing such information.

5.0 ABORIGINAL INVOLVEMENT

5.1 Introduction

The broad objectives of the Aboriginal tourism component of the Management Strategy are (in this report the term "Aboriginal" includes both Aboriginal and Torres Strait Islander peoples):

- To identify and document the Aboriginal cultural heritage of the area surrounding the offshore islands.
- To address the significance of the Aboriginal cultural heritage of the area surrounding the offshore islands.
- To identify opportunities for Aboriginal involvement in the ecotourism industry:
- interpretation of product;
- product development.
- To prepare a management framework that will facilitate and encourage a partnership between local Aboriginal groups and other stakeholders in the ecotourism industry.

The purpose of the **draft** document is to outline a framework to broker, on a case by case basis, although a standard model may apply, local agreements on development of Aboriginal tourism within the Strategy if required. The opportunity provided by development of the Strategy is to integrate the various Aboriginal groups, government authorities and other stakeholders who have a role or responsibility in Aboriginal tourism development. It is recognised for example, that many of the significant Aboriginal sites and areas are on conservation reserves and managed by the Department of Conservation and Land Management, are protected by the Aboriginal Heritage Act which is administered by the Aboriginal Affairs Department; are subject to resource development activity and managed by the Department of Resources Development and so on. It is also recognised that the distinction between the land and marine components of the Offshore Islands Ecotourism Strategy is a non-Aboriginal one, and for Aboriginal people the issue is "Country" and the traditional lines or pathways that join people, and seas.

An analysis of the literature on the Aboriginal cultural heritage of the area is provided and, importantly, this document outlines the views and opinions of the identified Aboriginal stakeholders who have been involved in the initial round of consultations. The proposals that are discussed in the draft have been informed by the issues raised by the Aboriginal stakeholders.

Our research and consultations have revealed that Aboriginal culture is now making a significant contribution to the Australian economy (Australia Council, 1993). Without any formal approval, contract or form of agreement, Australian tourism is marketed overseas using Aboriginal themes and music. Aboriginal culture now provides many of the images for Australian tourism, and yet Aboriginal culture is being marketed without much benefit coming to Aboriginal people in either employment or enterprise terms.

Aboriginal tourism is in its infancy, and the tourism product that is available is not yet integrated into the mainstream tourism industry. The evidence for this is that the current level of participation of Aboriginal people in tourism nationally, is very low (this includes employment in the mainstream tourism industry). Aboriginal operated tourism ventures are increasing and are gradually becoming successful, but they are few in number (Higgins, 1991) (Higgins & Wood, 1995).

However:

- there are many Aboriginal people who understand clearly the opportunities for involvement in the tourism industry which is a market containing millions of overseas and local tourists;
- there is recognition of the huge potential for ecotourism, Aboriginal and cultural tourism in the Pilbara;
- the ecotourism "product" has to be right and Aboriginal people have to want to be part of it, and to be involved in management, planning, protection and control of their cultural heritage.

5.1.1. Moving Forward

The starting point for development of Aboriginal tourism should be recognition of reconciliation and the two-way approach; that is, both Aboriginal and non-Aboriginal stakeholders to be respected and involved as equal stakeholders.

Research carried out in WA and the NT reveals that expertise in the joint management approach will be crucial in the development of Aboriginal tourism. (Altman, 1988) (Higgins, 1991).

While there are opportunities for development of Aboriginal tourism on a significant scale, there are also fundamental Aboriginal requirements and concerns about this potential development. Cultural and nature based tourism in WA is relatively new (WATC, 1994), but Aboriginal culture certainly is not and Aboriginal sites in WA have

been dated back to more than 60,000 years ago. The tourism industry needs to demonstrate respect for Aboriginal culture and heritage if it wants tourists to appreciate it. This will extend to monitoring the impacts of ecotourism developments and its effect on people and areas of significance.

The mainstream tourism industry is not regarded as sufficiently aware of the opportunities for Aboriginal tourism and the industry experiences problems with cultural relationships (Indigenous Australians and Tourism, 1993), and its ignorance and intolerance of Aboriginal people. The industry reportedly is wary of making financial commitments because of the perception of Aboriginal tourism ventures being unsuccessful, unreliable or unprofessional.

The tourism industry wants "tried and true" ventures that can be easily marketed, and when the marketing promise is not delivered, the industry and its reputation suffers. Thus, marketing of Aboriginal tourism must be carefully considered.

The Aboriginal community on the other hand is not sufficiently aware of the opportunities and pathways to successful tourism ventures and product development. Some members of the community view tourism as an easy way to make money or create employment for young people; others are not the slightest bit interested in "selling their culture".

Tourism is a hands-on, demanding industry that returns profits in the long term. The commitment of a few dedicated and able individuals with the motivation to get involved in developing Aboriginal tourism is the key. Aboriginal tourism will develop from the groups or communities who are prepared to get involved, develop the expertise, establish unity of purpose amongst those involved, persevere in the face of criticism and difficulties, and who keep their eyes open to the opportunities for developing sustainable tourism (Miller, 1993).

5.2. *The Aboriginal Cultural Heritage of the Area*

Information about the Aboriginal cultural heritage of the study area is a significant requirement for proper development of the Strategy. However there are constraints on publishing such information.

Firstly, government agencies, museums, universities and other bodies have compiled and stored detailed records relating to Aboriginal sites of significance and other areas of cultural significance. However, much of this data is either confidential or is not readily accessible.

Secondly, Aboriginal organisations and communities are themselves interested in the recording and protecting of sites and areas of significance. There is also growing recognition of traditional Aboriginal land management and conservation expertise, and the rights to protection of this expertise. It has been proposed that Aboriginal representatives and traditional owners should be consultants on managing the process of gathering, recording or sharing this "intellectual property". Hence, what follows is a general account of the recorded cultural heritage of the area surrounding the offshore islands; it is not site specific.

Ten reports on the study area have been reviewed (CALM 1992 and 1994, Depuch, Gara, McDonald Hale and Associates, O'Brien, Pilbara 21, Stow, Veth, Vinnecombe - see Bibliography for details), and 23 interviews carried out with local Aboriginal people and staff from CALM and AAD Heritage and Culture Division.

According to AAD (Reynolds, 1995 Pers. comm.), there are over 40,000 sites registered under the Aboriginal Heritage Act 1972 - 1980 in Western Australia. Of these, mapsheet records indicate that there are 3,227 sites in the study area (as at 1992). These are mainly land based sties, although there are a number of registered sites on the offshore islands.

The Pilbara 21 report (1992) acknowledges that the Pilbara region contains the largest range of Aboriginal rock engravings, paintings, carvings, standing stones middens etc in the state. Given that only 30% of the region has been subject to any detailed study - and this amount only as a consequence of resource development activity - it is obviously a rich area for future research.

As to the offshore islands themselves, starting with Depuch Island to the north, there is evidence of outstanding Aboriginal art on the Island (WA Museum, 1964). According to CALM (1994), the Dampier Archipelago and Depuch Island are of high and documented Aboriginal heritage value, and some other island groups are proving to have similar values.

The Burrup Peninsula itself is considered to be one of the most outstanding examples of Aboriginal art, anywhere in Australia (Veth et al, 1993). The Aboriginal heritage of the Peninsula is widely regarded as important to the national and international scientific community (O'Brien, 1994). Vinnicombe

(1987) identified 720 archaeological sites on the Burrup prior to the Veth study (ibid) which recorded 498 sites.

According to a report by McDonald Hale and Associates (1994) for the Department of Resource Development, 51 sites have been identified (by Bradshaw) through archaeological survey of the Dampier Archipelago, being 38 sites on West Intercourse Island, 3 sites on West Mid Intercourse Island, and 10 sites on the Burrup Peninsula itself.

Aboriginal respondents to the initial round of consultations also referred to sites and " Dreaming paths" in the Burrup Peninsula. Discussions with Aboriginal representatives has also revealed that the islands to the south - Thevenard Island and Ashburton Island off the Onslow coast, the Passage Islands, Serrurier (Long) Island, and Tent Island, and the Muirons Islands off the Exmouth Coast all contain Aboriginal heritage sites.

The *Ngarluma* and *Injibandi* people are proceeding with a land claim which includes the study area. Lawyers have been appointed by the group and the consultants were advised to refer any questions pertaining to the land under claim to their legal representatives.

In addition, the key custodians from the Roebourne areas have stated that exhaustive archaeological and ethnographic surveys which involved the Roebourne community should be conducted - this is the only way sufficient information will be available to Aboriginal people, developers and planners when considering possible tourism development.

5.2.1. Recommendation

To adopt the recommendations of the draft guidelines on Protecting Aboriginal and Torres Strait Islander Heritage Places (1995), and the National Ecotourism Strategy (1994) objectives, which emphasise the right of Aboriginal people to manage and protect their cultural and intellectual property. Further identification and documentation of the cultural heritage of the area surrounding the offshore islands should be addressed with a regional Agreement on Aboriginal control over their intellectual property.

5.3. The Significance of the Aboriginal Cultural Heritage of the Area

5.3.1. Background

Much of the coastal zone is of spiritual, cultural, social and economic interest to Aboriginal and Torres Strait Islander peoples.
(Resource Assessment Commission *Coastal Zone Inquiry Background Paper*, 1992 p.31)

Tourism is a growth industry with the potential to enhance Aboriginal self reliance and dignity. However, the tourism industry has impacts on the land and on the community (Kimberley Land Council & Waringarri Resource Centre, 1991) (Burchett, 1991). Aboriginal tourism is a unique resource which needs careful management and cultural protection in the marketplace. There is an important debate needed regarding the level of Aboriginal tourism that can be sustained without destroying the very cultural assets and environments that visitors have come to see.

It is argued that the development of Aboriginal tourism should be informed by social objectives as well as by economic objectives, if it is to be a sustainable industry (see Section 5.5.5). A case study illustrates this point. Karijini Tours in the Pilbara is regarded as a marketing, community development and employment, and cultural success for the local Aboriginal stakeholders, but financially it has not yet achieved the same success (Norm Nickerson, 1994 Pers. comm.). Opportunities for empowerment through direct and positive interaction with tourists; cross-cultural education and reconciliation, and a broader understanding of Aboriginal spirituality are important aspects of Aboriginal involvement.

In the long term tourism must bring some economic spin-offs to the community, not just the tourism operator. Unfortunately the literature reveals that this is generally not the case - "once Aboriginality is marketable it is exploitable" - the experience of some Aboriginal groups in the NT is that local people have been marginalised by tourism (Hudson, 1991) (Altman & Finlayson, 1992). Although, on the other hand, the Purnululu National Park won the first international "Tourism for Tomorrow" award in 1991 for successful integration of the needs of local people, the environment, and tourists (Purnululu, 1991).

John Ah Kit, Executive Director of the Jawoyn Association in the Northern Territory, recently presented a paper on tourism development and sacred sites at the 1995 Global Diversity Conference held in Sydney.

Ah Kit listed the examples of Aboriginal culture being used as a marketing tool - starting with the most recent example of Qantas Airlines who late last year unveiled one of its jumbos painted with Aboriginal designs; the old "Made in Australia" logo which used boomerangs, to the (offensive) "Whacko the Abo Self Raising Flour" which graced the shelves of general stores back in the 1940' s.

He makes the point that that Aboriginal culture has merely been a commodity - there to be utilised for commercial profit. Little if any benefit is derived by Aboriginal people through this arrangement. And yet, according to the Australia Council (1993), Aboriginal culture is now earning $46 million year for the Australian economy, through sale of art and crafts and through the performing arts. So, Aboriginal culture is clearly good for business.

John Ah Kit argues that there is also little, if any consideration of the culture that generates this marketing material. The concerns by Aboriginal people about "selling Aboriginal culture" are largely ignored, or depicted as being anti-development (as in the NT Government's campaign against Uluru being returned to the traditional owners). However, as recent history reveals, Uluru, Yulara and Nitmiluk (Katherine Gorge) in the NT are commercially successful tourism locations - and they are under the control of the Aboriginal custodians.

Thus, Ah Kit makes the point that:

> *Aboriginal culture comes from the strength of the beliefs and custodial relationships we have with the sacred sites that form part of our cultural heritage.*
>
> *The same sacred places that have been part of the creation and continuing practice of our culture have been the inspiration for the art that we now sell nationally and internationally.*
>
> *Ah Kit, 1995.*

He challenges those involved in tourism development to respect this and to remember that the protection of Aboriginal sites is a matter of religious tolerance, social justice - as well as commercial significance.

5.3.2. Aboriginal Tourism and Land in the Pilbara

Land ownership and management is a key issue for Aboriginal people in the Pilbara. (Coombs et al, 1987) (Crough & Christophensen, 1993). Given the WA Government's recently failed challenge to the High Court's Mabo -v- Queensland decision, the fundamental issue of land tenure and security for Aboriginal people in WA remains uncertain. This uncertainly is affecting Aboriginal tourism because potential developments are being put on hold and not pursued with the vigour that is possible. Until the land issue is resolved, Aboriginal people have said to us that they are reluctant to get involved.

The WA Government's Fish Resources Management Act 1994 may also affect opportunities for Aboriginal tourism. By restricting Aboriginal fishing rights it may effectively cut off the opportunity to include fishing as part of eco and cultural tourism with those communities with the greatest potential to provide it. (Staff, *West Australian*, Nov 16, 1994, Attwood, 1995 Pers. comm.). It is not argued here, however, that tourists themselves should be given any exemption from recreational fishing bag limits.

Thus, Government policy in WA needs to pay greater attention to Aboriginal tourism perspectives (Staff, *West Australian*, Nov 9 & 16, 1994). The proposed Nature Based Tourism Strategy for WA (WATC Discussion Paper, 1994) encouragingly, points in the direction of seeking to identify opportunities for the involvement of Aboriginal people and communities in promoting WA's "natural advantage" and in "supporting and promoting the affinity between Aboriginal people and the Land".

5.3.3. The Significance of the Aboriginal Cultural Heritage of the Area

Market research reveals that Aboriginal cultural heritage is highly desired as a potential tourism product in the Pilbara.

The islands contain an abundance of sites of previous occupation by Aboriginal people, in the form of shell middens, stone "factory" sites, rock engravings, hunting hides, standing stones and habitation sites.

However, local Aboriginal people have expressed a number of concerns regarding the significance of the heritage and protection of these sites, if tourism developments occur on the islands. These concerns relate specifically to the following:

- Some rock engravings are of religious or ceremonial nature and access is traditionally restricted to specific categories of people. This restriction needs to be respected.
- Protection of engravings sites which are considered sacred in some cases but in all cases are considered unique and previous cultural resources which must be safeguarded.
- Protection of shell middens and artefact scatters which are considered to be of archaeological significance.

The significance of these sites for Aboriginal people is threefold:

- Firstly, the "Dreaming" artwork and engravings contain the Aboriginal Law which is the foundation of their history and heritage. It is essential to the cultural survival of Aboriginal people that what is there is preserved for the sake of the future generations of Aboriginal people (Herbert, 1995 Pers. comm.).
- Secondly, the sites reveal the accumulated expertise in Aboriginal society regarding natural resource management, conservation and environmental sustainability of seas and islands (Attwood, 1995 Pers. comm.).
- Thirdly, the sites reflect Aboriginal prior ownership or "title" to the islands and adjacent areas. The Native Title claim by the Ngaluma and Indjibandi people specifically refers to the offshore islands in the Dampier Archipelago.

There is recent evidence (CALM, 1990 p.13) that suggests Aboriginal people have utilised the Dampier Archipelago for probably 18,000 year or more, well before rising seas isolated the coastal plains and hills as an archipelago approximately 8,000 years ago. This research shows that at the time of European settlement of the Roebourne district in the 1860s, the Yaburarra people were considered to be the traditional inhabitants of the Dampier Archipelago and Burrup Peninsula, and were referred to as the "island people" by the

neighbouring Aboriginal groups. That report states that it was estimated that the Yaburarra once numbered 100-120 individuals, but now no traditional owners survive, although recently, descendants have been identified. According to the report the Yaburarra used rafts to travel between the islands and made extensive use of the abundant marine life for food as evidenced by the shell litter at some sites; fresh water was available for part of the year from rock pools, and that shallow wells may have been dug in suitable areas on sandplains following rain. The report goes on to say that it is probably this group the Lieutenant Philip Parker King saw and communicated with during his visit to the Dampier Archipelago in 1818, and that their decline in the late nineteenth century followed the introduction of disease such as smallpox, exploitation by whalers and pearlers and violent confrontation with European settlers included the Flying Foam massacre in 1868, as also reported in Veth (1993).

According to the expert analysis contained in the Veth Report, it is necessary for future negotiations regarding the Dampier Archipelago area to accept the authority of Ngaluma people to speak for the Burrup and surrounding islands. Ngaluma people are aware of the extent of destruction of sites that has occurred by industrial development and the potential of future destruction from resource development. They argue that the Aboriginal heritage of the area much be preserved, as the core attraction for a wider involvement in ecotourism and for Aboriginal economic development generally.

Thus, the significance of the Aboriginal sites on the offshore islands for future ecotourism developments is that they can provide information and content for ecotours to the islands, and they can provide cultural interpretation and tour guide activities for local Aboriginal tourism operators. However, their overriding significance is the spiritual and cultural connections that are involved for the local Aboriginal community.

5.3.4. Recommendation

That more comprehensive archaeological and ethnographic survey work be carried out on the offshore islands. It is the opinion of local Aboriginal people that this is the best way to inform all interested parties (the Aboriginal community, planners and developers) when considering the future of the islands for tourism development. In fact, it is suggested that Aboriginal involvement should be sought at the

start of developing any strategies; that ownership and control of cultural and heritage values should be recognised, and that Aboriginal participation in the planning and decision making process will then be more pro-active.

5.4. *Identifying Opportunities for Aboriginal Involvement in the Ecotourism Industry*

One of the keys to developing sustainable ecotourism in the area surrounding the offshore islands lies with the Aboriginal community. Personal contact with Aboriginal people is emerging as a tourism product especially sought after by a growing number of international visitors (Northern Territory Tourism Commission and Northern Territory Office of Aboriginal Development, 1994; Market Equity, 1995).

Interest in culture provides an opportunity for Aboriginal people living in the area to get into the tourism industry as an economic base - more on their own terms and in accord with their cultural heritage. (O'Brien, 1994; Veth, 1993).

However, it was clearly recognised by Aboriginal respondents to the initial round of consultations that economic development and employment opportunities were a key to the success of ecotourism development in the study area. The Aboriginal community has largely missed out on the economic returns from mining and other industrial activity in their "Country" to date. Thus if ecotourism/tourism develops according to market predictions, the Aboriginal community has a right to achieve an economic return from the tourism promotion of its culture. Discussions have also been held into the possibility of using native title and compensation issues (i.e. prior ownership of land, damage to sites and loss of access to resources) as part of future negotiations with the tourism industry.

Clearly, Aboriginal people are the most appropriate providers of Aboriginal cultural tourism, and they should be involved in product development. Some Aboriginal enterprises have already been very successful with product development. For examples see publications as follows:

1. Australia. Department of Tourism. (1994). *A talent for tourism: Stories about indigenous people in tourism.* Canberra, AGPS.
2. *Indigenous Australians and Tourism: A Focus on Northern Australia. Proceedings of the Indigenous Australian and Tourism Conference, Darwin, June 1993.* Canberra, ATSIC.

Aboriginal tourism "success stories" have built themselves around existing tourism "hubs" such as Cairns and Darwin. In WA it will be essential to build up the Gascoyne and Pilbara regions as accessible tourism hubs to create the critical mass for sustainable Aboriginal tourism.

This is one of the factors that supports the partnership approach. Aboriginal tourism operators may need to develop partnerships with the mainstream industry which can provide accommodation, marine, transport etc while Aboriginal tourism providers can concentrate on providing the cultural experiences.

Opportunities for Aboriginal involvement in the ecotourism industry can include:

- Educational tourism and cultural tours which could be developed as individual or joint enterprises to carry out functions such as introducing visitors to:
  - The spectacular natural beauty of the Exmouth to Port Hedland offshore islands wilderness through boating trips and participating in Aboriginal heritage trails/island walks and tours; interpretation of the island landscape using Aboriginal guides, including gathering bush foods and observing animals, birds, fish etc and learning about the flora.
  - The "mysterious" Aboriginal culture and heritage, through island culture and heritage tours or through the establishment and operation of cultural centres which reflect both traditional *and* contemporary knowledge and experience.
  - The cultural renaissance in Aboriginal Australia, through observing Aboriginal dance and theatre, art and craft, or reading local guidebooks and other literature on Aboriginal culture and lifestyle.

- Participation as professional Aboriginal tour guides or hospitality providers in the mainstream tourism and hospitality industry, where visitors to the region are able to make contact and experience involvement with Aboriginal people.

Preliminary observations suggest that Aboriginal tourism developments could occur:

- in the Dampier Archipelago, for example the area of the old mining camp near Hearson's Cove in the Burrup Peninsula is of interest to local people i.e. observing the rock art, walking trails and tours, and boating tours from the Cove; an interpretation centre has also been proposed in the vicinity of Mount Wongana on the Burrup (O'Brien 1994, Veth 1993);

- from Onslow to the offshore islands;
- from Roebourne to the Dampier Archipelago;
- through integration with Exmouth tourism activities and island visits i.e. an interpretation centre on the Muiron Islands or visits to Tent Island;
- through tours from Port Hedland that include visits to Depuch Islands and other sites in the area.

5.4.1. Recommendations

This aspect of the strategy should be informed by the second round of consultations that will be undertaken over the next two months, in particular over the proposed Aboriginal tourism Agreement. Opportunities for Aboriginal involvement in the ecotourism industry should be considered within the framework of an Agreement.

5.5. A Management Framework For Encouraging a Partnership Between Aboriginal and Other Stakeholders in the Ecotourism Industry

5.5.1. Towards an Aboriginal Ecotourism Management Strategy: A Regional Agreement

The term "regional Agreements" has been borrowed from the Canadian experience in response to the existence of native title in that country. In Australia, regional Agreements are also being proposed as a basis for negotiation over native title. In fact, regional Agreements are provided for in the Native Title Act 1993. Resource and tourist developments can now avoid potentially costly and time consuming challenges to proposals by entering into the processes and implementation pathways that can be established under a regional Agreement. These Agreements do not have to be based on settling native title claims, nor do they have to operate within the legal provisions of the Native Title Act. In fact, they can be formulated as consultative agreements on the processes for determining the nature and extent of Aboriginal partnership. Agreements can be reached over the management of land, seas, islands, nature reserves, and conservation areas as well. CALM, for example, has proposed "Park Council" Agreements with Aboriginal stakeholders in Karijini National Park and in Purnululu National Park (Shea 1992). Other

examples that can be considered relevant to this study are: Kakadu National Park; Uluru/Katajutu National Park; Nitmiluk National Park; Great Barrier Reef Marine Park; and the Arafura Sea, which have involved a regional Agreement (Dodson 1995).

Basically, these Agreements have involved the principles of equitable (fair) and direct negotiation between the Aboriginal community and other stakeholders in a region to recognise the rights of indigenous people and to provide them some protection of their interests. The only firm requirement is that there is an identifiable region (in this case the area surrounding the offshore islands from Exmouth to Port Hedland). Beyond that, the content of the Agreement is dependent on the nature and circumstances of the relationship between the stakeholders.

As has been identified already in the Strategy Report, Aboriginal people living in the area claim to have unique skills, knowledge and resources that could inform development of ecotourism in the region. However, a Strategy Agreement will enable consideration of the following:

- Economic development
- Management, planning and control
- Protection and conservation of cultural heritage
- Tourism impact assessment
- Finance and funding
- Marketing and research
- Product development
- Employment and training
- Business development

The following sections outline the nine areas that could be included in a consultative process with Aboriginal stakeholders on their involvement in ecotourism activities.

5.5.2. A Regional Tourism Agreement Could Include a Strategy for Aboriginal Economic Development

It is axiomatic that self determination for the Aboriginal community in the offshore islands study area includes a greater share of and access to economic development, and that aboriginal involvement in tourism is one way to achieve this. However, the Aboriginal respondents to the initial round of consultations argued that currently, the WA Government's Acts and regulations dis-empower Aboriginal people and cut them out of economic development opportunities along the coastal zone. The WA Coastal Zone Management Review (1994) acknowledged that Aboriginal interests were not being thoroughly taken into account in coastal planning and management.

Thus, it must be acknowledged that if the interests of Aboriginal people are to be achieved, their direct representation in management and planning arrangements must be addressed and that their rights to a share of the economic returns from ecotourism must be respected.

5.5.2.1. Recommendation

The Agreement should address opportunities for Aboriginal involvement in the ecotourism industry and should be integrated with economic development and employment returns to the local community.

5.5.3. A Regional Tourism Agreement Could Include a Strategy for Aboriginal Management, Planning and Control

Aboriginal people have begun to assert the right to be involved in the planning and ongoing management of the area surrounding the offshore islands.

According to the National Ecotourism Strategy (1994) "Aboriginal and Torres Strait Islanders are involved as resource managers, site and intellectual property custodians, land holders and operators" (p.8). Thus, a regional Agreement could address the process of involvement and consultation with Aboriginal people, in recognition of their cultural heritage and intellectual property considerations over the offshore islands in the study area.

It is about "due process" and including Aboriginal representation in the policy making, planning, administration and management arrangements - at the earliest stage - from initial consultations though to negotiations about product development, and monitoring of the impacts of any developments. The process can also provide a consultative framework for balancing and negotiating and reconciling conflict.

It is also important to recognise the need for funding of the mechanisms of representation and consultation.

An Agreement could also ensure that decision making processes are competent, logical and transparent i.e. based on open information between the decision makers. This arrangement has to be operative at the most local level possible, and should include all the sectorial interest groups to ensure that an effective decision making process is in place.

5.5.3.1. Recommendation

The Agreement should adopt the recommendation of the draft guidelines on Protecting Aboriginal and Torres Strait Islander Heritage Plans, and the National Ecotourism Strategy objectives which emphasise the right of Aboriginal people to manage and protect their cultural and intellectual property.

5.5.4. A Regional Tourism Agreement Could Include a Process for the Management, Protection and Conservation of Aboriginal Cultural Heritage Sites and Associated Tourism Products

The draft documentation on "Protecting Aboriginal and Torres Strait Cultural Heritage Places", includes a set of guiding principles. An Agreement based on recognition of Aboriginal ownership of their cultural and intellectual property could involve the following:

- Identification of custodians and traditional owners and those who have the rights to speak for the area would be done at the commencement of the process.
- Identification of sites of prominence and importance to Aboriginal people would be carried out by Aboriginal people/ in conjunction with nominated experts/AAD.

Note: This arrangement is already being utilised by the Department of Resource Development (J Pryor, 1995 Pers. comm.).

- Properly resourced meetings to plan for the level and nature of involvement in tourism would be conducted with the Aboriginal stakeholders.
- Information on historic sites and Aboriginal occupation of the islands would be agreed on prior to any interpretive materials being developed.
- Product development would not proceed until its cultural significance has been established, agreed to, and clear development guides have been prepared.

Tourist product would ideally be developed through joint venture/partnership arrangements, with equal involvement in the development process.

5.5.4.1. Recommendation

The Agreement should address the means whereby comprehensive identification and documentation of the cultural heritage of the area can be appropriately controlled by the direct involvement of Aboriginal consultants.

5.5.5. A Regional Tourism Agreement Could Include a Strategy for Tourism Impact Assessment

The rationale here is that tourist development of the offshore islands will happen and that the Aboriginal community should be able to plan for it and manage its impacts.

The literature (Altman 1992, National Ecotourism Strategy 1994, Indigenous Australians and tourism 1993) indicates the costs associated with Aboriginal tourism can include the following:

- Increase in numbers of people to communities or islands
- Increases in demands on local people and exposure to outsider/culture contamination
- Disruption to lifestyle, ceremonial activity
- Extensive time commitment on behalf of the local people
- Guest contact/relating to tourists is demanding

- Sites damage
- Exploitation of culture as product or destruction of cultural flavour of the community
- Environmental damage
- Increased wear and tear on infrastructure
- Marginalisation of local people
- Too much power in vested interests
- Increased racism
- Higher accommodation costs/shortage in some towns
- Higher local prices
- Less friendly/more local conflicts
- Crime

The benefits associated with Aboriginal tourism can include the following:

- Empowerment through dignified and authentic interaction with visitors
- Cultural education, reconciliation, broader understanding of Aboriginal spirituality
- Economic growth and self reliance
- Ownership of projects
- Employment for local residents, and career paths for those interested
- Environmental and land care protection
- Improved prosperity through a partnership with mainstream industry
- Expansion of new services and businesses
- More infrastructure and community facilities
- More sealed roads, kerbing and guttering
- Increased variety of restaurants/entertainment
- Better educational facilities
- Better health facilities
- Tidier towns/communities

According to Altman (1992) the overruling principle in regard to Aboriginal tourism is sustainability. Ecologically and culturally

sustainable tourism adopts as a working model the interdependence between:

- Stewardship of the physical environment and the land;
- Promotion of cultural heritage;
- Preservation of cultural integrity; and,
- Commercial success and equitable distribution of returns to local participants both now and for future generations.

5.5.5.1. Recommendation

It is essential to recognise the "sustainable" factor in the development of Aboriginal tourism. This will involve impact assessments of the environmental, economic and cultural effects of tourism developments. Visitation to Aboriginal sites or areas of occupation on the islands must be monitored, and if necessary, controlled. The need to consider enforcement provisions which will protect Aboriginal heritage sites and possible strengthening of such provisions, will also have to be addressed.

5.5.6. A Regional Tourism Agreement Could Include a Strategy for Finance and Funding of Aboriginal Tourism

It is generally true, that potential earnings from tourism are over estimated. Tourism is an expensive business to set up and involves a long lead time to reach profitability. It can take up to two years to reach the point of being able to sell a tourism product. It is essential to be realistic about this and plan for the time, effort and financial resources that will be needed to establish and develop tourism enterprises to a state of commercial viability. This will involve consideration of how to accommodate the cultural as well as the commercial interests. Otherwise, the tourism development will not be sustainable and the resources will have been wasted.

There are basically two funding models.

1. Government funding which involves very demanding scrutiny of funds and bureaucratic processes, but usually not much attention to what is actually happening on-the-ground.

2. Private funding which is generally much more flexible to arrange, but is more demanding in terms of what is produced on-the-ground.

5.5.6.1. Government funding

The Federal Government is supporting Aboriginal tourism initiatives, provided Aboriginal people "own" the developments and provided there is proper, commercial business planning carried out. Government will also provide subsidies, grants and loans in recognition of the substantial disadvantages of rural and remote Aboriginal communities.

However, funding from government departments (such as ATSIC) involves very demanding scrutiny, accountability and reporting requirements. It also involves long lead times and slow reaction times which makes for difficulties in establishing the funding base for successful tourism enterprises.

5.5.6.2. Private funding

Private funding can be more flexible and far less bureaucratic than government funding. In the NT and Queensland in particular, non-aboriginal tourism developers have been allowed to establish Aboriginal tourism ventures that have no direct involvement of Aboriginal people. This indirect involvement allows for commercial management, book keeping, financial control and other "white" business practices to ensure viability of the enterprise. Private funding involving direct participation of Aboriginal people is rare, but is potentially more exciting - and sustainable. Private "backers" will expect performance on-the-ground and the specialist input of Aboriginal people in terms of culture, local knowledge etc., at a professional, world standard.

5.5.6.3. ATSIC National Tourism Strategy funding of tourism projects

The following points apply when applying for funds for tourism projects through ATSIC.

- *Grant* funding is available to declared Aboriginal and Torres Strait Islander (ATSI) organisations and to States and Territories, State/Territory bodies, and local government bodies.
- *Loans are available to ATSI individuals and organisations.*

- *Funding may be available through the following ATSIC programs:*
  - Business Funding scheme (BFS)
  - Community Economic Initiatives Scheme (CEIS)
  - Industry Strategies
- Other Commonwealth and State departments and agencies have programs under which funds may also be available. It may be particularly useful to approach the Commonwealth Department of Tourism (see the Department's *Regional Tourism Development Program* and *Tourism Assistance Guide* publications) and the Department of Employment, Education and Training.
- Refer to ATSIC's *Tourism Information Guide* publication for further details.

An ATSIC checklist applies when considering applications for pilot or demonstration projects. The projects must:

1. have relevance to the national ATSI tourism strategy;
2. involve ATSI people;
3. have the potential to increase ATSI employment;
4. have the support of the tourism industry, and
5. have national benefit/application.

5.5.6.4. Recommendation

The Agreement should address the finance and funding of Aboriginal tourism. This will involve consideration of both private sources of funding, and government funding. This will also involve consideration of the cultural as well as the commercial interests.

5.5.7. A Regional Tourism Agreement Could Include a Strategy for Aboriginal Tourism Marketing and Research

5.5.7.1 Marketing

Tourists can only show interest in what they know about. Australian Tourism Commission advertising which is currently screening in Asia, Europe and the USA, shows images of Aboriginal culture which is creating an expectation among international visitors to Australia. However, Aboriginal participation in tourism is low, and already, many international

visitors are disillusioned because the advertising misrepresents the nature of Aboriginal involvement in tourism. The travellers arrive here with expectations that currently cannot be met, except in some parts of Northern Australia.

On the other hand there is a huge potential for Aboriginal tourism based on the expectations that are there, waiting to be met. Switched on visitors in particular are attracted by the information they receive and the quality of the information they receive.

Pamphlets, brochures, guidebooks and other informative literature for the tourism market is crucial to achieve a better understanding of the significance of the Aboriginal cultural heritage of the offshore islands area. This would also involve education of the wider community in the study area about local Aboriginal culture and the extraordinary rock art "gallery" in the Burrup Peninsula and surrounding islands in particular.

5.5.7.2. Recommendations on Research

A market research strategy would need to consider the following:

- A regional image or profile of Aboriginal tourism.
- Corporate image and business name for the enterprise or products that are offered.
- Identification of what visitors want, and advertising of the product in a way that will attract people to the product.
- Identification of areas of Aboriginal significance; those sites that are suitable, and those sites that are not suitable for visitation.
- Identification of the information that is needed to achieve this, and the most effective way to get the information distributed:
  - guidebooks;
  - brochures;

videos;

- visitor centres/word of mouth.

- Identification of independent marketing opportunities and/or marketing through the mainstream tourism industry:
  - wholesalers (domestic and international);
  - inbound operators and travel agents.
- Identification of mechanisms for **on-going** monitoring of visitor expectations, visitor profiles, and demand for Aboriginal cultural experiences.

5.5.8. A Regional Tourism Agreement Could Include a Strategy for Aboriginal Tourism Product Development

The challenge facing Aboriginal tourism operators lies in ensuring sustainable and authentic products. Managing this objective means that the product may not be easily packaged and marketed. The following recommendations may help in balancing the commercial and the cultural requirements.

5.5.8.1. Recommendations

- Identify the tourism assets and attractions that are appropriate, and those places that are not suitable for tourism.
- Limit the access for cultural tours etc; keep it small scale and exclusive by targeting the upper end of the tourism market.
- Ensure cultural security for those people who do not wish to be involved or imposed upon, and ensure that the community can have some privacy.
- Establish visitor centres/cultural interpretation centres that can provide a point of contact for the mass market. It is important to integrate with the WATC and regional tourism offices in this regard.
- Produce "modules" which are offered by family or community groups and then market these modules through the local tourism centre or visitor centre.
- Get advertising etc organised well ahead of any operations starting.
- Build up the product slowly and make sure that the partners have the ability to provide the service. It is important to not

take on more than can be handled; the business must be manageable.

Some of the important things Aboriginal tourism operators need to consider are:

- Being able to supply what the client has paid for e.g. if the client does not get to see a dance performance by a group scheduled for a certain day of their tour, then that client may sue the travel agent or operator for the whole cost of the tour.
- Pricing of the tours needs to be set for the whole tourism year without alterations.
- Advertising brochures need to stipulate what is being offered; reliability and consistency of the product being offered is important (Australia. Aboriginal and Torres Strait Islander Commission, 1994. Minutes of tourism workshops held in Western Australia).

5.5.9. A Regional Tourism Agreement Could Include a Strategy for Aboriginal Education, Employment and Training

As the *Pilbara 21* report acknowledges, Aboriginal people are the most disadvantaged group in the Pilbara and the need to address employment and training outcomes is obviously important. In fact, targeted education, training and employment strategies are essential in building a strong foundation for Aboriginal tourism in the region. There is a pressing need for appropriate training for the mainstream tourism industry, Aboriginal tourism providers, and Aboriginal employees.

According to the research conducted over recent years, there are a number of design requirements for effective education and training delivery (Concord Training and Development, 1991) (Australia. Aboriginal and Torres Strait Islander Commission, 1994. Minutes of tourism workshops held in Western Australia).

5.5.9.1. Purpose-designed programs

Existing mainstream training courses are not generally regarded as accessible, appropriate or relevant. The solution is to develop and implement training courses that are purpose designed for the

situation in the region or area. The programs must be relevant to the Aboriginal employment and enterprise development, and must be aimed at excellence in high standard tourism services.

5.5.9.2. Industry or enterprise based programs

There is widespread dissatisfaction with many employment training programs because they are usually short-course "quick and dirty" approaches with weak linkages to the employment marketplace. The "work experience" approach basically misses the point in that the hospitality and tourism industry wants competent, high quality staff who can provide appropriate guest services, which is appropriate to the level and nature of their involvement in the industry.

The solution is industry or enterprise based training that is built around comprehensive, on-the-job training that is formally linked to employment in the enterprise.

5.5.9.3 High quality programs

A quality focus is the "glue" that will bind Aboriginal tourism and training and employment programs into successful ventures. Management practices and operational procedures should have inter-locking processes aimed at quality training and employment. This is because:

- a quality focus is the dominant model in world-standard hospitality and tourism industry service;
- there is a small pool of Aboriginal tourism operators and;
- Aboriginal tourism operators and employees must be able to provide the standard of service and consistency of service required by international visitors.

5.5.9.4 Mainstream industry training

Managers and supervisors

Managers/employers will either "make or break" Aboriginal tourism development and training programs. Their attitudes, relationships and management practices are as significant as the

employees they recruit. Unless they make a serious effort to build a partnership with Aboriginal people, no significant change in the status quo is likely.

The widespread insistence that "there are no barriers to Aboriginal people - the tourism industry is open to everyone", is in itself an example of the problem. Aboriginal people have not perceived the hospitality and tourism industry in a very positive light because of inappropriate management practices and because the industry has not had a positive image.

Thus, the industry has to recognise that it does have a problem, that it is not a level-playing-field for Aboriginal people, and if the mainstream industry wants to develop Aboriginal tourism products and partnerships, then it has to make a commitment to its own staff training and development in this area.

Curriculum topics for managers and supervisors

Managers and staff should receive training in areas of importance to Aboriginal people, and to ensure that they comply with the requirements and obligations under the Aboriginal Heritage Act.

- Orientation and awareness sessions on Aboriginal tourism opportunities and constraints and the importance of attitude change increased understanding and knowledge of aboriginality.
- Aboriginal culture training covering the spectrum of traditional, post contact and contemporary Aboriginal cultural upbringing and history and the diversity of regional and national Aboriginal culture.
- Managing and supervising Aboriginal staff covering EEO/race relations and the existence of racism; Aboriginal learning styles, inter-cultural communication and relationships and differences, the mentor and supervisor role.

The delivery of each level of training can be flexible i.e. short intensive training blocks can be delivered during the off-season and on-the-job training can be provided during the dry/busy season.

Curriculum topics for Aboriginal tourism owner/operators and employees

The three broad levels of training that need to be addressed are:

Level 1: Personal Development
Level 2: Work Ready Development
Level 3: Job Specific Development

Work information tours that familiarise people with other tourism enterprises are recommended.

5.5.9.5 Aboriginal Tourism Employment in the Region

Employment

CALM Rangers

The appointment of Aboriginal rangers and cultural interpretation centre guide training is a high priority. This is of great interest to *Ngaluma* and *Indjibardi* people.

HIART Program

The Western Australian Hospitality and Tourism Industry Education and Training Council's HIART Program is a purposed designed, accredited, industry based Aboriginal recruitment and career development program. The Program is run in-house with selected hotels/resorts that have the demonstrated capacity to host the Program; provide the HRM and training facilities; involve managers in cross-cultural training and supervision; and make the commitment to Aboriginal employment and career development. All employees are guaranteed on-going employment on satisfactory completion of their training.

Government Funded Employment Programs

There are several employment schemes that can be utilised by local tourism operators:

- Jobtrain (provides accredited training and work experience)
- Jobskills (as above and provides virtually 12 months wage subsidy). This type of assistance can provide the incentive for

tourism operations to take on additional staff as long as they are prepared to meet the job training requisites. Further details can be provided by DEET.

- The Federal Government's *White Paper* on employment also contains substantial budget increases for employment programs, which will have a positive impact on employment growth within regions and within the hospitality and tourism industry.

Education and Training Courses

Aboriginal and Islander Music College

- Associate Diploma of Arts (Music)
- Certificate of Performing Arts (Music)

Aboriginal Dance Development Unit

- Associate Diploma of Arts (Dance)
- Certificate of Performing Arts (Dance)

TAFE and the Independent Colleges

There are a range of approved courses provided by TAFE and the independent colleges which cover travel, tourism and hospitality skills development.

- **Pundlemurra College**
  The College is actively involved in Aboriginal tourism training in the North West, with programs already in place in Roebourne, One Arm Point and Fitzroy Crossing and with the Karijini Aboriginal Corporation. They have linkages to accredited Aboriginal tourism training in the Northern Territory and Queensland through an interstate cooperative arrangement with the Australian National Training authority (ANTA). The College has developed or delivered courses in tour guide training, culture centre/interpretation, public relations and marketing, first aid and "F" class bus drivers licences and other relevant short courses.

Travel Courses

- There are six (6) private training companies providing retail travel courses in WA. The courses cover travel and tourism, administration, forms and ticketing. Duration of the courses is 3-12 months.

Hospitality and Tourism Courses

- TAFE Colleges provide mainstream hospitality and training courses.
- Regional Skillshares also have a range of hospitality courses.
- Private colleges also offer hospitality courses.

5.5.10. A Regional Tourism Agreement Could Include a Strategy for Aboriginal Tourism Business Development

The major principle regarding Aboriginal tourism business development is to have a business approach. ATSIC funding in particular will be determined by evidence of a "profit driven business ethic" (ATSIC, 1994). This involves a dilemma for most Aboriginal tourism ventures - how to ensure Aboriginal control over tourism development while satisfying accountability and quality assurance requirements (Miller, 1993).

There are basically three enterprise modules that are talked about in the literature.

1. Community based initiatives, using the community council/incorporated body as the corporate structure and developing tourism ventures on community controlled land.
2. Entrepreneurial initiatives, using a company or other corporate structure and developing commercial enterprises in the marketplace.
3. Joint partnership initiatives using a mainstream tourism business partner and developing Aboriginal tourism products as a joint venture.

Whatever model is adopted, equity involvement of the Aboriginal participants is crucial. Development of community based initiatives allows for a management approach that is informed, familial and culturally based but is regarded as risky because of the history of community politics interacting with community business. The entrepreneurial model is best suited to development of profit-driven

ventures, and if developed by family groups with the ability to run a business successfully, can be the way to go. Development of joint partnerships is recommended by ATSIC. This approach can ensure that the Aboriginal partners can concentrate on the product (tour, activity or attraction) while the non-Aboriginal partner concentrates on the business, cash flow and marketing aspects. The danger with this approach is that the non-Aboriginal partner(s) may dominate the management domain, impose on the community or group and weaken the Aboriginal self-determination aspect.

5.5.10.1. Assistance with Aboriginal tourism business development in Western Australia

Aboriginal Economic Development Office (AEDO)

AEDO provides support to Aboriginal communities and individuals in several areas. Broadly, these are as follows:

Business Development
Assisting individuals and communities prepare business plans, access funding, organise appropriate legal structures and establish suitable management and financial systems.

Community Development Projects
These are usually larger projects with long term outcomes. Tourism based projects (e.g. Karijini Visitor Centre, Darlngunaya Tourism Plan, Kooljaman Resort at Cape Leveque, Bibelmen Mia based projects (Kurrawang Emu Farm, Miriwoong Mango Farm Development) are a few of the projects AEDO assists. AEDO' s involvement is very much hands-on in working up viable ideas with communities, preparing funding submissions, linking organisations who have an interest in supporting these projects once they get off the ground if this is required.

Product and Market Development
AEDO has established an Aboriginal art studio and retail outlet in Perth called *Artist in Residence.* This provides interested artists with studio space, a retail outlet and exposure to commercial reality. AEDO assists in designing, packaging, pricing strategies and overall marketing of products. A very strong wholesaling market has been established supplying Aboriginal art and artefacts throughout the world.

Business Enterprise Centres (BEC) Network

These Centres operate to assist sustainable business enterprises throughout WA, to ensure that local communities benefit from economic development.

Western Australian Tourism Commission (WATC)

Provides grants to Country Tourism Associations, Special Events Assistance, Tourism Development Grants and general advice and support to the tourism industry. The WATC have also produced a *Development Guide* which provides information and advice on how to develop tourism projects.

The WATC has recently appointed an **Aboriginal Tourism Product Coordinator** to ensure that Aboriginal tourism is marketed properly and new entrants into the industry are made aware of tourism marketing opportunities.

5.5.10.2. Recommendations for Aboriginal Tourism Development

Business Plans

Business plans must be developed and must be professional. The plan must consider the following:

- Funding
    - administration, training, and operating and infrastructure costs
- Marketing, distribution, product development
- Decision making, authority and control structure
    - ensuring that Aboriginal management is properly coordinated
- Clear operating guidelines
    - ensuring "Articles of Association" are properly understood and implemented
    - conforming to statutory guidelines and requirements for licences and permits
- Lead time to reach profitability and on-going support and advice to maintain profitability

- Watching out for consultants. They generally provide what you want to hear and not always what you need to hear.

Linkages and Networks

It is important to build linkages between Aboriginal tourism operators and the mainstream industry. There are opportunities for leverage and cooperative marketing on a regional or enterprise level that should be explored. Also, the lack of information sharing and exchange between the various sectors of the industry is a barrier to development of Aboriginal tourism. By liaising with the mainstream industry, comparability of tourism development can be achieved.

Visitor Centres

Cultural centres or "Keeping Places" are considered to be important points of contact. The challenge lies in how to present the history and culture of the region with integrity and in a non-paternalistic manner.

6.0. PLANNING CONSIDERATIONS

6.1. Introduction

Iron Ore and Oil & Gas are the main industries of the Pilbara, but further development of tourism is seen as one way of diversifying the region's economic base. Tourism has a long way to go in both the Pilbara and Gascoyne regions, but virtually all the relevant literature recognises tourism as one of the best potential growth industries for these regions. In particular, ecotourism promises considerable potential benefits. The off-shore islands are recognised as a potentially valuable ecotourism resource.

Sustainability is the crucial issue in ecotourism. The project brief is unequivocally clear about the need for the conservation of the physical environment of the offshore islands. The brief states:

> *The coastal islands are indeed a valuable asset to the Pilbara/ Gascoyne Regions, Western Australia, Australia and the world. It is essential to develop a strategy which will protect this unique environ whilst providing access for multiple use where it is sustainable. (Project Brief - Page 3).*

It is clear from this statement that the primary aim of any ecotourism management strategy must be the maintenance of the quality of the natural asset base. Clearly, any ecotourism strategy which resulted in a deterioration of the natural asset base, would ultimately be self-defeating.

6.2. Planning Objectives

The National Ecotourism Strategy presents the following objective relating to Regional and Town Planning.

> *Develop a strategic approach to integrated regional planning based on ecologically sustainable principles and practices and incorporating ecotourism.*

The specific actions intended to realise this objective are summarised as:

- "Identify the potential impacts and benefits of ecotourism in the regional planning process and encourage the development of interregional planning strategies that provide a framework for ecotourism planning."

- "Utilise an ecosystem / bioregional approach to managing, interpreting and promoting natural and cultural tourism resources....."
- "Provide opportunities.... for community participation in regional planning....."
- "Prepare and publish guides on planning approval processes and provide advice to prospective ecotourism operators."

This study is intended to help implement these actions with regard to the offshore islands. From the Regional and Town Planning perspective, therefore, the main aim of the Off-shore Islands Ecotourism Strategy may be defined as:

> *To ensure that planning strategies and practice facilitate and encourage sustainable ecotourism within the offshore islands of the study area.*

To achieve this will require:

1. Identification of potential island-related ecotourism assets, activities and development opportunities;
2. Identification of significant public infrastructure inadequacies which may hamper island-related ecotourism;
3. Identification of necessary support facilities and services such as mainland accommodation, and the identification of locations suitable for development;
4. Streamlining of development approval processes, but in a way which will still ensure the integrity of the physical and cultural environment.

6.3. Planning Context

6.3.1. The Study Area

The Pilbara Region is a very large, somewhat arbitrarily defined region based on historic local authority boundaries. It is far too big and diverse to be planned as an integrated unit and, for regional planning purposes, definition of smaller sub-regions is necessary.

The Pilbara 21 report identifies several broad geographic planning units within the region. Units C (coastal) and D (offshore) are the units with which this study is mainly concerned, however, only that portion of Unit C south-west of Port Hedland is included within the present study area.

In the interests of taking "an ecosystem/ bioregional approach" to regional planning issues, the study area also extends southwards beyond

the Pilbara region into the north-western extremity of the Gascoyne region to include Exmouth and its associated offshore islands.

6.3.2. The Coastal Towns

In addition to the islands, the study area necessarily includes the mainland coastal towns. Established towns are crucial to any tourism strategy for the islands, as it is currently the towns which are the bases for offshore ecotourism activity. The mainland coastal towns are:

- Exmouth
- Onslow
- Dampier
- Karratha
- Roebourne
- Wickham
- Point Samson
- Cossack
- Port Hedland

Though all of these towns have some role to play in the future of tourism within the region, the towns of Exmouth, Onslow, Dampier and Karratha are seen as having the main potential as service centres for island-related ecotourism. Port Hedland, which is clearly of strategic importance to tourism generally, also has some significance for island-related ecotourism. These towns will be discussed in Section 6.5.1.

Though Cossack and Point Samson are on the coast and have considerable tourism (and ecotourism) potential generally, they are not seen as being significant future platforms for the island-related ecotourism which is the subject of this study.

6.3.3. The Islands

Information about the offshore islands has been thoroughly inventoried and mapped by other members of the study team. This section, therefore, does not seek to be comprehensive. The following sub-sections summarise selected information relating to the regional and town planning considerations. Some of these matters may also have been covered elsewhere.

6.3.3.1 Reserves

From an examination of Mines Department maps and Department of Conservation and Land Management (CALM) tenure information, it can be seen that most of the larger islands within the study area are Conservation or Nature Reserves, or are part of an island group contained within such a reserve. CALM advises that 90 percent of such reserves are vested in the National Parks and Nature Conservation Authority (NPNCA).

Several of the smaller islands are reserves too, although a considerable number remain as Vacant Crown Land. CALM has provided a list of the geographic coordinates, land area and tenure status of each island in the study area in its database which will form the basis of the resources map.

Though development within conservation reserves is not impossible, it may be quite difficult to achieve. *CALM advises that the purpose of the reserve is the important guide to what development might be possible and what probably will not.* For example, development in Nature Reserves is generally not permitted. If, however, a conservation reserve is vested to include public recreation as one of its purposes, then appropriate developments would probably be considered. In a similar way, oil exploration activities can be permitted, e.g. Barrow, Thevenard.

Where management plans exist for particular reserves, any development is expected to comply with such plans. Where management plans do not exist, then a process called "Compatible Operations" may be instigated where there is a proposal for development in a suitable reserve. Recently such a process was instigated for some form of wilderness accommodation on the Montebello Islands. This process involves a preliminary phase to seek general comment on the proposal, then an "Expressions of Interest" phase to seek private sector involvement in the proposal.

Vacant Crown Land may be freeholded or leased by the Department of Land Administration (DOLA) to facilitate development projects, however, applications to do so are subject to close scrutiny by an array of agencies, including CALM. Therefore, even if a VCL island was considered suitable for development by a proponent, CALM (together with as many other agencies as might be considered appropriate) would be

given the opportunity to consider or reconsider the island's potential conservation status prior to clearance for any development.

From a planning perspective, the appropriate context for approving any development on the offshore islands would be a CALM approved management plan. More will be said about this in Section 6.4.5 of this chapter.

6.3.3.2. Mining & Petroleum Leases

Few of the islands in the study area are the subject of Mining Tenements. Enderby Island off Dampier is subject to some 14 Mining leases, but there are only isolated instances of such tenements elsewhere. Industry sources advise, however, that continuous improvements in technology could lead to an increase in exploration and mining activity sometime in the future. Potential for valuable mineral exploration and extraction should therefore not be underestimated at this point in time.

Reference to the Petroleum Exploration and Development Tenements map produced by the Department of Minerals and Energy, indicates that virtually all the islands west and south-west of Cape Preston are subject to numerous Petroleum Exploration or Development Tenements. The study area falls squarely within the area covered by the state's large and important oil and gas exploration and production industry. The "Carnarvon Basin" is amongst the best prospective basins in the world.

A large portion of the study area, is covered by Exploration Permits, Production Licenses or other tenements. The affected area includes the Montebello Islands, Barrow Island and all islands in the study area to the south and south-west of these significant features. The islands of the Dampier Archipelago seem, from the available information, to be the least affected by the mining or petroleum industry at the present time, as they are largely unaffected by the various tenements.

This point, of course, excludes Dampier itself, and a few of the islands nearest that town, which are totally dominated by port and other infrastructure associated with the iron ore and oil & gas industries.

6.3.4. Planning System

The planning context for the study is also defined by the planning system in the state of Western Australia. This has been documented elsewhere, so the following sub-sections simply summarise this aspect for the sake of completeness.

6.3.4.1. State Planning Strategy

A State Planning Strategy is currently being prepared by the Western Australian Planning Commission (WAPC). It is expected that a draft strategy will soon be completed which will then be the subject of extensive consultation. It is anticipated that the final strategy will be completed by the middle of 1996.

When finalised, the State Planning Strategy will be the highest level of strategic plan in the State. It will indicate to service agencies and the like where the WAPC considers growth and major development opportunities are likely to occur.

In addition, the strategy will be the only planning tool which will link, in a strategic context, other major and key planning strategies such as the Heavy Industry strategy, State Tourism Strategy, the recently released Coastal Management Strategy and the New Horizons in Marine Management Strategy.

6.3.4.2. Regional Planning

The next level down in the planning hierarchy, after the State Planning Strategy, is regional planning. There has been an increased amount of regional planning activity in the state in recent years, as community and government awareness of the economic and social importance of the various regions has increased.

This has found expression in the creation of the regional development commissions which are responsible for mobilising local initiatives for economic and social development, and coordinating state level interests in the various regions. This study envisages the Pilbara and Gascoyne Development Commissions as having a crucial role in facilitating development and expansion of the region's offshore islands ecotourism potential.

Regional planning covers a wide scope and includes regional structure plans, resource and environmental management plans, and regional development programs. Regional level planning projects of relevance to the current study include:

- Pilbara 21
- Roads 2020 (Pilbara Regional Road Development Strategy, 1994)
- Pilbara Regional Land Use Study (in progress)
- Off-Shore Islands Ecotourism Strategy (this study)
- Gascoyne Regional Ecotourism Strategy (in progress)
- Gascoyne Regional Aquaculture Plan
- Burrup Peninsula Land Use & Management Plan
- Exmouth Coastal Strategy
- Onslow Coastal Plan

6.3.4.3. Local and Specific Area Plans

The next level in the hierarchy is where non-statutory development plans for towns and parts of towns are carried out. These are often subsequently adopted as policies by planning authorities. This category may contain a wide variety of planning activity from quite detailed streetscape projects, to urban strategies such as commercial or housing strategies, to municipal heritage inventories. Specific island development and management plans would fall into this category.

Local area plans tend to be regarded as a positive or pro-active form of planning, because they are generally aimed at bringing about specific forms of development. They should therefore be prepared in full consultation with all relevant planning and service-providing authorities.

6.3.4.4 Statutory Plans

These include town planning schemes and complementary plans such as improvement or development plans which have some statutory or quasi-statutory status. It is in statutory planning schemes that precise parcels of land are zoned for specific purposes.

Statutory plans are often regarded as "negative" or restrictive instruments because, although they control what others may do on particular parcels of land, they do not, in themselves actually encourage development. Nowadays, whilst land use compatibility remains a core issue, the tendency in statutory plans is away from precise and detailed segregation of land uses in favour of a more generalised approach. This often envisages mixed use developments in appropriate locations. The basic zoning instrument has been supplemented by other methods to achieve this.

6.4. Sustainable Development

Sustainable Development is development which is *"able to be carried out without damaging the long-term health and integrity of natural and cultural environments"* (National Ecotourism Strategy). Naturally, any physical development intended to facilitate or support ecotourism must have sustainability as its overriding criterion. The ecotourism potential itself exists only as a result of an area" s natural assets; and because human beings wish to experience the superior natural quality of those assets.

This crucial point is reflected in the clearly stated sustainability requirements of the project brief. Any development will change the natural environment to some extent, however, so it is necessary to carefully balance impacts against returns and establish acceptable levels of change.

Therefore, when considering opportunities for sustainable ecotourism development, natural assets present, at the very same time, both opportunities (to utilise the asset for an economic benefit) and constraints (to preserve the health and integrity of the asset). A detailed consideration of the area's natural assets, and how humans want to interact with them, is therefore essential to the understanding of what development might be sustainable and what might not.

6.4.1. Natural Assets

The natural assets of the study area (the starting point for any ecotourism industry) have been identified, studied and mapped by other members of the project team For the purposes of this discussion it is therefore considered sufficient just to list them:

- Whale Sharks

- Dugongs
- Coral Reefs
- Mass Coral Spawning
- Seabird Nesting
- Turtle Nesting
- Fish
- Mangroves and other Flora
- Terrestrial Fauna
- Cave Fauna
- Fossils and Rocks
- Aboriginal Sites
- Other Cultural Sites (for example ship wrecks, lighthouses, etc - for all intents and purposes "natural" assets)

In themselves, these natural assets are not ecotourism. In order to cater for ecotourism (that is, to become a tourism product), these assets need to be accessed and experienced by human beings. In the process, they will be associated with specific recreational activities. It is not until the assets are associated with activities that tourism and any subsequent development potential is generated. It should be noted that development is not necessarily essential for this interaction, but may facilitate it more easily and pleasantly, in the appropriate circumstances.

6.4.2. Types of Recreational Activity

As part of the overall experience of some visitors to the region (not everyone will want an island experience), it is envisaged that the natural assets of the offshore islands will be experienced as an integral part of a recreational outing or expedition. Such trips would necessarily include *one or more* of the following activities:

- A Scenic Flight;
- Boating;
- Scuba or Snorkel Diving;
- Line Fishing;
- Walking around on an island, observing, photographing, etc (day and / or night);
- Scientific research and associated activity, (Earthwatch projects, etc);

- Eating, drinking and being merry;
- Relaxing or sleeping on a boat; or
- Relaxing or sleeping ashore.

All activities which may impact on the environment of the islands need to be managed to some extent, in order to ensure *indefinite conservation of the assets*. Such management may involve some type of development on the islands (such as, for example, boardwalks). In other cases, full realisation of an ecotourism opportunity may require a higher level of development. In such cases, development should only be permitted if it is judged to be "sustainable".

At this stage it needs to be noted that the recreational activity of local people in relation to the islands is one of the most significant management issues. Management for local visitors is possibly more problematic than for tourists. Most tourists will experience the islands as part of an organised tour, whereas many locals, and some other visitors from further afield who have their own boats, will visit the islands informally. Locals may visit the islands many times informally. Management strategies should therefore aim to cater for both types of access (informal and formal).

6.4.3. Types of Development

To help assess the potential for sustainable tourism development on the islands, a development hierarchy has been defined. The following list (which identifies both terrestrial and marine development types) contains potential island development categories aimed at catering for the activities associated with ecotourism (listed above). These development types have been ranked in rough order of their estimated potential impact (see Land Use Matrix,Appendix).

Terrestrial Developments

1. No development of any kind
2.1 Information signs
2.2 Paths, boardwalks, etc
2.3 Picnic areas
2.4 Camping areas

3.1 Simple shelters (no walls)
3.2 Helicopter landing pads
4.1 Shacks / Chalets (small numbers)
4.2 Backpacker-type hostels (small numbers)
5.1 Larger complexes of 8 and 9 above
5.2 Basic hotels
5.3 Three-star hotels
5.4 Luxury hotels
5.5 Major resort complexes
5.6 Caravan Parks

It should be noted that all accommodation developments from 2.4 onwards (inclusive) would require some form of toilet facilities. Toilet facilities *may* also be desirable in formal picnic areas (type 2.3). Developments from 3.2 onwards would, in addition to toilets, require some form of ablution facilities and probably some other infrastructure such as power generation, water supply, communications, etc.

Caravan parks have been placed out of order at the end of the list because, obviously, they could never occur on an island and will be limited to the mainland towns only. They are included in the list, however, due to their importance to a great many visitors to the region (see Section 6.5.2).

Marine Developments

1. No development of any kind
2.5 Boat moorings (small numbers)
2.6 Boat moorings (larger numbers)
4.3 Boat ramp
4.4 Jetty (single)
4.5 Jetty (several)
4.6 Houseboats (small boats/ numbers)
5.7 Houseboats (larger boats/ numbers)
5.8 Floating hotel/s
5.9 Small Boat Harbour/ marina (and associated development)
5.10 Large Boat Harbour/ marina (and associated development)

For the purposes of this study, houseboats are regarded as "development" due to their nature, size and potential environmental impact.

Actual tourism development projects may include several different types of development components selected from the list. Also, marine development components may be combined with terrestrial development components. Some examples of such combinations are:

- Boardwalk *and* Information sign
- Shacks *and* Camping area
- Boat moorings *and* Shacks *and* Camping area
- Jetty *and* Chalets
- Marina *and* Major resort complex

6.4.4. Types of Location

The locations within which island-related ecotourism developments may occur have, for the purposes of this analysis, also been categorised. The defined location categories are:

1. The Mainland Coastal Towns
2. Barrow Island
3. The Montebello Islands
4. Other large islands which contain shacks already and / or other infrastructure, probably established by the oil and gas industry
5. Other large islands which have no shacks or other infrastructure on them at the present time
6. Small to Medium sized islands which are elevated and / or hilly
7. Small to Medium sized islands which are low lying and / or flat

The rationale for this categorisation is discussed in the following sub-sections.

6.4.4.1. Mainland Coastal Towns

The coastal towns present the main opportunities for development to serve the island-oriented ecotourism industry. This is mainly because they are well known destinations in their own right, with well established physical infrastructure. They are also strategically located near many of the islands of interest. As

stated previously, the towns with the most significant opportunities are:

- Exmouth
- Onslow
- Dampier
- Karratha
- Port Hedland

Although each of these towns currently exists, the economic bases of Exmouth and Onslow are not as securely established as those of many other towns in the state. The economy of all these towns could benefit greatly from focussing limited development resources and infrastructure within them. In regional planning terms it would be inadvisable to dilute whatever economic and development forces there are within the study area by developing facilities on islands (at considerably greater expense) which could serve ecotourism equally well if developed in an established town.

It is considered that, while not precluding development on selected islands, it makes better sense from a planning, environmental, economic and resource perspective *to generally favour development in the towns rather than on the islands, if possible.* Such a prioritisation should ensure that development on the islands would only be that which was ideally suited to an island location, over all other possibilities. This would obviously apply where particular markets specifically required separation from towns, for example, to provide a "wilderness" experience for tourists.

By adopting this approach, the islands and the mainland towns would always *complement and support one another* in pursuit of the benefits of ecotourism. If this approach is not adopted, then the risk will be created of the towns and the islands ***competing*** with one another in a non-sympathetic and counter-productive way. This situation could have adverse economic and environmental consequences and should be avoided. It is reiterated, however, that in maintaining this key strategic approach to the issue of land development, there could be a number of opportunities for development on some of the islands. The rest of this section is concerned with how this might be approached and managed.

6.4.4.2. Barrow Island

Barrow Island has been placed in a category of its own because it is by far the largest island in the study area. In addition, it is extensively used for oil extraction and has significant infrastructure in place, including a sealed airstrip and accommodation complex. Dirt tracks serving a multitude of individual oil wells crisscross the southern half of the island. Barrow Island stands out as having significant longer term development potential due to the existence of this infrastructure.

In addition, the island is of high conservation value and has many natural assets which would attract the ecotourist. The western coast of Barrow Island is quite spectacular with a rocky shoreline and low cliffs. In places, coral reefs extend right up to the shore. Towards the north, turtles can be seen in the water, and there is plenty of evidence on the sandy beaches of their nesting activity. There is also a large diversity of terrestrial fauna and flora on the island.

The task of developing tourism side by side with industry on Barrow Island would not be insurmountable in theory. However, for the foreseeable future, the island's ecotourism potential may remain unrealised due to the continued operations of the oil and gas industry.

It should be noted that while Barrow Island is of interest for ecotourism due to its infrastructure and extensive natural assets, any future development must be subject to stringent environmental controls to protect the island's natural environment.

6.4.4.3 Montebello Islands

The Montebello Islands have also been placed in their own category due to the size, extent and strong definition of the island complex; as well as their relative inaccessibility. The desolate remoteness of these islands is one of their most significant features. Tourist visits there would be in the nature of a true "wilderness" experience.

The inaccessibility of the Montebellos makes them unsuitable for day trips, except by helicopter. It is therefore likely that any development on the islands (should it be required) would need to be of a more substantial nature than would otherwise be the case. Houseboat expeditions to the Montebellos, where tourists stay on a pontoon-style twin hull houseboat for five nights and six days, are currently launched from Onslow.

6.4.4.4 Other Larger Islands (with shacks/ oil)

In addition to the two categories described above, any large island which already contains some development in the form of accommodation of some kind, and / or any oil industry based infrastructure; is regarded as a separate category. One example is Thevenard Island off Onslow, which has both. On the face of it, a range of developments which utilise to some degree the facilities already in place, without additional environmental detriment, could be envisaged on these islands. However, some islands with substantial oil/gas production facilities, e.g. Veranus Island, cannot, at present, support dual activities for safety reasons but may be suitable for ecotourism in the future.

6.4.4.5 Other Larger Islands (without shacks/ oil)

Larger islands which currently have no form of development or infrastructure on them are treated as a separate category. There should naturally be more hesitation about development on such islands, than there would be compared to the previous location category.

6.4.4.6 Small/ Medium & High/ Hilly

For the purposes of this part of the analysis, two categories of small to medium sized islands have been identified. Those small to medium sized islands which are elevated or have other significant topography may offer opportunities for certain types of developments to be located where they could remain visually unobtrusive.

6.4.4.7 Small/ Medium & Low/ Flat

On the other hand those islands which are low lying and flat pose special problems for development. Even quite small developments on such islands could achieve such a visual

prominence as to spoil the character and atmosphere of the island entirely.

6.4.5. The Development Potential Matrix

By relating the various types of development to the defined location categories, a "Development Potential Matrix" has been defined. This is presented as an Appendix. In the matrix, the Potential Development Categories are broadly graded in significance from the top to the bottom of the list. The location categories are also broadly graded in terms of development potential from the left to the right. Five categories of potential suitability have been defined:

1. **Suitable** - the potential development is suitable for consideration in relation to the location category.
2. **Probably Suitable** - though not so obvious as in Category 1, it is reasonably likely that such a development would be considered suitable for the location category.
3. **Possibly Suitable** - it is by no means clear that the development would be found to be suitable, and would depend very much on the circumstances of the case. However, there is insufficient reason to rule out the possibility of the development type being suitable.
4. **Probably Unsuitable** - there is a reasonable likelihood that the Development would not be suitable in the location category.
5. **Unsuitable** - it is virtually certain that such a development would not be suitable in the location category.

It is important to note that use of the Development Potential Matrix would not on its own confirm that a particular development was suitable for a particular location within a location category. *The matrix is simply indicative of the types of development which may be considered for certain types of locations* and is read in conjunction with the Land Use Matrix. Two important points should, however, be noted:

1. The environmental assessment carried out as part of this study has identified several islands which, due their environmental importance and sensitivity, should not even be considered for development of any kind. Such islands are therefore specifically excluded from the location categories presented in the Development Potential Matrix.

OFF-SHORE ISLANDS ECOTOURISM STUDY

Table 6.1 **Development Potential Matrix**

Location Category / Potential Development	Coastal Towns	Barrow Is	Montebellos	Other Large (with shacks/oil)	Other Large (w'out shacks/oil)	Small/ Medium & High/ Hilly	Small/ Medium & Low/ Flat
Terrestrial							
1.0 No development of any kind	(na)	(na)	5	(na)	5	5	5
2.1 Information signs	5	5	5	5	5	4	4
2.2 Paths, boardwalks, etc	5	5	4	4	4	3	3
2.3 Picnic areas	5	4	4	4	4	3	3
2.4 Camping areas	5	4	4	4	3	3	3
3.1 Simple shelters (no walls)	5	4	3	4	3	3	3
3.2 Helicopter landing pads	5	4	3	4	3	3	3
4.1 Shacks / Chalets (small numbers)	5	4	2	4	3	3	2
4.2 Backpacker-type hostels (small numbers)	5	4	2	3	3	2	1
5.1 Larger complexes of 4.1 and 4.2 above	5	4	2	2	2	2	1
5.2 Basic hotels	5	4	2	2	2	2	1
5.3 Three-star hotels	5	3	2	2	2	1	1
5.4 Luxury hotels	5	3	1	2	2	1	1
5.5 Major resort complexes	5	2	1	1	1	1	1
5.6 Caravan Parks	5	1	1	1	1	1	1
Marine							
1.0 No development of any kind	(na)	(na)	(na)	(na)	5	5	5
2.5 Boat moorings (small numbers)	5	4	4	4	4	3	3
2.6 Boat moorings (larger numbers)	5	4	3	3	2	2	1
4.3 Boat ramp	5	4	3	3	2	2	1
4.4 Jetty (single)	5	4	3	3	3	2	1
4.5 Jetty (several)	5	3	3	3	2	1	1
4.6 Houseboats (small numbers)	5	3	3	3	2	1	1
5.7 Houseboats (larger numbers)	5	3	2	2	1	1	1
5.8 Floating Hotel/s	5	3	2	2	1	1	1
5.9 Small boat harbour/ marina	5	3	2	2	1	1	1
5.10 Large Boat Harbour/ marina	5	2	1	1	1	1	1

LEGEND

Suitable	5
Probably Suitable	4
Possibly Suitable	3
Probably Unsuitable	2
Unsuitable	1

Notes:

1. This table does not apply to those islands which have been identified in the study as having no development potential whatsoever, due to their environmental importance and sensitivity.

2. This table is indicative of possible development potential only. Any development on any island within the study area should only occur in accordance with an approved Structure or Management Plan for the Island.

2. Even though the Development Potential Matrix indicates possible development scenarios, any actual development proposal on a specific island would still require a separate "normal" environmental and planning approval. Also, developments should only be implemented in accordance with an approved Structure or Development Plan for the island. Such plans should be approved by the proposed Regional Planning Committees. Development on islands outside the context of an approved development plan *should not even be considered.* Even in the towns where development is regarded as most desirable, normal development approval procedures will still apply (although these may be able to be streamlined).

6.5. Strategy Considerations

The previous section discussed assets, activities, development types, general locations and the potential for development suitability in relation to ecotourism objectives on the offshore islands. This section is intended to contribute to the development of the main strategy by placing these and other regional and town planning factors into an appropriate strategic framework.

6.5.1. Towns and Island Groups

As stated in Section 6.3.2, the mainland coastal towns of Exmouth, Onslow and Dampier/ Karratha are considered to have the best potential for major island-oriented ecotourism development. Port Hedland also presents opportunities for accessing some unique island resources. The towns should be favoured over the islands as the preferred choice for major developments. Each of the main coastal towns is well located as the main service centre for several main groups of islands:

- Exmouth has a major airport and is close to the Muiron Islands, Serrurier Island, and several other small islands in the vicinity.
- Onslow is ideally placed to facilitate travel to Thevenard Island, and is reasonably well placed for access to Barrow and the Montebello Islands; as well as other nearby smaller islands such as Airlie and the Mangrove Islands.
- Dampier & Karratha are of course superbly located in relation to the numerous islands of the Dampier Archipelago. Dampier is also a

similar distance to Onslow from Barrow Island and the Montebellos. Karratha also has a major airport.

- Port Hedland has an international airport, and is strategically important to general tourism in the Pilbara and Kimberley regions. It is also the principle base for recreational boat trips to Depuch Island, which is one of the most interesting islands in the study area.

The following sub-sections briefly discuss the development potential of these mainland coastal towns in terms of catering for tourism.

6.5.1.1 Exmouth

The town of Exmouth has a population of around 3,128 persons (ABS 1991 census count) and is widely recognised as the main centre for marine tourism in the Gascoyne region. The whale sharks are world famous. Tourism and fishing have virtually saved Exmouth since the US Navy vacated the communication station base there. Tourism now offers very significant potential for future town expansion.

Land supply in Exmouth is not a problem. There is ample land adjacent to the existing developed area for the town to virtually double in size, should there be a demand for such growth. The new Town Planning Scheme currently under preparation (TPS 3) identifies six large tourism development sites which can be used for upgrading and expanding existing tourism facilities (such as Norcape Lodge) or creating new ones.

Also, to the south of the town on the coast, an area has been identified adjacent to the recently approved boat harbour for the possible development of a major tourism/ residential complex associated with a large marina to be developed using the boat harbour as a starting point. It is understood that LandCorp is investigating the feasibility of this large development.

Exmouth does, however, have two potential constraints to future development. These are:

1. The location of the waste water treatment plant;
2. The availability of a potable water supply.

The existing waste water treatment plant is in a location which could very likely be put to a "higher and better" use. However, as the plant has spare capacity in its existing location, the Water Authority has stipulated that moving the plant to facilitate development should be at the cost of the proponent of the development.

The planning consultants preparing the new Town Planning Scheme for Exmouth have, however, stated in their planning report: *"Re-location of* the *WTP should be pursued as a matter of priority for the future of the town"*. There is a better site for the treatment plant slightly to the north of the townsite and there is no doubt that relocation of the plant would present additional opportunities for tourism development.

The Water Authority presently draws potable water for Exmouth from a thin lens of groundwater located to the south of the town. Considerable expenditure will be required to upgrade the system (by expanding it further southwards) to accommodate any significant future growth of the town. Apparently this is a significant issue which must be resolved soon, as the existing water supply is more or less at capacity now.

6.5.1.2. Onslow

Onslow has a population of 881 persons (ABS 1991 census count). The most recent planning of Onslow is represented by the "Onslow Coastal Plan" prepared for the State Planning Commission (now the Western Australian Planning Commission) by the Department of Planning and Urban Development (now the Ministry for Planning) on behalf of the Ashburton Shire Council. The Plan was released for Public Comment in March 1994.

The Onslow Coastal Plan makes the point that Onslow "is a town precariously balanced between the harsh semi-desert environment and a favoured tropical cyclone path." It is within an identified hazard zone. The town is subject to storm surges and inundation and future planning needs to be mindful of this fact and permit development only under certain conditions. There are duty of care and legal liability issues to consider in this regard.

In fact, the Coastal Plan goes to significant pains to point out that the State Planning Commission has sought and received legal

advice to the effect that the Commission "has a direct responsibility to the people of the town to ensure their general welfare is safeguarded".

However, "The main planning and management implications from the assessment of the social and economic aspects indicate that while Onslow's relative isolation has tended to result in the slow growth of tourism, there is an increased awareness of Onslow as a winter tourist area in relation to diving and fishing in the nearby islands" (Onslow Coastal Plan).

The two most promising tourism oriented development potentials in Onslow at the moment seem to be:

1. Development of a motel or "Broome-style" backpackers accommodation on the Water Authority site. This site is ideally located for such a development, centrally within the town, with a waterfront location. Such a development would contribute further to the evolution of an attractive tourism character in Onslow which has been so admirably commenced by the establishment of "Nikki' s" licensed restaurant.
2. Development of a Marina and associated caravan park at Beadon Creek. Both a marina and caravan park would serve established tourism requirements. At this stage the caravan park may be a little premature, but the statistics indicate caravan visitation to the region is increasing and is likely to continue to do so.

Though there may be other potential development opportunities in Onslow which could be usefully exploited, it is considered that Onslow' s relative inaccessibility and the development constraints resulting from its low topography and potential storm surge areas (refer to the Onslow Coastal Plan) will prevent it becoming as large a tourism centre as Exmouth and Dampier / Karratha.

The fact remains, however, that Onslow offers more waterfront development potential than any other mainland coastal town. It has the potential to become a most attractive destination, provided additional tourism oriented developments can be attracted.

6.5.1.3. Dampier/ Karratha

Dampier and Karratha are considered together because of their close proximity and complementary functions. The 1991 ABS census recorded a population of 1,810 persons in Dampier and 11,325 persons in Karratha. For the purposes of this study Dampier is the main focus as a potential tourism centre of some significance. In fact Dampier is seen as having the main potential to serve the needs of island-related ecotourism in the region, as well as to become a significant tourist attraction in its own right. The main reasons for this opinion are:

1. Dampier has intrinsic interest in its own right. It is unique in physical layout and within a spectacular setting. This setting epitomises the Pilbara with views of red rock, blue ocean, offshore islands and industry. It is without doubt the most attractive and interesting town in the study area.
2. It is very close to the regional centre - Karratha - which provides additional interest for tourists. Both towns are well located in terms of road, air and water transportation. These towns are relatively close to other significant tourism destinations in the Pilbara
3. Dampier is close to the most extensive island complex in the study area - the Dampier Archipelago, and thus offers the most significant opportunities to access a larger number of offshore islands.
4. These islands (apart from those immediately adjacent to Dampier) appear to be the least constrained of all islands in terms of conflict with the aspirations of the oil and gas industries.
5. The Islands off Dampier appear to have virtually the full range of natural assets on offer in the study area.
6. The topography of many of the islands is significant, thus offering a greater range of possibilities for developing tourism facilities on them.

Dampier does, however, have considerable constraints on its future development and expansion:

1. It is largely a "closed" mining town, owned by Hamersley Iron Pty Ltd (although some residences are now being sold privately).
2. Physical expansion of the town would be very difficult and expensive. The difficulty and cost of expanding Dampier led to the decision to create Karratha.
3. The services infrastructure, especially the sewerage system, is currently operating at capacity and further town development would require its expansion. It is also considered to be "sub-standard" by Water Authority criteria, however, Hamersley Iron argues that the standard is adequate. This issue could perhaps benefit from an independent engineering assessment.

Nevertheless, there is no doubt that there are some potential tourism development sites in the town; and physical infrastructure can always be upgraded (albeit at high cost). There is potential for at least one hotel / motel, a backpackers (possibly converted single men's quarters) and a caravan park. The potential for an upgraded marina / boat harbour associated with relocation and upgrading of the sewerage treatment plant should be carefully investigated.

Whatever development potential Dampier might possess, it will probably not be sufficient to cater for long term demand for tourism facilities in the area. Nearby Karratha, as the regional centre, can complement selective development at Dampier by further catering for mainstream tourism development, which of course, will have an ecotourism component.

6.5.1.4. Port Hedland

For the purposes of this discussion, a general reference to "Port Hedland" refers to both Port Hedland and South Hedland. The 1991 ABS census recorded a population of 11,344 persons in Port Hedland. Though Port Hedland is a comparatively large and important town, its population has nevertheless declined in recent years. In 1986 the census count was 13,069 persons (ABS).

Until the 1930's the port at Port Hedland was mainly used for exporting pearl shell, wool, livestock, gold and tin. The port continued to serve the pastoral and mining industries in a modest way until the mid 1960's when the massive infrastructure

developments to service the iron ore industry were established. Since then, the iron ore industry has dominated the form, function and economy of the town. The establishment of South Hedland, some 20 kilometres to the south of the port, was a direct result of rapid and significant population growth largely driven by the iron ore industry.

Port Hedland also has strategic significance for the tourism industry. It has an international airport, and is also the last major town in the Pilbara for people travelling northwards to the Kimberley. It is a convenient day's drive away from Broome. Port Hedland is also well located as a base from which to visit locations of interest in the northern Pilbara such as Marble Bar. Travellers through the inland Pilbara heading north way well miss Exmouth and even Karratha, but the location of Port Hedland makes it a virtual certainty for a visit. The tourism office in downtown Port Hedland is indeed a lively place.

With regard to island-oriented ecotourism, Port Hedland is not as strategically located as the other main towns in the study area. Nevertheless, it currently serves as a base for charter boat operations to the dramatic Depuch Island, some 100 kilometres to the south west. Depuch Island offers a rich source of Aboriginal rock engravings, as well as good fishing and diving. Also, Port Hedland is nearly as well placed as Broome to provide a mainland base for access to the Rowley Shoals to the north (outside the study area).

It is generally recognised that there is a demand for more hotel/ motel accommodation in Port Hedland. Much of the existing accommodation in the town caters for the business traveller as well as tourists, and a lot of the time it seems to be near capacity. There appears to be an opportunity to develop some more tourist-oriented accommodation in Port Hedland, on a couple of sites near the waterfront. The condition of several of the structures in parts of the town centre also indicate some redevelopment potential.

The strategic location of Port Hedland, and the quality of the potential accommodation sites suggests that a tourist orientation in the accommodation style, as well as a business orientation, may be appropriate. Realisation of this potential may require a pro-active facilitating role for the Pilbara Development Commission.

6.5.2. Tourism Demand

This section explores selected aspects of future tourism demand. It is not intended to be comprehensive, and its sole function is to form an impression of the likely future tourism demand in order to assess whether the available land in the important (to this study) towns is likely to be adequate.

The future demand for island-oriented ecotourism is virtually impossible to predict at this point in time. It is the type of industry which would be highly susceptible to a marketing campaign, yet a concerted marketing effort has not yet been implemented. Prior to mounting such a campaign, of course, suitable preparation by the fledgling industry would be required.

Tourism demand and marketing issues are covered elsewhere in the study. This section simply examines some indicators of demand in order to assess the adequacy of existing town infrastructure. Whatever development potential exists on the islands themselves, it is clear that, for the foreseeable future, it is the established coastal towns in the region which will continue to be the bases for island-oriented ecotourism in terms of catering for accommodation needs.

The most recent market research publication on tourism in the Pilbara region is the "Market Equity" report. This report is based on market research carried out over a 12 month period during 1994 with existing and potential Pilbara tourists. The Market Equity report is not discussed here (interested readers are referred directly to the report), however, the main conclusions and recommendations of the study include the following key points (see 4.2):

1. The Pilbara contains many undeveloped ecotourism opportunities, many of which are a "well kept secret".
2. Most visitors to the Pilbara (72 percent of all visitors) are "passing through" to other destinations (although they may actually stay in the region for several days).
3. Lack of awareness of what the region has to offer is the main reason for this phenomenon. Lack of awareness is also very pronounced among potential tourists.
4. The main short-term potential for expansion of the tourism industry in the Pilbara is in "tapping" the potential of existing visitors who are passing through.

5. Some 68 percent of existing tourists in the region use caravans or campervans.
6. Some 71 percent of existing tourists are aged 45 years and over.
7. The main focus for Pilbara promotion should be on the interstate and intrastate potential rather than the international potential.
8. In the medium term, there is clearly considerable scope to develop the Pilbara as a unique tourism destination, with particular emphasis on nature-based tourism and Aboriginal cultural tourism.
9. The other niche segments of "young singles and young couples" and "families with young children" offer further future potential for developing "activity based eco-tourism style concepts".
10. The recommended market positioning of the Pilbara is as a "new frontier" offering a range of attractions, with few other tourists in a clean environment and appealing climate.
11. At present the Pilbara is not seen to offer the same water-based activities as adjoining regions. Developing and promoting this aspect would greatly add to the appeal of the Pilbara.
12. Promotional campaigns will be necessary to increase tourism in the region.

In terms of the current study, these findings are most informative. They suggest that the interest in and demand for island-based ecotourism experiences could increase very substantially once informative promotional campaigns are commenced, and when tourism product is available. Growth of the tourism industry would in turn generate employment opportunities and thus opportunities for expansion of the region' s resident population.

6.5.3. Development Requirements

The material presented in the preceding sub-section, together with evidence from a variety of other sources, suggests that the current supply of commercial accommodation in the Pilbara Region is just catering for the current levels of demand. If current levels of occupancy were regarded as the optimum levels in Hotels, Motels, Guesthouses and

Caravan Parks; and these levels were maintained (along with duration of visit), then (in theory) an additional unit of accommodation (room or van) would be required for each additional 66 guest arrivals to the region.

Based on recent trends and anecdotal evidence, by 2000/01 an additional 900 accommodation units may be required in the region over the 1992/93 levels. By 2005/06 a total of 1,400 additional accommodation units may be required over the 1992/93 levels.

Therefore, it is concluded, that, based on current trends, some increases in the supply of commercial visitor accommodation will probably occur, though this will not be enormous. This situation could, however, alter dramatically in response to promotion and marketing campaigns which, as indicated by the Market Equity research, could bring significant changes above trend estimates due to increasing awareness.

At this stage, however, a key component of the strategy should be to ensure that there is sufficient potential for the development of at least one, preferably two or three tourist accommodation developments in each of the main towns, as well as whatever potential exists on the islands themselves. At present, there does appear to be sufficient potentially available development sites in the towns to ensure that availability of sites is not an impediment to the development and growth of the tourism industry generally, and the ecotourism industry in particular.

6.5.4. Potential Conflicts

As discussed in previous sections, a number of different development components may be required to form an integrated ecotourism development. For all intents and purposes, however, such a combination will be considered as a single development proposal (for example, some chalets and a jetty). Such combinations of uses are "synergistic" and conflicts between uses at this level is rarely an issue.

The main cause of potential land use conflict in the study area is likely to be between ecotourism activities and its associated development, and the following industries/activities:

- Oil & gas industry
- Iron ore industry
- Commercial fishing industry

- Aquaculture
- Conservation of natural resources
- Recreation
- Servicing

6.5.4.1. Oil, Gas & Iron Ore

Off-shore oil and gas exploration and extraction activity is far and away the most significant influence on island-based ecotourism aspirations in the study area. Iron ore activities pose fewer problems, but they are fairly intense close to Dampier.

The importance of the iron ore and petroleum industries to the economic wellbeing of the state and the nation cannot be overstated. It is estimated that the value of these industries in 1994 was in the order of $6 billion (Pilbara Economic Conditions, 1994).

By contrast, the tourism industry in the Pilbara and Gascoyne regions is relatively small. This is not to say the tourism industry is not important, because clearly it is; and its importance is set to increase greatly. Rather, the point is made to stress the relative importance of the oil, gas and iron ore industries.

Even though the tourism industry is growing strongly, it will, for the foreseeable future, remain small compared to the other main industries of the region. Yet, it is important to note that island-related ecotourism activity, with its relatively small economic benefits does have the potential, if not managed properly, to prejudice the development of valuable oil and gas projects.

It is essential that this does not occur. From a strategic planning perspective, it is important to note that, while efforts should be made (where appropriate) to develop infrastructure to serve the budding ecotourism industry, such efforts should not constrain oil and gas extraction.

In theory, ecotourism has a very long term potential, while the potential of oil and gas is limited to the extent and quantity of the resources. In practice, however, improvements in technology continue to push back the supply horizon in both minerals and

hydrocarbons, also providing these crucial industries with very long term prospects.

The stringent environmental controls over the oil and gas industry should, barring disasters, enable full economic exploitation of the resources without destroying the natural environment. This environment can then be enjoyed by tourists in perpetuity. In the meantime, however, ecotourism and major marine-based resource industries must continue to co-exist.

In the short term, therefore, any significant or "permanent" ecotourism development on the islands should only occur in the following situations, unless there was an imperative to do otherwise:

1. Where there is minimal or no potential for oil or gas extraction in the future. This may occur where the resource has been exhausted or where it is known not to exist.
2. Where oil or gas is present, and where the full extent of the infrastructure necessary to extract/produce it is in place. In such circumstances, tourism development may be *designed to co-exist* with the oil and gas infrastructure, provided suitable arrangements can be made with the relevant oil or gas company. In regard to this potential for co-existence, it may be entirely reasonable to require of the oil and gas industry some consideration of aesthetics and natural context when major infrastructure is being designed.

The main situation to avoid is one where potential for oil and gas extraction is known to exist, yet it has not yet been proved or developed. Significant "permanent" ecotourism developments should not be permitted in these circumstances. The reasons are:

1. Oil companies, when seeking permits to explore or mine, must consider potential impacts on the social environment as well as the physical one. It is therefore possible that an ecotourism development could limit or prevent the scope of oil and gas exploration and/ or extraction activity.
2. However, it is more probable that in such a situation the oil and gas industry would be regarded as more important than an established tourism development, and exploration and/ or extraction would be allowed to go ahead regardless of the

presence of the tourism development. In this case, the pleasant surroundings and economic wellbeing of the development could be severely disrupted.

It is considered that sensible regional planning should not create an environment which could result in either of the above scenarios occurring. A long term view should be taken which, on the one hand, recognises the huge importance, but essentially finite nature, of the oil and gas industry; and on the other hand recognises the potentially indefinite potential of the ecotourism industry in the area.

It is important to recognise that this key element of the strategy will not necessarily preclude island development. There are many island development opportunities in the study area which could be realised in the short to medium term, should they prove economically and environmentally feasible.

6.5.4.2. Aquaculture

Aquaculture activity presents another possible form of conflict with ecotourism because it significantly modifies the natural environment in the vicinity of its operations. It can be a hazard to boating and, if inappropriately located, may affect opportunities for tourism activity and development. Shore bases may also compete directly for sites suitable for tourism. For the purposes of any planning strategy, aquaculture should therefore be regarded as "development" and proposals for aquaculture evaluated accordingly.

Pearling leases currently operate in the southern extremity of Exmouth Gulf, the Montebello Islands, and off Dolphin and West Lewis Islands in the Dampier Archipelago. There is also interest in establishing more intensive aquaculture operations off Enderby Island. Pearling within the study area has considerable economic value.

Aquaculture developments should continue to be permitted in the study area, however, such activity should not be allowed to prejudice the use of the more scenic islands for ecotourism. It is therefore recommended that aquaculture generally be discouraged from establishing in the three main island groupings considered to have the best potential for ecotourism development,

unless it can be clearly demonstrated that no negative tourism impacts will result.

In the same way that ecotourism should not significantly prejudice the oil and gas industry, it is considered that aquaculture should not significantly prejudice ecotourism. However, the establishment of aquaculture in suitable areas (ie those without significant ecotourism potential) should be strongly encouraged provided they will not have adverse environmental impacts.

It is therefore recommended that, as development, and as part of the island management context which this study is seeking to define, aquaculture license applications should be referred to the proposed Islands Consultative Committee for comment prior to their normal processing.

Aquaculture facilities could well become items of interest to mainstream tourism, and therefore their presence in a tourist area could be an additional attraction (provided problems of access could be overcome). However, aquaculture, wherever it is established, would likely be considered by "pure" ecotourists as the complete antithesis of what they are seeking.

6.5.4.3 Commercial Fishing

The Pilbara fishing industry is small scale, particularly compared with other regions of Western Australia. It had a total value of less than $5 million in 1988/89 (Pilbara 21 Report). The Gascoyne fishing industry is of much greater significance, with an annual catch valued at around $96.7 million in 1992/93 (Gascoyne Coast Regional Strategy). Of most relevance to the current study is the prawn fishery in the Exmouth Gulf.

The commercial fishing industry is highly regulated in order to preserve species and fish numbers. It is considered to be operating at a sustainable level at the present time, and no future expansion is envisaged. It is considered that properly managed ecotourism will not prejudice or unduly interfere with the commercial fishing industry.

6.5.4.4 Conservation of natural/cultural resources

Offshore islands ecotourism will depend on the conservation of natural and cultural resources for these are the very foundation of the industry. This is not to say that tourism should have no negative impacts because it will but rather to manage impacts on the basis of predetermined acceptable limits of change. On the other hand, tourism can be beneficial by educating local communities and travellers about natural and cultural values and by providing funds for the management of natural resources and for local communities.

However, the use of natural and cultural resources for tourism must only occur in consort with managers/owners of these resources and must provide desired returns be they financial or educational. This strategy suggests tourism development on offshore islands based on the sustainability of these resources.

6.5.4.5 Recreation

The study area is predominantly used for recreation by local people and intrastate visitors using their own boats. A corollary of promoting tourism and raising awareness about a region is increased recreational use which will gain further momentum as more infrastructure such as marinas is provided. While recreational and tourism uses are fundamentally compatible in activity, they will compete for space and may detrimentally affect each other by causing environmental degradation and through competition for resources.

One of the prime objectives of this strategy is to identify opportunities for the provision of tourism infrastructure including accommodation on offshore islands. At present, the only built accommodation is on Thevenard Island in the Onslow zone of opportunity, in the Dampier Archipelago in the Dampier/Karratha zone of opportunity. Accommodation on Thevenard Island is commercially available to tourists but accommodation in the Dampier Archipelago is privately licensed by CALM/DOLA to individuals and two game fishing clubs. Licences are annual and are not transferable. CALM accommodation is used by CALM officers and visiting researchers as bases for field operations and scientific work.

- **Dampier Archipelago chalets/shacks**

  Chalets/shacks are currently located on islands which this strategy identifies as suitable for tourism infrastructure. Therefore, the strategy does not suggest removal of these structures but rather compliance with suggestions for the environmental management of any structures on and visitation to islands and their use for tourism.

  Chalets/shacks provide exclusive use for a limited number of individuals and two game fishing clubs and are not readily available for ecotourism or public use. Within the scope of this study, the chalets/shacks are a valuable resource for ecotourism and private licences should be phased out over the next five years in favour of public ownership with CALM/DOLA. CALM/DOLA would then make the chalets/shacks available to licenced tourism operators and local residents, at a charge, providing more equitable access to the islands and revenue for their management.

  Increased use would increase waste and chalets/shacks would have to comply with waste management systems proposed for development on all islands within the study area. Commercial use of chalets/shacks would also require approval from the Shire of Roebourne and chalets/shacks may need upgrading.

- **CALM field stations**

  CALM field stations on Enderby Island and the Montebello Islands can be used as bases for scientific tourism. However, it may also be possible to make these field stations available to licensed ecotourism operations for small groups of wilderness ecotourists.

6.5.4.6 Servicing resource exploitation and local communities

The resource exploitation industries and local communities are well serviced at present but tourism growth could compete with some of these services.

- **Resource industry**

  The prime area for conflict here is access to port facilities and shipping lanes provided for these industries. These facilities also enhance access to islands and offer opportunities to service tourist boats and it is important that tourism operators respect the needs of other industries. The most intensive services and activity are in Dampier and its adjacent coast.

- **Local communities**

  Competition between local communities and tourists for health and emergency services are most likely to arise in the Onslow and Exmouth zones. The Dampier/Karratha zone has bigger towns and is better serviced.

6.5.5. Evaluation Process

The island management strategy should be able to be used in an on-going capacity to ***identify, evaluate,*** and ***facilitate*** ecotourism development opportunities. Detailed development proposals will need to be processed fully to ensure their sustainability and suitability. There are statutory processes which need to be gone through and, while there may be some potential to streamline such processes, so that processing of development applications takes less time; it will be very important for environmental values to remain protected. Thus, detailed formulation, approval, and execution of a development process is bound to continue to be time consuming.

The degree of certainty for potential developers may be able to be improved considerably, however, if a simple but effective initial screening process for projects is established to provide a means of assessing whether or not a particular development proposal appears suitable at the strategic level. If it does, then there will be a far greater likelihood that it will check out satisfactorily at the more detailed or local level. In this way, strategic considerations can be taken into account "up front", before any details are considered.

All that needs to occur is for a simple "expression of interest" in a particular project to be lodged with the Pilbara or Gascoyne Regional Planning Committees. The expression of interest need contain no more than the following:

1. A simple description of the development proposed, including its components (see list in the Development Potential Matrix - Table 6.1);
2. If and how it is proposed to provide water, power and waste treatment services in the development;
3. A suitable description or map of the location of the proposed development;
4. A rough estimate of the value of the proposed development.

With this information, the Regional Planning Committees could then carry out an "initial appraisal" of the desirability of the development from the strategic perspective. The rationale here is that if the development seems suitable at the strategic level, it may well prove suitable at the detailed level, and the more costly detailed work would probably be worth the proponent' s investment.

On the other hand, if the proposal is not suitable at the strategic level, it will very likely not be suitable at the local level. This advice could be given to the proponent and, while it may not stop them from progressing the proposal further, at least they would have been warned of the strategic situation and perceived negative aspects.

It is stressed that this process will not take the place of the various approval processes which will still be necessary. It will simply provide preliminary advice to proponents to help them decide whether or not a proposal might be worth pursuing further.

It is recommended, however, that obtaining the preliminary advice from the Regional Planning Committees be made a statutory requirement. This will ensure that strategic considerations are always taken into account, and that detailed development proposals are produced with a complete knowledge of the strategic implications. It is not considered necessary for this preliminary assessment to be provided as a pre-requisite for mainland-based developments however.

6.5.5.1. Identification

In most cases it is envisaged that development opportunities, both on the mainland and the islands will be identified by private sector participants in the tourism industry. However, it is also likely that the Pilbara and Gascoyne Development Commissions

will from time to time identify a development opportunity which they will then ***promote*** to the private sector.

Smaller developments which might have no economic return in themselves (such as a boardwalk for example) might be developed by the Tourism Associations, CALM, or local authority either as a public service or with the cost to be recouped through license or access fees of some description.

6.5.5.2. Evaluation

As discussed above, if the private sector identifies what it believes to be a significant development opportunity, it needs to be able to fairly quickly ascertain whether or not the proposal is likely to be acceptable in terms of sustainability and the ecotourism strategy generally. In the case of a potential PDC or GDC identified project, such an evaluation will need to be carried out before the concept could reasonably be promoted as a concept to the private sector.

Even though every development proposal will need to accord with a management plan, and may need to be the subject of an environmental assessment, developers need to be given some indication of the suitability or otherwise of a proposal prior to the potential developer proceeding to carry out the detailed and expensive planning. This is where a preliminary level of evaluation may be used to provide this information.

The recommended initial appraisal process could possibly take the form of a checklist, something along the following lines:

1. Is the proposed development on an island with an environment which has been identified as too sensitive for any development? (If so, the development is not suitable. Other islands may be suggested to the proponent.)
2. Is the development proposed on or near an island which is the subject of an exploration tenement, but which has not yet had its oil and gas potential fully assessed? (If so, the development may be unsuitable. Other islands may be suggested to the proponent.)

3. What are the components and form of the proposed development in terms of the potential development lists (marine/ terrestrial)?
4. What Location Category does the island fall into? (Refer to the Development Potential Matrix)
5. What is the Potential Suitability rating for the development components, in relation to the location category? (Refer to the Development Potential Matrix - and Land Use Matrix)

After this process has been run, the proponent can be advised whether his proposed development is considered to be:

1. Suitable;
2. Probably Suitable;
3. Possibly Suitable;
4. Probably Unsuitable; or
5. Unsuitable

In accordance with the terminology used in the legend of the Development Potential Matrix.

This process, though extremely simple to carry out should identify most if not all development proposals which would have little or no hope of being approved. Proponents should be advised that passing this hurdle means no more than that the proposal should be able to be seriously pursued. If the proposal passes this stage, then necessary management plans and environmental studies may be worth conducting.

Such a preliminary screening system would offer consistency and support to potential developers of tourism infrastructure on the islands. It would significantly reduce non-productive time and effort and provide the Islands Consultative Committee with a significant role in the strategic regional planning implementation process.

Where tourism competes with other activities, hydrocarbon extraction and processing should have priority over other activities/uses in the regions provided governance continues to rigorously assess likely impacts and storage and processing

facilities in areas of tourism potential are sensitively designed and sited.

Mining activities on islands and adjacent coastlines and other visible areas should not occur.

Commercial fisheries should continue to be managed to present standards with continual reassessment of stocks and impacts.

Other commercial activities such as aquaculture and tourism must be assessed on the basis of:

- environmental impacts;
- employment prospects including multiplier effects;
- infrastructure requirements;
- projected returns;
- bureaucratic support needs and costs of these.

In effect, proposals for activities/uses should be accompanied by comprehensive management and marketing plans and proposals should be subject to environmental review processes. Furthermore, developments must be subject to ongoing monitoring to ensure that approval conditions are met and that impacts are assessed. This implies that tourism operators and other resource users should be licensed and that the granting of licences, leases or any other approval must involve rigour and adherence to agreements.

Appraisal of activities/uses should occur within a statutory planning framework to minimise political interference and address conflicting intergovernmental and industry interests (see Planning Process, Figure 6.1, on following page).

6.5.5.3. Facilitation

The process described in Section 6.5.5.2 will achieve much in the way of facilitating approval of projects by quickly identifying proposals which have little prospect for approval early on. It is reiterated that identification at this level would not be a "refusal" but would simply be advice. Proponents could still, if they wished, proceed to seek more formal approvals to their projects. These formal approvals can be broadly categorised as:

1. Environmental Approvals;
2. Planning Approvals.

The issue of environmental approvals is covered in the environmental working paper.

6.5.5.3.1. The Local Approvals Review Program

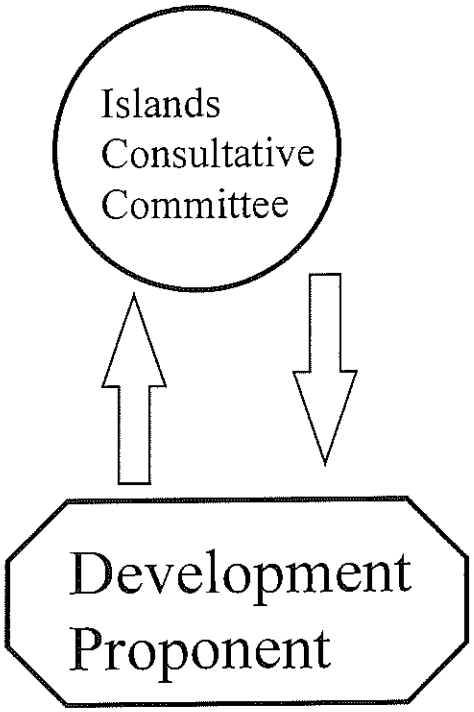
Development approval processes are frequently criticised for their slowness and complexity. In the interests of facilitating beneficial tourism development, these processes should be streamlined where possible.

One way of doing this which has been adopted by several local authorities in WA is the Local Approvals Review Program (LARP). The program emerged as a Federal Government Initiative arising out of the 1989 Special Premiers Conference on Housing, convened in response to concern about the spiralling cost of housing provision, particularly in Sydney and Melbourne.

LARP commenced nationally in 1990 as a program which initially focussed on promoting lower development costs and faster and better quality approval decisions leading to lower housing costs. Since its inception, LARP has concentrated on achieving these objectives by aiming to:

- Encourage councils to adopt efficient and cost effective approval mechanisms;
- Achieve cooperative parallel reform and improved functional relations across Commonwealth, State and Local Government and the private sector;
- Achieve savings in Council operations and provide associated benefits to the community.

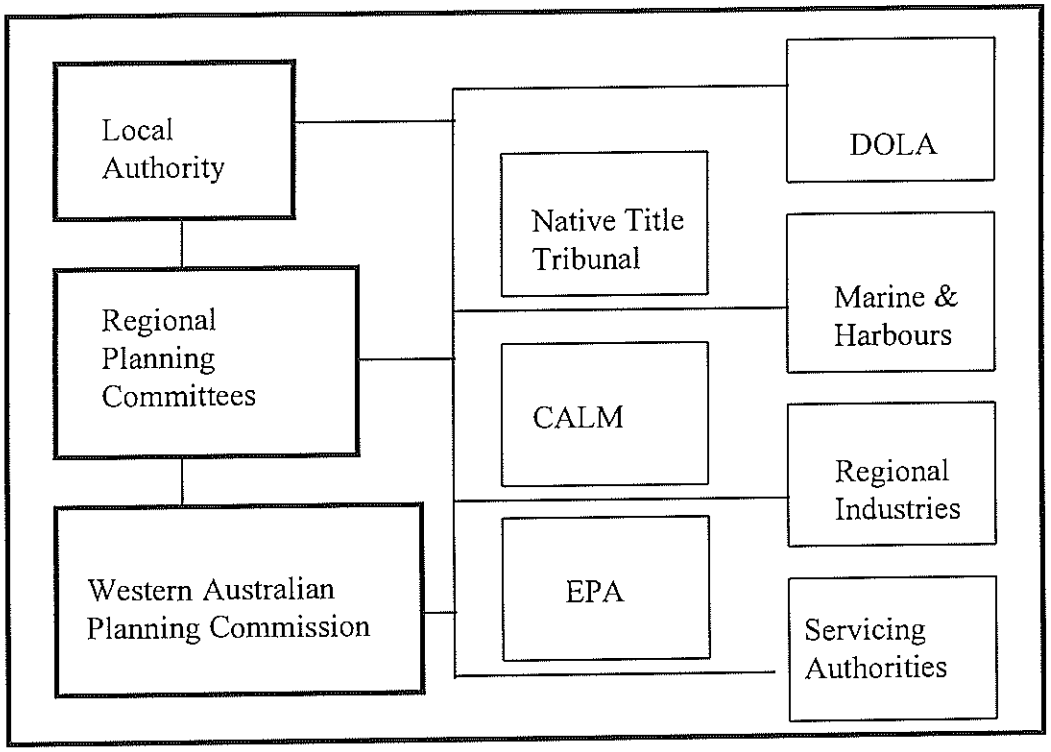
Rather than local authorities adopting a separate set of approval reform procedures, it is considered better to link into an established program. There is an opportunity for the Pilbara and Gascoyne Development Commissions to take a leadership role in encouraging local authorities in the study area to adopt and implement the LARP program (refer to Appendix for further detail on the LARP Program).



INITIAL STEP

PROPONENT SEEKS AND RECEIVES A PRELIMINARY ASSESSMENT FROM THE REGIONAL PLANNING COMMITTEE

IT IS THEN DECIDED WHETHER OR NOT IT IS WORTHWHILE PROCEEDING WITH THE FORMAL APPROVAL PROCESS



Off-Shore Islands *Eco-Tourism Study* June 1995	Development & Evaluation Approval Process	Figure 6.1

6.6. Conclusions and Recommendations

1. The principles of sustainable development on the offshore islands should never be compromised. The ecotourism potential of the islands depends upon it.
2. Most of the significant islands within the study area are Conservation or Nature Reserves, or are part of an island group contained within such a reserve. Though development within nature reserves is not impossible, it may be quite difficult to achieve, and may involve amendments to vesting orders. Depending on the level of vesting, amendments involve approval of both Houses of the WA Parliament (Class A), approval of the Governor on the basis of a report to Parliament by the Minister for Lands (Class B) or approval of the Governor (Class C). In most cases approval would also be required from the NPNCA, CALM and DOLA. The implementation of parts of this strategy may, therefore, involve the initiation of amendments to vesting orders by CALM and DOLA.
3. Hardly any of the islands in the study area are the subject of Mining Tenements. However, virtually all the islands west and south-west of Cape Preston are subject to numerous Petroleum Exploration or Development Tenements.
4. The islands of the Dampier Archipelago seem, from the available information, to be the least affected by the mining or petroleum industry, as they are largely unaffected by the various tenements.
5. A combination of natural assets and desired human recreation activity create the potential for ecotourism and any associated land development. In the interests of sustainability all activity and development on the islands needs to be managed.
6. Most tourists will experience the islands as part of an organised tour, whereas locals and some visitors from W.A., with their own boats, will probably visit the islands informally, and perhaps frequently. Management strategies should aim to cater for both types of access (formal and informal).
7. A development hierarchy and set of location categories have been defined and related in the form of a Development Potential Matrix. This tool should be used to determine the potential suitability of development proposals.
8. The economy of the mainland coastal towns could benefit greatly from focussing limited development resources and infrastructure within them, rather than on the islands (at considerably greater expense).
9. In regional planning terms it would therefore be inadvisable to dilute whatever economic and development forces there are within the study area

by developing facilities on islands, which could serve ecotourism equally well if developed in an established town.

10. It is considered that, while not precluding development on selected islands, it makes better sense from a planning, environmental, economic and resource perspective ***to generally favour development in the towns rather than on the islands, if possible.*** Such a prioritisation should ensure that development on the islands would only be that which was ideally suited to an island location, over all other possibilities (for example, to create a "wilderness resort").

11. By adopting this approach, the islands and the mainland towns would always ***complement and support one another*** in pursuit of the benefits of ecotourism; rather than ***compete*** with one another in a non-sympathetic and counter productive way.

12. Of all the islands, Barrow Island stands out as having the most significant longer term development potential. It is large and while there have been some visual variations by industry, it retains significant diversity in fauna and flora. The island could potentially support a small tourist village.

13. The mainland coastal towns of Exmouth, Onslow and Dampier / Karratha are considered to have the best potential for major ecotourism oriented development. Port Hedland also has potential as an access point to Depuch Island. The towns should be favoured over the islands as the preferred choice for major developments. Each of the main coastal towns is well located as the main service centre for several main groups of island s:

    - Exmouth is close to the Muirons, Serrurier Island and several other small islands in the vicinity.
    - Onslow is ideally placed to facilitate travel to Thevenard Island, and is reasonably well placed for access to Barrow, and the Montebello Islands; as well as other nearby smaller islands such as Airlie and the Mangrove Islands.
    - Dampier & Karratha are of course superbly located in relation to the numerous islands of the Dampier Archipelago. Dampier is also a similar distance to Onslow from Barrow Island and the Montebellos.
    - Port Hedland has an international airport, and is strategically important to general tourism in the Pilbara and Kimberley regions. It is also the principle base for recreational boat trips to Depuch Island, which is one of the most interesting islands in the study area.

14. While all these towns do have various constraints on their expansion potential, there are sufficient development sites available to cater for estimated tourism demand for the foreseeable future.

15. The Market Equity Report demonstrated that lack of information and awareness was the major reason why the majority of tourists in the region were just "passing through" en route to other destinations.

16. Accommodation statistics indicate the high seasonality of tourist visitation to the region. In peak periods it may be difficult for the traveller to obtain the type and quality of accommodation he requires. As well as a clear future potential for new accommodation developments, there is also potential for existing establishments to increase their annual occupancy rate by promoting tourism in the shoulder seasons.

17. The main potential source of land use conflict associated with island-related ecotourism is with the oil and gas industry, however, given the economic benefits of the oil and gas industry, its essentially finite nature, and the indefinite potential of the ecotourism industry; it is recommended that in conflict situations ecotourism "gives way" to the oil and gas industry where necessary. However, every attempt should be made to avoid such intractable conflicts, in favour of a policy of co-existence.

18. There is potential for mixed use island developments, co-existing with oil and gas infrastructure. In the short term, however, any significant or "permanent" ecotourism development on the islands should only occur in the following situations:

    - Where there is minimal or no potential for oil or gas extraction in the future. This may occur where the resource has been exhausted or where it is known not to exist.
    - Where oil or gas is present, and where the full extent of the infrastructure necessary to win it is in place. In such circumstances, tourism development may be ***designed to co-exist*** with the oil and gas infrastructure, provided suitable arrangements can be made with the relevant oil or gas company.

19. The Regional Planning Committees should establish a system for providing potential developers of island-related ecotourism facilities with an "initial appraisal" of the potential development opportunities using a checklist approach and the defined ***Development Potential Matrix***. Such an appraisal would provide advice in relation to the proposed development at the strategic level, before a potential developer went to the trouble and expense of seeking formal approvals. The advice would be provided in response to a developer-initiated "expression of interest".

20. The same process should apply to all development of the islands.

21. The Islands Consultative Committee should also adopt a leadership role in encouraging local authorities in the region to implement the Commonwealth sponsored Local Approvals Review Program (LARP) in order to streamline development approval processes at the local authority level.

Pilbara Development Commission

Pilbara Gascoyne Offshore Islands Ecotourism Management Strategy

Appendices

A. Environmental Assessment
Sources Consulted During the Study
Database of Islands by Resources

B. Aboriginal Community Consultations

C. Local Approvals Review Program

D. Land Use Matrix

E. Bibliography

Study Area Map at Rear

APPENDIX A. Environmental Assessment

Sources Consulted During the Study
Database of Islands by Resources

SOURCES CONSULTED DURING THE STUDY

Name:	Position Title:	Organisation:	Consulted On:
John Stevens	Princip al Research Scientist	CSIRO Hobart	Whale sharks
Peter Kendrick	Pilbar a Ecologist	CALM Karratha	Terrestrial and Marine fauna, Impacts and management
Sue Osborne	Ningaloo Marine Park Manager	CALM Exmouth	Marine fauna
Bill Humphries	Cave Fauna Biologist	WA Museum	Island cave fauna
Ken Aplin	Curator of Vertebrates	WA Museum	Island vertebrate fossils, recent survey work
Tony Preen	Research Scientist	James Cook University, Qld.	Exmouth Gulf marine surveys
Ron Sheppard	Shark Bay Marine Park Manager	CALM Denham	Dugong surveys
Kurt Jenner	Cetacean Biologist		Whale migration and numbers
Iva Stejskal	Environmental Co-ordinator	Apache Energy	Lowendal Islands
Michelle Zaunbrecher	Environmental Scientist	BHP Petroleum	Seabird research, BHP Natural Resource Atlas
Harry Butler	Biologist	WAPET	Island fauna, management strategies
Mike Osmond	Cetacean Biologist	Underwater World	Whale Migration
Charlie Thorn	Director of Aquaculture	Fisheries Department	Aquaculture activity, licenses
Andy Williams	Technical Officer	CALM Woodvale Wildlife Research	Turtles, whale sharks
Bob Prince	Research Officer	CALM Woodvale Wildlife Research	Turtles, Dugongs, terrestrial fauna
Kelley Holborn	PhD Student	University of WA, Zoology	Coral spawning, coral impacts
Matthew Power	Environmental Officer	Ampolex Pty Ltd	Oil industry, site requirements
Fran Stanley	Reserves Officer	CALM Karratha	Dampier Archipelago,

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
1	Abutilon (Lowendal Group)	'C' Class Nature Reserve				Important Site (Bridled Terns)		
2	Ah Chong (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park	Greens					
3	Airlie	'C' Class Nature Reserve	Some Greens	Taunton Reef to the E	Several Individuals Recorded	Moderate Numbers (shearwaters, terns)	Terrestial Fauna	Oil/Gas Industry Present
4	Alpha (Monte Bello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						Nuclear Weapons testing in 1950s
5	Anchor					Important Site (shearwaters)		
6	Angel (Dampier Archipelago)	'C' Class Nature Reserve	Greens, Hawksbills				Terrestial Fauna	
7	Angle (Passage Group)							
8	Ashburton		Greens, Flatbacks	Extensive Coral Reefs		Terns		Aboriginal sites
9	Aster (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park					Seabirds Terrestial Fauna	
10	Bare (Dampier Archipelago)	'C' Class Nature Reserve				Important Site		
11	Barrow (Barrow Group)	'A' Class Nature Reserve	Important site for Greens, Flatbacks	Biggada Reef to W, Barrow Island Shoals to SE	Individuals recorded off coast	Some species nesting	Mangroves, rare fauna	Oil Industry Present
12	Beacon							
13	Beagle							

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
14	Bessieres (Serrurier Group)	'C' Class Nature Reserve	Greens	Some Fringing Reef	None Recorded	Some species nesting		
15	Bezout							
16	Bluebell (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park				Important Site (Caspian Tern)		
17	Boodie (Barrow Group)	'A' Class Nature Reserve	Greens		Foraging area to W		Terrestial Fauna Rare Plant species	
18	Boomerang (Barrow Group)						Terrestial Fauna Rare Fauna	
19	Bridled (Lowendal Group)					Important Site (Bridled Terns, Pied Cormorant)		
20	Brigadier (Dampier Archipelago)	'C' Class Nature Reserve	None Recorded			Important Site		
21	Brooke							
22	Brown (Exmouth Gulf)		None Recorded	Not Significant		Not Significant		
23	Burnside (Exmouth Gulf)							
24	Buttercup (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
25	Campbell (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
26	Carey							

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
27	Carnation (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
28	Cohen (Dampier Archipelago)	'C' Class Nature Reserve	Greens			Important Site (Pelican, Terns, Shearwaters)	Seabirds	
29	Conzinc (Dampier Archipelago)	'C' Class Nature Reserve	None Recorded	High species diversity on shallow slopes				
30	Cormorant							
31	Coure	B' Class Nature Reserve						
32	Crocus (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
33	Dahlia (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park				Terns		
34	Daisy (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
35	Dandelion (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park					Seabirds	
36	Delambre (Dampier Archipelago)	'C' Class Nature Reserve	Important site (Greens, Flatbacks, Loggerheads, Hawksbills)	Best reefs in Archipelago on W and E sides				
37	Delta (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
38	Depuch		None Recorded				Rock Wallabies	Aboriginal sites
39	Direction			Extensive Coral Reefs				

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
40	Dixon (Dampier Archipelago)	Crown Land	None Recorded					
41	Dolphin (Dampier Archipelago)	'B' Class Nature Reserve	Greens, Hawksbills				Highest Floristic Diversity, Mangroves, Rare Fauna, Wallabies	Highest Elevation in Archipelago, aquaculture, Aboriginal sites
42	Doole (Exmouth Gulf)	'C' Class Nature Reserve			Commonly Sighted in bay		Mangroves, flora Shark Bay Mouse	
43	Double (Barrow)	'A' Class Nature Reserve						
44	Downes	Vacant Crown land					Mangroves, flora Terrestrial fauna	
45	Eaglehawk (Dampier Archipelago)	'C' Class Nature Reserve	Greens, Hawksbills			Terns, Ospreys		
46	East	'B' Class Nature Reserve						
47	East Goodwyn (Dampier Archipelago)	'C' Class Nature Reserve						
48	East Hermite (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park	Greens					
49	East Intercourse (Dampier Archipelago)	Mining Lease	None Recorded					
50	East Lewis (Dampier Archipelago)	'C' Class Nature Reserve	None Recorded				Terrestrial fauna	Recreational Shacks
51	East Moore							
52	Egret (Dampier Archipelago)	'C' Class Nature Reserve	None Recorded	Good reefs to NW and SW		Some species nesting		

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
53	Elphick Nob (Dampier Archipelago)	'C' Class Nature Reserve	Hawksbills				Important site	
54	Enderby (Dampier Archipelago)	'A' Class Nature Reserve	Greens, Flatbacks, Hawksbills	Best reefs in Archipelago on NW side			Diverse Flora, Mangroves, Wallabies	
55	Epsilon	'A' Class Nature Reserve, 'C' Class Conservation Park						
56	Eva (Exmouth Gulf)							
57	False (Mary Anne Group)		None Recorded	Poor to moderate condition fringing reef		Some species nesting		
58	Flag		None Recorded	Not Significant		Not Significant		
59	Flat (Serrurier Group)	'C' Class Nature Reserve	None Recorded	Not Significant		Not Significant		
60	Fly (Exmouth Gulf)							
61	Fortescue	'B Class Nature Reserve	None Recorded	Not Significant		Not Significant	Terrestrial fauna	
62	Foxglove (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
63	Gannet							
64	Gardenia (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
65	Gidley (Dampier Archipelago)	'C' Class Nature Reserve	None recorded				Mangroves Terrestrial fauna	

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
66	Gnandaroo (Exmouth Gulf)	'A' Class Nature Reserve				Some species nesting (Pelicans)		
67	Goodwyn (Dampier Archipelago)	'C' Class Nature Reserve	Greens, Hawksbills			Important site (Terns, Shearwaters)		
68	Great Sandy	'B Class Nature Reserve						
69	Hauy (Dampier Archiplelago)	'C' Class Nature Reserve	Greens, Flatbacks					
70	Haycock (Dampier Archipelago)	Crown Land	None Recorded					
71	Hermite (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park	Greens	Extensive, rich reefs			Terrestrial fauna	Pearl culture to E
72	Intercourse (Dampier Archipelago)	Crown Land	None Recorded					
73	Jarman	Heritage Commission						
74	Jonquil (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
75	Keast (Dampier Archipelago)	'C' Class Nature Reserve	Greens, Flatbacks			Important site, Pelican Nesting		
76	Kendrew (Dampier Archipelago)	'C' Class Nature Reserve	Greens, Flatbacks	Best reefs in Archipelago on seaward side				
77	Kingcup (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
78	Lady Nora (Dampier Archipelago)	'C' Class Nature Reserve	Greens			Important SIte		

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
79	Large (Mary Anne Group)	'B' Class Nature Reserve	None Recored	Poor to moderate condition Fringing Reefs		Some species nesting		Rocky substrates
80	Legendre (Dampier Archipelago)	Crown Land	Greens, Flatbacks	Hamersley Shoal to the SW				
81	Lily (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
82	Little Rocky (Dampier Archipelago)	'A' Class Nature Reserve			Moderately abundant	Important Site (Pelicans)		
83	Little Turtle							
84	Locker	'A' Class Nature Reserve	Greens	Extensive fringing Coral Reefs, Baylis Patch to SW		Important site (shearwaters)		
85	Long (Passage Group)	'B' Class Nature Reserve						
86	Low					Pelicans		
87	Malus (Dampier Archipelago)	'C' Class Nature Reserve (part) C' Class Conservation and Recreation Reserve (part)	Greens, Hawksbills	Good Condition, diverse Reefs		Shearwaters, Striated Heron		Recreational Shacks, European heritage
88	Mardie	'C' Class Nature Reserve						
89	Marigold (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
90	Mary Anne (Mary Anne Group)					Pied Cormorant		
91	Mawby	'C' Class Nature Reserve						

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
92	Middle (Barrow Group)	'A' Class Nature Reserve	Greens			Important site (many species)	Terrestrial fauna	
93	Middle (Mangrove Group)		None Recorded, but important foraging ground to E	Some fringing reef	Important Foraging ground to E		Mangroves	Pearl culture operation to W
94	Middle (Passage Group)	'B' Class Nature Reserve						
95	Mistaken (Dampier Archipelago)	Mining Lease	None Recorded					
96	Nelson Rocks	'C' Class Nature Reserve				Important site		
97	North (Mangrove Group)		None Recorded, but important foraging ground to E	Some fringing reef			Mangroves	
98	North Double	'C' class Nature Reserve						
99	North Muiron (Exmouth Gulf)	'C' class Nature Reserve	Important site for Greens, Loggerheads	Rich, extensive Coral Reefs	Seen regularly in some areas	Important site (shearwaters)		
100	North Sandy	'B' class Nature Reserve						
101	North Turtle	'A' class Nature Reserve						
102	Northeast Regnard	'B' class Nature Reserve			Foraging ground to E	Important site (Shearwaters)		
103	Northeast Twin		None Recorded	Small but diverse reefs to the S				
104	Northwest (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park	Greens	Extensive, rich reefs				

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
105	Observation (Exmouth Gulf)		None Recorded	Not Significant		Not Significant		
106	Paney (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
107	Parakeelya							
108	Pasco (Barrow Group)							
109	Passage (Passage Group)	'B' class Nature Reserve						
110	Peak (Exmouth Gulf)		None Recorded	Not Significant		Some species nesting		
111	Pemberton (Dampier Archipelago)	Crown Land	None recorded					
112	Picard							
113	Potter	'B' class Nature Reserve						
114	Preston	'B' class Nature Reserve						
115	Primrose (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
116	Pup (Passage Group)	'B' class Nature Reserve						
117	Reefs							

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
118	Roberts (Exmouth Gulf)	'C' class Nature Reserve	None recorded	Not Significant				
119	Rocky	'C' class Nature Reserve						
120	Roly Rocks (Dampier Archiplelago)	Crown Land	None recorded					
121	Ronsard							
122	Rosemary (Dampier Archipelago)	'A' Class Nature Reserve	Greens, Hawksbills, Flatbacks, Loggerheads	Good fringing reef, Sailfish Reef to the NW		Important site (Terns, Herons)		Recreational Shack
123	Rosily			Good Reefs				
124	Round (Passage Group)	'B' Class Nature Reserve	None recorded	Not Significant		Not Significant		
125	Round (Serrurier Group)	'C' Class Nature Reserve	None recorded	Not Significant		Some species nesting		Proposed 'A' Class Reserve
126	Sable							
127	Serrurier (Serrurier Group)	'C' Class Nature Reserve	Important site for Greens	Extensive, luxuriant Coral Reefs. Black	None Recorded	Osprey, Sea-eagle, Terns, Important Shearwater colony		Safe anchorages and landing points, small group camping
128	Sholl (Passage Group)	'B' Class Nature Reserve						
129	Simpson (Exmouth Gulf)	'C' Class Nature Reserve						Proposed 'A' Class Reserve
130	Solitary (Passage Group)	'B' Class Nature Reserve						

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
131	Somerville							
132	South (Mangrove Group)		None Recorded, but foraging ground to the E		Foraging ground to the E			Sand Cay
133	South Double	'C' Class Nature Reserve						
134	South Muiron (Exmouth Gulf)	'C' Class Nature Reserve	Important site for Greens, Loggerheads	Rich, extensive Coral Reefs	Some sightings	Important Site (shearwaters)		Proposed 'B' Class Reserve
135	South Passage	'B' Class Nature Reserve						
136	Southeast (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
137	Southeast Regnard	'B' Class Nature Reserve			Foraging ground to S			
138	Southeast Twin		None recorded	Small but diverse reefs to S and N				
139	Steamboat	'B' Class Nature Reserve				Terns		
140	Stewart	'B' Class Nature Reserve				Important site		
141	Sunday (Exmouth Gulf)		None recorded	Not Significant		Not Significant		
142	Table (Serrurier Group)		None recorded	Some good condition reef		Not Significant		
143	Tent (Exmouth Gulf)	'C' Class Nature Reserve						

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
144	Tern (Dampier Archipelago)		None recorded					
145	Thevenard	'B' Class Nature Reserve	Greens, Flatbacks	Regionally largest Coral Reefs	Individuals commonly sighted foraging	Moderate (Terns, Osprey, Oystercatchers)	Thevenard Island Mouse (Leggadina sp.)	Established, medium-scale tourism, oil industry
146	Thringa	'C' Class Nature Reserve						
147	Tortoise		Greens	Extensive Coral Reefs				Small group camping currently allowed
148	Tozer (Dampier Archipelago)		None recorded					
149	Trimouille (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park	Greens	Extensive, rich reefs				Nuclear weapon testing in 1950s
150	Varanus (Lowendal Group)	'C' Class Nature Reserve	Flatbacks, Greens, Hawksbills, Loggerheads		Individuals recorded	Moderate (Osprey, shearwaters)		Oil/Gas Industry Present
151	Victor	'C' Class Nature Reserve				Terns		
152	Violet (Montebello Group)	'A' Class Nature Reserve, 'C' Class Conservation Park						
153	Walcott (Dampier Archipelago)	Crown Land	None recorded					
154	Weerdee	Vacant Crown Land					Mangroves, Flora, Seabirds	
155	Weld	'C' Class Nature Reserve			Moderately abundant			Proposed 'A' Class Reserve
156	West (Mary Anne Group)	'B' Class Nature Reserve	None Recorded	Poor to moderate condition fringing reefs		Some species nesting		

DATABASE OF ISLANDS BY RESOURCES

No.	Island Name (Island Group)	Current Status	Near Shore				Island Interior	Other Comments
			Turtle Nesting	Coral Reefs	Dugongs	Seabird Nesting	Flora/Fauna	
157	West Intercourse (Dampier Archipelago)	Crown Land	None recorded					
158	West Lewis (Dampier Archipelago)	'C' Class Reserve	Greens		Moderately Abundant			Recreational shacks, Aquaculture
159	West Moore							
160	Whalebone	'C' Class Nature Reserve						Proposed 'A' Class Reserve
161	Whitmore	'C' Class Nature Reserve						
162	Wilcox (Dampier Archipelago)	'C' Class Nature Reserve	None recorded					
163	Y (Exmouth Gulf)	'C' Class Nature Reserve						Local recreational use
164	Yammaderry		None recorded, but foraging ground offshore		Foraging area offshore			

APPENDIX B. Aboriginal Community Consultations

Pilbara Offshore Islands Management Strategy

Report on the Response to the Draft Strategy by the Aboriginal Community

CONFIDENTIAL

DAVID HIGGINS AND ASSOCIATES
October 1995

TABLE OF CONTENTS

1. INTRODUCTION

This Report presents the responses and relevant issues raised during the second round of consultations with the key Aboriginal informants. Interviews/meetings took place during a two week period from 25 September - 6 October. Letters of endorsement are attached to the report.

Responses have been recorded zone by zone to reflect the local area issues and interests, and have been recorded under the nine headings proposed in the regional agreement for Aboriginal involvement.

In the Onslow Zone:

Brian Hayes	Team Leader Family and Children's Services
Trudy Hayes	Chairperson Thalanjie Aboriginal Corporation
Darren Injie	Karijini Aboriginal Corporation

In the Karratha/Roebourne Zone:

John Ceder	Project Officer PDC, Karratha
Jill Churnside	Representative Nanga-Ngoona Moora-Joorga Land Council, Roebourne
Mary Cosmo	Representative Yaburarra Language Group, Roebourne
David Daniels/ Doreen Daniels	Ngaluma Representatives Roebourne and Karratha
Arron Herbert	Coordinator Ngurin Resource Agency, Roebourne
Peter Kendrick	Ecologist CALM, Karratha
Greg Tucker	ALO Education Department, Karratha

In the Port Hedland Zone:

Mary Attwood	Representative Pilbara Aboriginal Land Council, Port Hedland
Adrian Brahim	Chairperson Ngarda Ngarli Yarndu ATSIC Regional Council, South Hedland
Stanley Nangala	Regional Manager AAD, Port Hedland
Camus Smith	Aboriginal Tourism Lecturer Pundlemurra College, South Hedland
Erin Wilson	Project Officer Hedland College Social Research Centre, South Hedland

1.1 Summary

Five themes emerged during the second round of consultations.

- The Strategy itself has received the **endorsement** of all Respondents and is seen to have addressed the concerns that Aboriginal people have expressed for a long time. It covers in a family extensive manner, the key issues surrounding Aboriginal involvement.

- There is a greater awareness of the **opportunity** provided to the Aboriginal community through their involvement with the Strategy.

- There is an increased level of **interest** in getting involved with Islands ecotourism and Respondents were more confident in the view that their involvement would be a 'good thing'.

- There is a clear demand for more awareness/information about the **linkages** between the Strategy and Aboriginal involvement in it.

- The Aboriginal Land Councils in the three zones of opportunity that have been identified in the Strategy have been supported as the appropriate **representative** body in each zone.

2. ONSLOW ZONE

2.1 Management Planning and Control

The Thalanjie group are moving towards "representative body" Land Council status and have already registered a Native Title claim over land in the town. Thus, it is considered that Thalanjie is the appropriate agency with whom to negotiate over ecotourism involvement. This position is supported by Darren Injie from the Karijini group. Karijini is based in Onslow for historical reasons but does not claim custody over the coastal area; it will move its headquarters back to the group's traditional area when funds permit. On that basis the Karijini group did not consider that it was appropriate for them to become involved in the Islands Strategy.

Based on my contacts with the Thalanjie group over the past 9 months, the group is not, in my opinion, as developed or progressive an organisation as the two other Land Council groups in the Strategy area. Thus, more 'foot work' and interaction with the PDC/RCC will be required at an earlier stage in the implementation process.

It was recognised by Trudy Hayes in particular, that working together in partnership with the other Land Councils would be a significant factor in the development of Thalanjie's involvement in Islands ecotourism.

2.2 Economic Development

The Thalanjie and Karijini groups both provide business outlets and employment for Aboriginal people in Onslow. Interestingly, the Thalanjie group have negotiated a contract with WAPET to transport scrap metal by barge from Barrow Island. This venture occupies much of the resources of the group at present, but it also creates the potential for diversification into Islands ecotourism activities. It was clearly understood during my consultations with the group that Islands ecotourism created the potential for economic development in the town and people were keen for this to occur.

2.3 Cultural Heritage

No specific comments on this issue.

2.4 Impact Assessment

No specific comments on this issue.

2.5 Finance and Funding

Onslow is relatively underdeveloped as a tourism area, hence the financing of Aboriginal involvement will probably be significant. However, given the Onslow Salt venture and the associated land claim, the view was put by Thalanjie that, as with WAPET and the Barrow Island business, Onslow Salt could possibly be persuaded to provide some funding for local tourism development.

2.6 Marketing and Research

No specific comments on this issue.

2.7 Product Development

There is a lack of awareness in the Onslow community about tourism product development. This is a crucial issue for development of Islands ecotourism. However, it was felt that the existing expertise in the fishing industry which many Aboriginal people living the area have, and the (untapped) talents and abilities of the town's young people, provided the opportunity to establish Islands ecotourism in the future.

2.8 Employment and Training

One of the positive aspects of the development of Islands ecotourism was that it would create local employment. Apparently many young people (and their parents!) are unhappy about having to leave Onslow for work or education - even to Port Hedland. Thus, locally based training i.e. the extension courses offered by Pundlemurra College was considered important. Information and awareness raising amongst the local community would be the crucial first step in the development of tourism training.

2.9 Business Development

The need for orientation tours or other exposure to Aboriginal tourism activities such as in the Northern Territory and the Kimberley was raised.

3. KARRATHA/ROEBOURNE ZONE

3.1 Management Planning and Control

The Land Council and the ATSIC Regional Council were both receptive to the Regional Agreements Model outlined in the Strategy. It was their view that, as in the Kimberley, everyone was working towards Regional Agreements anyway. The Land Council and ATSIC were also in agreement that the Land Council was the appropriate body to negotiate Aboriginal involvement in Islands ecotourism. The conflicting land use claims in the Burrup i.e. the recent granting of a pearling lease in the area were cited as examples of poor management planning, given the Native Title claim. It was regarded that commercial aquaculture developments of this kind would restrict the space and the opportunity for Islands ecotourism. A Regional Agreement could provide a way to ensure such applications were better managed in the future. The Land Council and Ngurin Resource Agency also expressed concern about CALM's stance on this issue. They expressed confusion as to CALM's policy and vision for the management of Islands ecotourism.

It was pointed out that the negative reaction by recreational fishing groups and shack dwellers to some of the proposals in the draft Strategy provided an insight into how Aboriginal people have felt for generations about land ownership - it is "our" land but government authorities control what we are able to do. The anger and resentment being expressed by the island squatters about "their" land being taken from their control and use, is the same for Aboriginal people.

The view was also put that the PDC still needed to push the issue of Aboriginal involvement in Islands ecotourism. It should still be part of its brief, and its commitment to regional planning, to lead by example i.e. having an Aboriginal project officer who could lead and provide direction for Aboriginal involvement. It was not considered appropriate for the PDC to "wipe their hands" of this simply because of the ATSIC, AAD or Land Council presence in the area.

A Regional Agreement/management framework was not just about legal issues over Native Title. It was about economic development for Aboriginal people and importantly, it was about "people skills" and the working relationships that the PDC had established with the Aboriginal community in the region.

3.2 Economic Development

The Land Councils' view is that their role in relation to economic development and tourism is a whole-of-community approach. Profits from future Islands ecotourism development would be poured back into the community. More generally, people spoke of the importance of land - "let us use our land so that we can develop an economic base in this area and create income and employment for us in the tourism area".

3.3 Cultural Heritage

This recommendation is supported by the Land Councils. The Land Councils' view is that the identification and survey work for Islands ecotourism should be directly controlled by them, as representing the Ngaluma/coastal people.

However, it is important to point out that during the initial round of consultations, contact was made with the Cosmo family - the identified descendants of the original coastal group of the Dampier/Burrup area, the *Yaburrara*. Several members of the family had subsequently met to discuss the Strategy and their involvement in it. Mary Cosmo had agreed to represent the family's interest in this matter and she requested that I meet with her. According to Mary, the family is interested in the Strategy and would like to be involved in any further discussions/meetings about Aboriginal involvement. The family has recognised their status as the original descendants of the area and were involved with the Land Council on that basis.

3.4 Impact Assessment

Roebourne, as an identified "Aboriginal town" was an important base for Aboriginal tourism developments. It was "unexploited" at this stage and positive benefits could be achieved for the town by opening up tourism developments based around the Aboriginal cultural heritage of the area.

3.5 Finance and Funding

Interest in Aboriginal involvement in tourism developments on the Burrup Peninsula is growing at present. This is because it is believed there is an opportunity, in particular, with the mining companies - WAPET, BHP and Hamersley Iron, to fund Aboriginal tourism ventures. Having reaped huge rewards from the land, the companies can now begin to provide some returns to the original land owners. Apparently BHP is going to contract local custodians to carry out survey work in the Burrup Peninsula.

There is also some discussion about the possibility of one of the mining companies contributing to the building of a "keeping place" and cultural centre in Roebourne.

3.6 Marketing and Research

No specific comments on this issue.

3.7 Product Development

Interest in development of Aboriginal tourism product is growing, and a number of respondents have expressed their interest in direct involvement, but are unsure about the "what" and the "how". It is recognised that it will be important to start on a small scale and cater to small groups initially.

The involvement of the Torres Strait Islander community in product development was also discussed. Their knowledge of the area, of traditional fishing and navigation would be invaluable in developing tourism products. Apparently there are a number of Torres Strait Islanders with skippers tickets who could provide their skills in developing Islands tours.

3.8 Employment and Training

The type of training that people will need depends on the type of product that is going to be developed. This is why an integrated Strategy that can link product development to purpose-designed training is crucial. The tourism training courses provided by Pundlemurra College/Community Education Centre is acknowledged by the Roebourne community, and this facility could be an important link in the development of Islands ecotourism.

The issue of pre-training/awareness raising was raised repeatedly. Tourism is on the agenda now, but how the local Aboriginal community can link into it and develop effective tourism business enterprises will hinge on the quality of training that is made available.

3.9 Business Development

It is recognised that Aboriginal tourism enterprises will create the potential for economic development and will boost the tourism industry on a regional basis. This is where the two-way exchange is needed. Aboriginal people will need to learn the tourism business by working alongside established tourism operators. Equally, however, the non-Aboriginal tourism operators will need to learn the cultural tourism business by working alongside the Aboriginal custodians. Both sides will have to give-and-take to establish successful business.

4. PORT HEDLAND ZONE

4.1 Management Planning and Control

Both the National Ecotourism Strategy and the Pilbara Strategy aim to increase self-determination of Aboriginal people in the ecotourism industry, encourage participation in the management, planning and control of ecotourism, and to assist in the integration of regional planning, environmental, cultural and tourism industry stakeholders. Aboriginal people and the ATSIC Regional Council in the Port Hedland area have said they support this approach. AAD, however, can not provide its support due to the political conflict between the State and Federal Governments. They are unable to support or be party to a Regional Agreement until the Commonwealth and the State Government make a bi-lateral agreement over Native Title and related matters. AAD has to comply with State legislation, and currently, this precludes Regional Agreements. It also precludes direct negotiation with the Land Councils and instead requires AAD to work with the State's proposed "Commission of Elders". When the State's Aboriginal Plan in released (due in November), the situation may become clearer, but for now the AAD is not able to be a stakeholder.

4.2 Economic Development

No specific comments were made apart from the often repeated criticism of the neglect of Aboriginal people generally in the mining boom that has occurred in the Pilbara.

4.3 Cultural Heritage

There is a strong history of Aboriginal heritage and ownership in the area. This is regarded as the key to development of Aboriginal tourism By talking to local people, it will be revealed that they have a source of knowledge and expertise about the environment and land care that could benefit everyone who lives in, or visits, the

Pilbara. Many of the traditional custodians of the area will pass on without sharing this heritage, if there is no proper participation and a partnership in reconciliation for the neglect and mistreatment of the past.

It was recognised that the Land Council has a clear role in heritage, site surveys and general information about the cultural heritage of the area.

4.4 Impact Assessment

Pundlemurra College representative expressed a concern about the negative impacts of an increase in tourism activity. The effect on traditional activity, the demands of time and effort in providing tourism services may create the situation where Aboriginal stakeholders say "we don't want this" and the Strategy will break down.

4.5 Finance and Funding

No specific comments on this issue.

4.6 Marketing and Research

No specific comments on this issue.

4.7 Product Development

There is a growing appreciation of the contribution that Aboriginal people can make to tourism and indeed the world. In addition to environmental and land care expertise, is the potential for bush medicines, and at a more abstract level, the breathing of life back into the bush and the interaction with land and animals that only Aboriginal custodians can achieve.

4.8 Employment and Training

No specific comments on this issue.

4.9 Business Development

It is regarded that a fairly extensive Regional Agreement, as proposed in the Strategy, is crucial. A regional, united approach will be needed to create successful Aboriginal tourism enterprises.

5. CONCLUSION AND RECOMMENDATIONS

The Strategy has been endorsed by the Land Councils, ATSIC, and the other key representatives in the area. The Land Councils have also been endorsed as the appropriate representative body to enter into negotiations with the proposed Regional Coordinating Committee or equivalent. In fact, the three Land Councils have proposed a joint approach between themselves to present a united voice at the negotiation table.

The main issue in relation to establishing this arrangement is the need for pre-training/awareness raising for the Aboriginal representatives. The Strategy has been 'put on the agenda' now, but Aboriginal people have expressed the need for information about how to link into the tourism industry and what tourism product should, or could, be developed. It is also recognised that there is a danger in having raised expectations about the opportunity to develop Islands ecotourism, that it will not happen.

The situation in relation to state authorities (AAD, CALM, Fisheries etc) and the political antagonism to Regional Agreements, is the most significant barrier to implementation of the Strategy. The sooner State and Federal leaders can reach an agreement on Native Title and pastoral leases etc, the sooner the Strategy can be developed.

However, a solution to this problem may be for the PDC/RCC to promote the Agreement as a philosophical rather than a legal initiative. It is about creating a management culture that can embrace an Agreement, or at least the ground rules for mediating an Agreement over Aboriginal involvement. The relevant issue here is that a great opportunity has opened up through the development of the Strategy, and a proactive and progressive implementation strategy is needed to ensure that the opportunity is not lost.

Recommendations

1. Pursue the proposal for a regional forum for the Aboriginal tourism stakeholders.

    1.1 Appoint a top-level consultant/mediator (e.g. Justice French) to facilitate the forum and to address the legislative, commercial, marketing, cultural heritage and other crucial aspects of the Strategy.

    1.2 Approach the three Land Councils to seek their involvement in the Forum and to determine the appropriate location and structure of the meeting.

    1.3 Appoint a project officer/short term contract person to undertake the necessary planning, liaison and coordination of the forum.

2. Prepare an information package (based on the Strategy document) for distribution to the Land Councils etc, that provides a simple to read/plain English description of the opportunities for Islands ecotourism.

3. Seek funding from relevant authorities/private sector to implement the Strategy as a Best Practice/Demonstration Project on regional and integrated development of ecotourism.

NANGA-NGOONA MOORA-JOORGA
LAND COUNCIL
THE LAND COUNCIL OF THE ROEBOURNE COMMUNITY
PO BOX 230 ROEBOURNE WESTERN AUSTRALIA 6718
PHONE/FAX 091 82 1081
Direct FAX 091 821387

19 July 1995

Mr David Higgins
Higgins Wood and Associates
P.O. Box 693
Subiaco 6008

BY FACSIMILE (09) 388 2971

Dear Mr Higgins,

RE : PILBARA OFFSHORE ISLANDS ECOTOURISM MANAGEMENT STRATEGY

Thankyou for attending our Land Council meeting on 13 July 1995 and briefing us on the above report.

The Land Council will now consider the report ,however, it may be appropiate that we have further meetings to discuss all aspects of the report and the implications to our Community. This is particularly relevant to our Native Title claims and the involvement of the Aboriginal community in any tourism on the land subject to these claims.

The matter will be placed on the agenda for the next Council meeting which is scheduled for 8 August 1995. We will advise you of the outcome of discussions following that meeting.

If you wish to discuss this matter in the meantime please contact Jill Churnside at the Land Cuncil office.

Yours faithfully.

CAROL LOCKYER
CO-CHAIRPERSON

Pilbara Offshore Islands Ecotourism Management Strategy:

It is recommended that the Land Council adopt the following position with respect to the recommendations contained in the report.

Recommendation 2.1 - agreed subject to sighting draft guidelines on Protecting Aborginal and Torres Strait Islander Heritage Places (1995) and the National Ecotourism Strategy (1994) objectives.

Recommendation 3.4 - agreed subject to Land Council involvement.

Recommendation 4.1 - agreed.

Recommendation 5.2.1 - agreed.

Recommendation 5.3.1- agreed subject to proviso in 2.1 above.

Recommendation 5.4.1 - agreed subject to Land Council ownership of intellectual property rights.

Recommendation 5.5.1 - agreed subject to involvement of Land Council.

Recommendation 5.6.4 - agreed subject to involvement of Land Council and discuss on property ownership and copyright.

Recommendation 5.8.1 - as 5.7.2 above

Recommendation 5.10.2 - agreed subject to involvement of Land Council.

General Comment:

1. Land Council to be recognised as consultative and decision making body.
2. Land Council key shareholder.
3. All matters relating to this issue concerning the Roebourne Aboriginal community to be referred to Land Council.

PILBARA ABORIGINAL LAND COUNCIL
ABORIGINAL CORPORATION
PO BOX 764,
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TEL: 09 73 3003
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Mr. David Higgins,
Director.
Higgins Wood & Associates,
PO Box 693,
SUBIACO WA 6008
Phone 09 388 2000
Fax 09 388 2971

Dear Mr. Higgins,

Re: PILBARA OFFSHORE ISLANDS ECOTOURISM STRATEGY.

We wish to make official response to the draft report on the above.

Generally the trust of the report focuses on many of the issues which were concerns to the Aboriginal Community in the Port Hedland area for many, many years.

We wish to congratulate your company for not only taking the time to discuss these important issues with Aboriginal people in the area but also for your commitment to enshrine those comments and concerns very clearly and precisely into this document, which many researchers have been reluctant to do in the past. We are of the opinion that the report provides a very clearn message to other stakeholders on issues which are affecting our people, and also for the first time looking a real benefits for a proposed partnership which will in the longterm benefit everone.

We wish to continue our participation in this strategy and we would appreciate a copy of your final report which we will endeavour to disseminate to as many of the Aboriginal Community as possible who may have traditional links to the coastal areas in this Region and who may wish to be personally involved.

Yours sincerely

Gordon Yuline,
Chairperson.
6th October, 1995.

APPENDIX C. Local Approvals Review Program

LARP

PRINCIPLES FOR APPROVALS REFORM AT THE LOCAL LEVEL

PRINCIPLE 1: INTERNAL MANAGEMENT PRACTICES

Local Government's internal management of building and development approval processes should reflect the practice of efficient and effective decision-making for the benefit of the wider community.

Strategies

(i) Encouraging greater involvement by elected members in policy and less involvement in day to day matters.

(ii) Devolution of responsibility to the lowest competent level, particularly from elected members to responsible Officers.

(iii) Restructuring of council administrative procedures to enable the development of a single decision-making process, for example through 'development assessment units' or integrated environmental services departments linked with strategic planning activities.

(iv) Introduction of more frequent meetings of Council development assessment and decision making bodies, such as development assessment units, to reduce delays.

(v) Improved training and increased awareness amongst elected members of the need for reform and options for operating a more effective and efficient approvals process.

(vi) Promotion of broad-banding of awards for professional staff to reduce artificial professional barriers to multi-skilling, and encouraging the use of multi-skilled area based teams in larger authorities or on a regional basis.

(vii) Improved career path opportunities for staff involved in the approvals process.

(viii) Staff development to enhance and broaden the skills base of approvals personnel including the development of a problem solving approach rather than a regulatory policing approach by professional and clerical staff.

(ix) Extension of the use of information technology and computer systems for such activities as direct data entry of applications, use of bar codes for tracking files and applications and on line geographic information.

(x) Establishment of systems for regular review of efficiency, effectiveness, relevance and appropriateness of the approvals process and planning instruments in relation to policy for planning controls.

(xi) Closer linkage of development assessment activities and strategic planning, including use of information of trends in approvals sought.

Better Approval Practices /

PRINCIPLE 2: LOCAL GOVERNMENT AND STATE RELATIONS

State legislation and administrative procedures such as the referral and concurrence arrangements should maximise responsibility of Local Government in the planning and development approvals process.

Strategies

(i) Clearer development criteria and documentation of development guidelines at State level.

(ii) Increased responsibility for decision making at the local level, such as through formal delegation agreements

(iii) Encouragement of greater use of joint State/Local Government assessment practices to expedite complex developments.

(iv) Local Government being a one stop shop for all planning land development and building approvals.

(v) Introduction of a uniform method of determining fees for building and development approvals which reflect a balance between the direct costs to councils of regulating the internal standards of development, the relationship of a development with its external environment, and the role of Local Government in considering the wider public interest.

PRINCIPLE 3: LOCAL GOVERNMENT AND COMMUNITY RELATIONS

Local Government development and building approval processes should reflect its accountability to the community.

Strategies

(i) Clearer and more understandable community information including brochures, pamphlets, newspaper advertisements and on-site signs.

(ii) Involvement by the community at the earliest possible stage of the development and building approvals process.

(iii) Enhanced community consultation approaches that more strongly link strategic/forward planning approaches with community views on development.

(iv) Increased community awareness of the continuum between strategic or policy planning and local development decisions.

(v) Reducing unnecessary delays caused through ineffective consultation mechanisms.

(vi) More precise information on community and third party appeal rights of objection.

PRINCIPLE 4: LOCAL GOVERNMENT AND CLIENT RELATIONS

Local Government development and building approval processes should foster good client/Local Government relationships.

Strategies

(i) Use of a single counter for receipt of all development, building, sub-division, rezoning and heritage applications and through common convenient opening times across council departments and across councils through regional co-operation.

(ii) Simplified and consolidated "user friendly" forms for all applications such as combining development and building approval forms.

(iii) Encouraging pre-lodgement consultations and more extensive discussion with applicants in order to improve the quality of applications.

(iv) Clearer guidelines and information on approval procedures including the basis for and level of fees and charges.

(v) Developing common conditions and documentation for different types of approvals amongst councils through regional co-operation.

(vi) Introducing conciliation conferences to minimise legal costs and unnecessary delays in development and building appeals.

(vii) Greater emphasis on staff training and development in telephone, interview and counter skills in order to develop an orientation towards customer service.

(viii) Greater use of mechanisms such as private certification in building approvals.

(ix) Introduction of limited liability provisions to address council concerns over duty of care implications of advice.

LARP REVIEW

INFORMATION FOR TASKFORCE MEMBERS

PROVIDED BY JENNY SMITHSON
LARP FACILITATOR

WHAT IS LARP?

LARP stands for Local Approvals Review Program. LARP emerged as a Federal Government initiative arising out of the 1989 Special Premiers' Conference on Housing, convened in response to concern about the spiralling cost of housing provision, particularly in Sydney and Melbourne

LARP commenced nationally in 1990 as a program which initially focussed on promoting

* lower development costs.
* faster and better quality approval decisions leading to lower housing costs.

Since its inception, LARP has concentrated on achieving these objectives by aiming to:

* encourage Councils to adopt efficient and cost effective approval mechanisms
* achieve co-operative parallel reform and improved functional relations across Commonwealth, State and Local Government and the private sector.
* achieve savings in Council operations and provide associated benefits to the community

Many people are concerned with the cost, complexity and unnecessary overlap in existing planning, development and building approval systems across Australia. It is widely recognised that existing approval systems are not working as effectively as they should be. The benefits of reform are substantial. It could result in large scale cost savings, as well as better quality decision-making involving local communities in the development process.

Many of the problems associated with poor approval practices are experienced at the local level. Local Councils are therefore uniquely placed to act as a focus for reforming approval procedures, and to act as a catalyst for action by others sectors and levels of government. As a consequence one of the major initiatives of the early LARP work was the production of a "do it yourself" guide for individual Councils to undertake a review of their current approval practices and procedures. The guide is titled *"The Better Approval Practices Manual"* and has been distributed to all Councils . It is recommended that all members of the Taskforce take the opportunity of reading the Manual which is available from the Taskforce Manager. A second document that may be of interest to Taskforce members is a short paper titled *"Principles for Approvals Reform at the Local Level"*. Copies of this paper will be available at the first

UNDERTAKING THE REVIEW

A draft program for undertaking the review over the next 6 months has been provided to the Taskforce Manager. Taskforce meetings will be scheduled as necessary during the course of the program which involves a number of consecutive stages as follows:

STAGE 1 - INITIATION/EDUCATION

Initial Discussions with Council and Establishment of Taskforce

Stage 1 involves initial discussions with Council representatives and establishment of a Taskforce, comprising representative staff, elected members, and representatives from the community and the development industry, to oversee and set the review program (these 2 steps have already been undertaken). At the first meeting of the Taskforce the program will be finalised and key target dates set. Other initiatives to be considered in the review will be discussed

Education/Training Sessions

Following the first Taskforce meeting, a series of Education/Training Sessions will be held over a 2 week intensive training period. Specific sessions are as follows:

* "Introduction to LARP" - this is a half day session involving all staff associated with the building or development approvals process (including clerical, administrative, technical and management staff). Elected representatives are also invited to attend

* "The Administrative Role" - this is a half day session geared specifically to the personnel in Council performing administrative functions associated with approvals and would include clerical staff (ie wpo's, file clerks etc.), counter clerks, administration managers etc.

* "Specialist Staff Parts A & B" - these are two half day sessions involving all technical or professional staff involved or proposed to be involved in the approvals process including town planners (strategic and statutory), subdivision and development engineers, environmental health officers, building surveyors and inspectors, and other relevant specialist staff (eg housing officers, heritage architects, precinct co-ordinators, tree preservation and landscape officers, etc)

* "The Role of Elected Representatives" - this is an evening session aimed specifically at the elected Councillors and Senior Management of Council.

Dates for all of these sessions will need to be determined at the first Taskforce meeting in order that all sessions can be held early in the program to ensure all Council personnel are aware of, and enthusiastic about, the LARP project. Concurrent with the Education/Training sessions, the Taskforce will need to commence collation of background information on the current DA, BA, SA processes at work within Council so that the 'existing situation' can be documented.

STAGE 2 - REVIEW/EVALUATION

Development Industry/ Community Workshop

It is suggested that at least 1 workshop be held with the Development Industry and the community to gain input from 'users' or 'recipients' of 'the system' on suggestions for reform.. The Taskforce may consider supplementing such a workshop with questionnaires to recent applicants or community groups, or with comment sheets sent out with approvals etc

Taskforce Report on the Existing Situation

The Taskforce prepares a report on 'the existing situation' in terms of the approvals process, outlining some of the areas or opportunities for reform. This report is then made available to other Council staff/elected representatives for consideration and discussion.

Small Group Committees

It is suggested that small staff committees be established as working groups to examine specific issues that have arisen from the evaluation of the existing situation. It may also be the case that external working groups (eg community or developer groups) or groups of elected representatives may be formed if specific issues of interest to them arise. Results of these working groups would be directed back through the Taskforce for collation and consideration. The groups would hold regular weekly meetings over a period of 4-6 weeks as required so that the issues are fully explored in terms of opportunities for reform in a certain area, the constraints to and implications of that reform and its priority for implementation.

STAGE 3 - REFORM PROGRAM

Action Plans

Following the completion of the Review stage, it will be the responsibility of the Taskforce to come up with a series of action plans or recommendations for reform, highlighting the objective behind each reform initiative, the strategy and required steps and resources for its implementation, the person/body responsible for pursuing implementation and the likely timing for its introduction.

Final Report

It is a requirement of Council's participation that a Report on the LARP Facilitation exercise is produced at the end of the review (ie in late May). The Report will need to receive the endorsement of Council and should remain as an in-house working document of Council amended as new reform opportunities emerge in the future.

On-going Work

Once the involvement of the Facilitator is completed it is hoped and recommended that the Taskforce continue to meet as required to consider on-going reform opportunities and to evaluate the reforms after implementation. As a minimum the Taskforce Manager and/or a designated Council staff member should remain active in LARP related duties

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FIRST MEETING

Circulate relevant summary on LARP to members prior to meeting (1 - 2 pages). At the meeting:

Facilitator to provide LARP overview.

Discuss the role of the Taskforce and Taskforce manager;

Discuss issues relevant to LA, what they expect from LARP, what community expects, what benefits do they believe will accrue from LARP;

Table suggested work programme - set dates and deadlines

Concentrate on 3 important stages:

- initiate project/educate staff and community,
- review/evaluate existing processes;
- recommend then implement reforms.

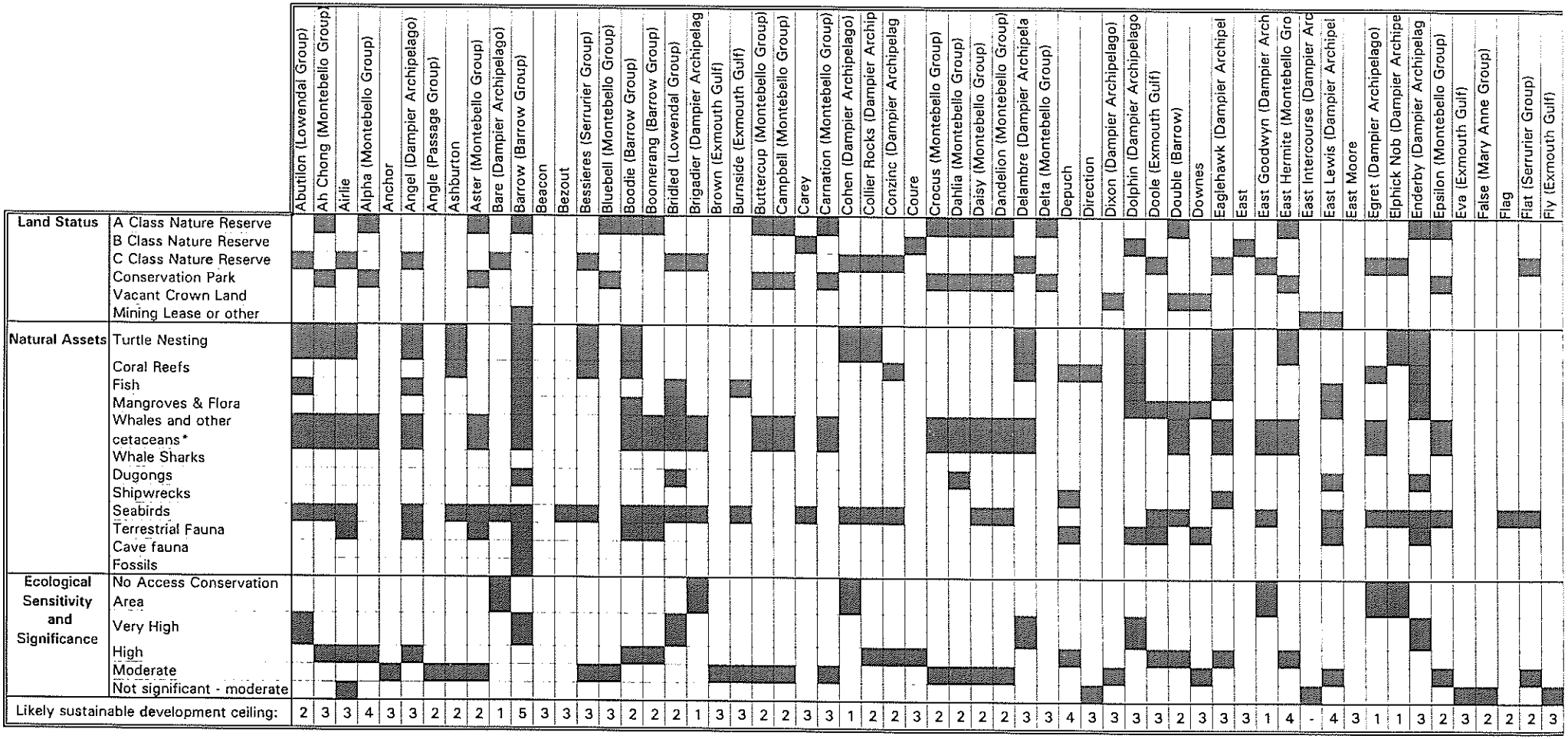
Outline workshop requirements and 'training sessions'

SUBSEQUENT MEETINGS/RESPONSIBILITIES OF TASKFORCE

- Organise workshop content and participation.
- Monitor progress of research/solicit support from other staff as required.
- Provide suggestions for additional or specific matters that may require attention
- Individual members to be responsible for assisting manager in preparing Evaluation Report, drawing together responses from workshop and staff/elected reps. input, and for providing their own overview of the existing situation
- Complete Evaluation Report.
- Assist in conduct of workshops
- Develop suggestions for reform and determine priorities for implementation.
- Obtain Council support for reform.
- Monitor implementation of reforms.
- Evaluate reform after say 12 months.

APPENDIX D. Land Use Matrix

LAND USE MATRIX

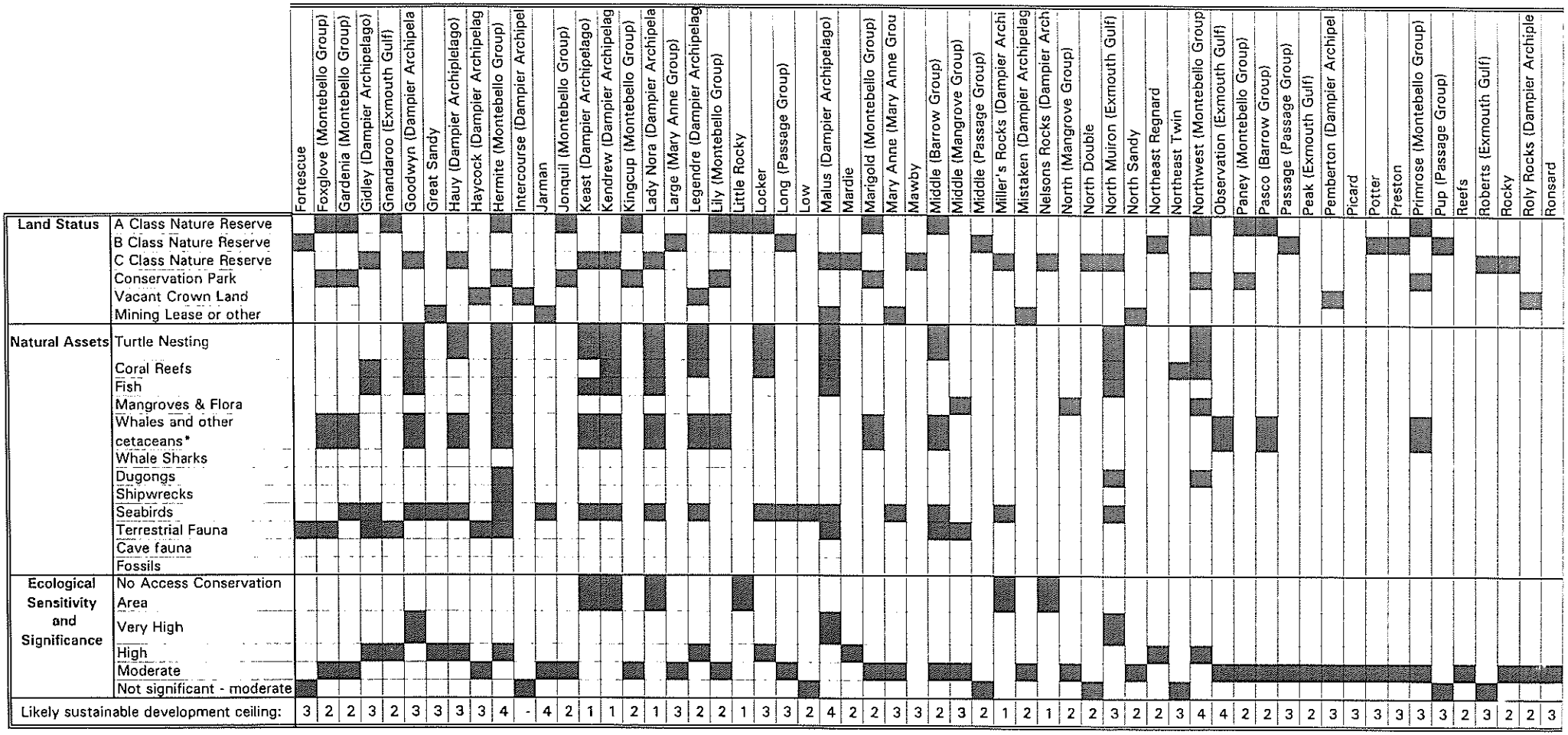


Key to likely Ceilings for development

1: Scientific Research Only
2: Boat Visitation
3: Overnight Camping (regulated)
4: Accommodation - Small Scale
5: Accomodation - Large Scal

LAND USE MATRIX

APPENDIX D



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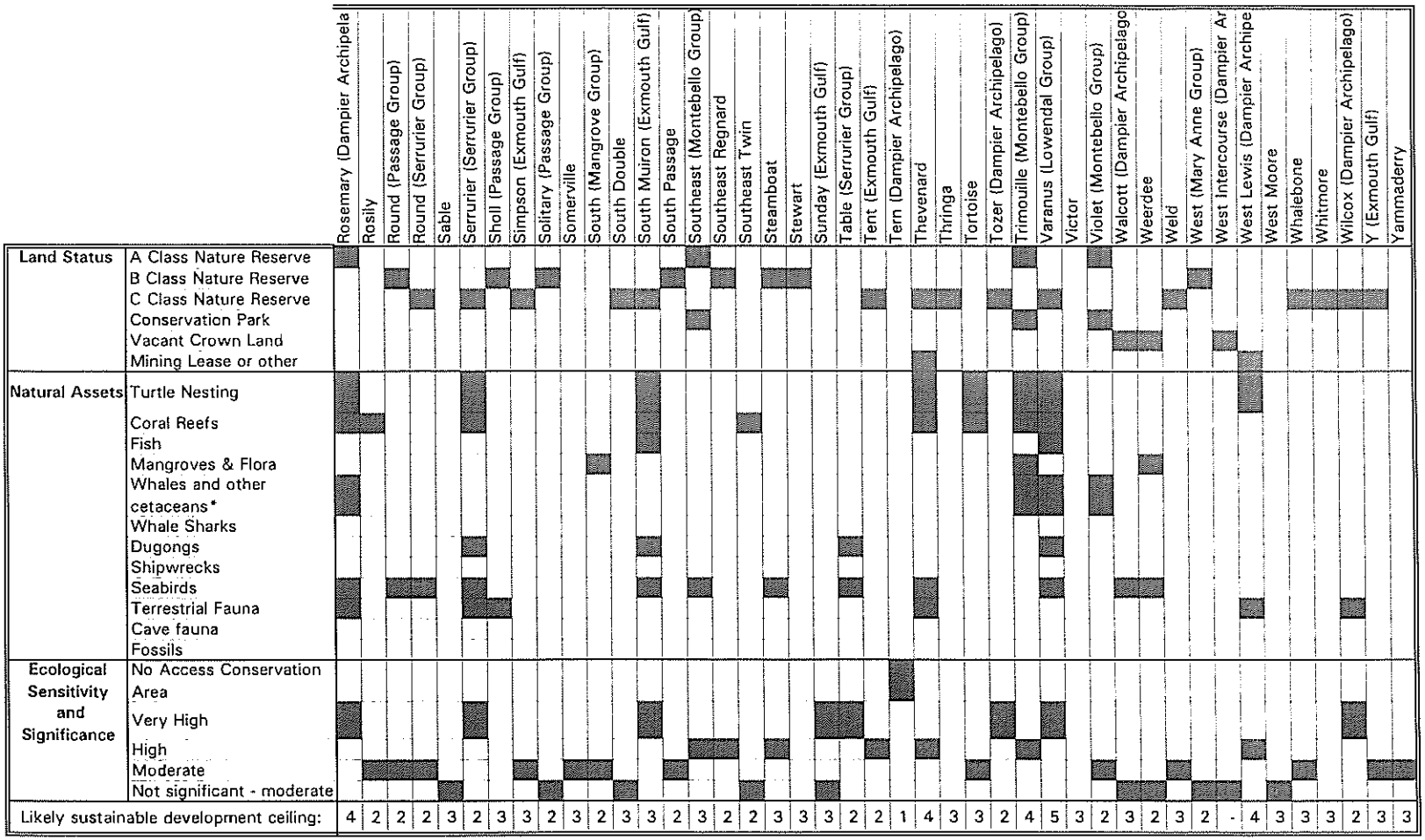

Key to likely Ceilings for development

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APPENDIX E.

Bibliography

Ah Kit, J. (1995, April). Development and sacred sites. In the 1995 global diversity conference: strength in diversity - an investment in our future. Conducted in Sydney.

Albuquereque, K.A. and McElroy, J.L. (1992). Caribbean small-island tourism styles and sustainable strategies. environmental management 16(5): 619-632.

Allcock, A., Jones, B., Lane, S., and Grant, J. (1994). National ecotourism strategy. Canberra: Australian Government Publishing Services.

Allen, G.R. and Swainston, R. (1988). The marine fishes of north-western Australia: A field guide for anglers and divers. Perth: West Australian Museum.

Altman, J.C. & Finlayson, J. (1992). Aborigines, tourism and sustainable development. (Centre for Aboriginal Economic Policy Research Discussion Paper No. 26/1992). Canberra: Australian National University.

Altman, J.C. (1988). Aborigines, tourism and development: The Northern Territory experience. Canberra: Northern Australian Research Unit. Australian National University.

Altman, J.C. (1989). Tourism dilemmas for Aboriginal Australians. Annals of Tourism Research, 16(4), 456-476. (From APAIS, 1989, Abstract No 29635).

Ampolex Limited. (1995). Drilling of exploration well Wonnich-1 near Montebello Islands. consultative environmental review. Perth: Ampolex Limited.

Anderson, P.K. (1986). Dugongs of Shark Bay, Australia - seasonal migration, water temperature, and forage. National Geographic Res., 2: 473-490.

Anderson, P.K. (1991). Dugong behaviour: Observations, extrapolations, and speculations. In: Marsh, H. (ed.), 1991. The Dugong: Proceedings of a Seminar/Workshop held at James Cook University 8-13 May, 1979: 91-111.

Armstrong, P. H. (1992). Human impacts on Australia_s Indian Ocean tropical island ecosystems: A review. The Environmentalist, 12(3): 191-206.

Australia. Aboriginal and Torres Strait Islander Commission et al. 1995). Protecting Aboriginal and Torres Strait Islander cultural heritage places. Canberra: Aboriginal and Torres Strait Islander Commission.

Australia. Aboriginal and Torres Strait Islander Commission. (1994). Draft National Aboriginal and Torres Strait Islander Tourism Industry Strategy Part 1. Canberra: ATSIC.

Australia. Aboriginal and Torres Strait Islander Commission. (1994). Draft National Aboriginal and Torres Strait Islander Cultural Industry Strategy. Canberra: ATSIC.

Australia. Aboriginal and Torres Strait Islander Commission. (1994). Minutes of tourism workshops held in Western Australia. Canberra: Aboriginal and Torres Strait Islander Commission, Economic Development and Industry Policy Section.

Australia. Aboriginal and Torres Strait Islander Commission. (1994). Tourism information guide: A guide for Aboriginal and Torres Strait Islander peoples who are planning to enter the tourism industry. Canberra: Aboriginal and Torres Strait Islander Commission, Economic Development and Industry Policy Section.

Australia. Department of Tourism. (1992). Tourism assistance guide: Commonwealth government initiatives for the tourism industry. Canberra: AGPS.

Australia. Department of Tourism. (1993). Regional tourism development program: guidelines, application form, conditions of grant. Canberra: AGPS.

Australia. Department of Tourism. (1994a). A talent for tourism: Stories about indigenous people in tourism. Canberra: AGPS.

Australia. Department of Tourism. (1994b). National ecotourism strategy. Canberra: AGPS.

Australia. Government. (1989). Royal Commission into Aboriginal Deaths in Custody. Canberra: AGPS.

Australia. Government. (1994). Working nation: The white paper on employment and growth. Canberra: AGPS.

Australia. Resource Assessment Commission. (1993). National coastal action plan: The draft conclusions and recommendations of the coastal zone inquiry. Canberra: Resource Assessment Commission.

Australian National Parks and Wildlife Service. (1989). Whale watching guidelines. Canberra: Australian National Parks and Wildlife Service.

Australian Tourist Commission. (1994). Seminars 1994. Canberra: Australian Tourism Commission.

Ayala, and Kiger, (1984). Modern genetics. California: Benjamin Cummings.

Beard, J.S. (1990). Plant life of Western Australia. Perth: Kangaroo Press.

BHP Petroleum Pty Ltd. (1995). A natural resource atlas for the north-west shelf. Prepared by Bowman Bishaw Gorham Pty Ltd for BHP Petroleum, Melbourne.

Brokensha, P. & Guldberg, H. (1992). Cultural tourism in Australia: A report on cultural tourism. Canberra: Department of the Arts, Sport, the Environment and Territories.

Buckley, R.C. (1983). The flora and vegetation of Barrow Island. Journal of the Royal Society of Western Australia, 66:91-103.

Burbidge, A.A. (1971). Fauna and flora of the Montebello Islands. Report 9. Perth: Department of Fisheries and Fauna.

Burbidge, A.A. (1985). The value of Western Australian islands as biological reservoirs and the development of management priorities. In: Burbidge, A.A., (ed.) 1985. Australian and New Zealand Islands: Nature Conservation Values and Management: 17-25. Perth: Department of Conservation and Land Management.

Burchett, C. (1991). Ecologically sustainable development and its relationship to Aboriginal tourism in the Northern Territory. In Proceedings of Ecotourism Incorporating the Global Classroom: 1991 International Conference. 70-74. (From Leisure and Tourism Index, 1991 Abstract No A921111430).

Butler, W.H. (1970). Summary of the vertebrate fauna of Barrow Island. Western Australian Naturalist, 11:149-160.

Butler, W.H. (1989). Additions to the Vertebrate Fauna of Barrow Island. Western Australian Naturalist, 32:149-160.

Chapman, D.M. and Armstrong, G.J. (1993). Ecotourism - what of the future? National Parks Journal, Dec 1993: 10-12.

Chitlleborough, R.G. (1982). The Dampier Archipelago marine study: A progress report. Bulletin 141, Perth: Department of Conservation and Land Management.

Command Petroleum Holdings NL. (1992). EP341 and EP364 Offshore Permit-wide Drilling Programme, Consultative Environmental Review. Perth: Command Petroleum Holdings NL.

Concord Training and Development. (1991). Recruitment and involvement of Aborigines in the hospitality industry: A feasibility study for the Industry Steering Committee Tourism Training WA. Perth: Tourism Training WA.

Conservation Through Reserves Committee (CTRC). (1974). Conservation Reserves in Western Australia. Perth: Environmental Protection Authority.

Coombs, H.C., McCann, H., Ross, H., & Williams, N.M. (Eds.). (1989). Land of promises: Aborigines and development in the East Kimberley. Canberra: Australian National University, Centre for Resource and Environmental Studies.

Crough. G. & Christophersen, C. (1993). Aboriginal people in the economy of the Kimberley region. Darwin: Australian National University, North Australia Research Unit.

Dalton, T. and Isaacs, R. (1992). Australian guide to whale watching. Sydney: Weldon Publishers.

Dodson, M. (1995). Indigenous social justice: Vol. 1. Strategies and recommendations. Sydney: Office of the Social Justice Commissioner.

Dodson, M. (1995). Indigenous social justice: Vol. 2. Regional agreements. Sydney: Office of the Social Justice Commissioner.

Dodson, M. (1995). Indigenous social justice: Vol. 3. Resource materials. Sydney: Office of the Social Justice Commissioner.

Dowling, R.K. (1993). An environmentally based tourism development plan for the Gascoyne Region, Western Australia. Perth: Murdoch University.

Figgis, P. (1993). Eco-tourism: special interest or major direction? Habitat Australia, Feb 1993: 8-11.

Finlayson, J. (1991). Issues in Aboriginal cultural tourism: Possibilities for a sustainable industry. In Proceedings of Ecotourism Incorporating the Global Classroom: 1991 International Conference. (pp 66-69). (From Leisure and Tourism Index, 1991 Abstract No A921111429).

Fisheries Department of Western Australia. (1989). Anglers and divers fishing guide. Perth: Fisheries Department of Western Australia Pamphlet.

Flood, J. (1990). The riches of ancient Australia: A journey into prehistory. Brisbane: University of Queensland Press. (From Heritage, 1990 Abstract No B902141).

Hadson Energy Pty Ltd. (1990). Harriet Gas Platform CER. Perth: Hadson Energy Pty Ltd.

Hadson Energy Pty Ltd. on behalf of participating Oil Industry Companies. (1994). Distribution of coastal marine habitats from North-west Cape to Dampier. Perth: LeProvost Dames and Moore Environmental Drafting Services.

Hall, M., McArthur, S., and Spoedler, P. (1991). Ecotourism in Antarctic and Sub-Antarctic islands: development, impacts, management and prospects for the future. In: Ecotourism Incorporating the Global Classroom, Section 7: Case Studies in Ecotourism Development and Management, 156-164.

Heinsohn, G.E. (1985). The Dugong. In: Strahan, R (ed.), 1985. Complete book of Australian mammals, 474-476. The Australian Museum, Sydney: Angus and Robertson Publishers.

Henderson, G. (1980). Unfinished voyages: Western Australian shipwrecks 1622-1850. Crawley: UWA Press.

Henderson, G. (1988). Unfinished voyages: Western Australian shipwrecks 1851-1880. Crawley: UWA Press.

Higgins, D. & Wood, D. (1993, Nov). Kimberley Development Commission tourism development program: Preliminary consultations with ATSI representatives. (Available from [David Higgins]).

Higgins, D. (1994). Hospitality Industry Aboriginal Recruitment and Training Program (HIART) Employees' Training Curriculum. Perth: WAHTIETC.

Higgins, D. (1994). Hospitality industry Aboriginal Recruitment and Training Program (HIART) Managers' Training Curriculum. Perth: WAHTIETC.

Hudson, P. (1990). Structural changes in three small North Western Australian communities: The relationship between development and local quality of life. In Proceedings of the Annual Conference of Regional Science Association, Australian and New Zealand Section. Perth: Regional Science Association.

Indigenous Australians and Tourism: A Focus on Northern Australia. Proceedings of the Indigenous Australian and Tourism Conference, Darwin, June 1993. Canberra: ATSIC.

Johnstone, R. (1972). The avifauna of Barrow Island. Western Australian Naturalist.

Jones Lang Wooton. (1993). North-west Cape: Tourism Development Study. Perth: Jones Lang Wooton Special Projects.

Katona, S.K. (1991). Large scale planning for assessment and recovery of humpback whale populations. Memoirs of the Queensland Museum, 30:297-305.

Kenchington, R. (1991). Tourism development in the Great Barrier Reef Marine Park. Ocean and Shoreline Management, 15: 57-78.

Kimberley Land Council & Waringarri Resource Centre. (1991). Report of the conference on resource development and Kimberley Aboriginal control: The Crocodile Hole report. Derby: Kimberley Land Council.

Lasmo Oil Ltd. (1990). Petroleum exploration permit areas EP342 and TP/9, Rowley Shelf, Western Australia: Consultative environmental review. Perth: Lasmo Oil Ltd.

Maiden, A.N. (1993). On Holiday - No, but seriously. The Independent Monthly, Nov 1993: 74-81.

Maiden, A.N. (1994). The hidden treasures of Aboriginal Australia. The Independent Monthly, Sept, 100-109.

Marine Parks and Reserves Selection Working Group (MPRSWG). (1994). A Representative Marine Reserve System for Western Australia. Perth: Conservation and Land Management.

Market Equity Pty. Ltd. (1994). Progress reports for the Pilbara Development Commission. West Perth: Market Equity.

Market Equity Pty. Ltd. (1995). Identifying opportunities for increasing tourism in the Pilbara. West Perth: Market Equity.

Marsh, H. (1988). An ecological basis for dugong conservation in Australia. In: Augee, M. (ed.), 1988. Marine Mammals of Australasia: Field Biology and Captive Management, 9-21. Sydney: Royal Zoological Society of New South Wales.

May, R., Wilson, B., Fritz, S. and Mercer, G. (1989). Ningaloo Marine Park (State Waters) Management Plan: 1989-1999. Parks and Reserves of the Cape Range Peninsula Part 2. Management Plan No. 12, Perth: Conservation and Land Management.

McDonald, Hales and Associates. (1994). A report of a preliminary Aboriginal heritage survey for the proposed Karratha heavy industry project, Western Australia. Perth: McDonald, Hales and Associates.

McGrath, D. (Ed.). (1991). Valuing diversity in a global industry. Hosteur, 1(2).

Miller, G. (1993). A cautionary tale. In Indigenous Australians and Tourism: A Focus on Northern Australia. Proceedings of the Indigenous Australian and Tourism Conference, Darwin, June 1993, (pp. 51-55). Canberra: ATSIC.

Minora Resources NL. (1989). Oil exploration permit EP325, Exmouth Gulf, Cooper No. 1: Notice of Intent. Perth: Minora Resources NL.

Morris, K. (1990). Dampier Archipelago Nature Reseves Management Plan, 1990-2000. Management Plan No. 18, Perth: Conservation and Land Management.

National Centre for Studies in Travel and Tourism. (1994). Draft national Aboriginal and Torres Strait Islander tourism strategy. Canberra: ATSIC.

Nishiwaki, M. and Marsh, H. (1985). Dugong - Dugong dugon. In: Ridgway, S.H. and R. Harrison (eds.). Handbook of Marine Mammals Vol. 3: The Sirenians and Baleen Whales., 1-31. London: Academic Press.

Northern Territory Tourism Commission and Northern Territory Office of Aboriginal Development (1994). Aboriginal tourism in the Northern Territory: A discussion paper. Darwin: Northern Territory Tourism Commission.

O'brien and Associates. (1988). Draft Environmental Guidelines for Tourism Developments. Perth: O'brien and Associates.

O'Brien Planning Consultants. (1994). Burrup Peninsula draft land use and management plan. Perth: Burrup Peninsula Management Advisory Board.

Peters, A., and Verhoeven, K.J.F. (1994). Impact of artificial lighting on the seaward orientation of hatchling loggerhead turtles. Journal of Herpetology, 28(1): 112-114.

Pilbara 21 Group. (1992). Pilbara 21 Final Strategy Report. Perth: Government of Western Australia.

Prince, R.I.T., P.K. Anderson, and Blackman, D. (1991). The status and distribution of dugongs in Western Australia. In: Marsh, H. (ed.), 1991. The Dugong: Proceedings of a Seminar/Workshop held at James Cook University 8-13 May, 1979: 67-87.

Purnululu wins green tourism award. (1991). Landscope 6(3), 8. (From Heritage, 1991 Abstract No B911135).

Queensland. Department of Tourism, Sport and Racing. (1994). Queensland ecotourism strategy: discussion paper. Brisbane: Department of Tourism, Port and Racing.

Ride, W.D.L., Crawford, I.M., Storr, G.M. Berndt, R.M. & Royce, R.D. (19....). Report on the Aboriginal engravings and flora and fauna of Depuch Island Western Australia. Perth: Western Australian Museum.

Shea, S. (1992). Joint management of national parks - park councils. Personal Communication.

Simpson, C.J. (1985). Mass spawning of Scleractinian Corals in the Dampier Archipelago and the implications for management of coral reefs in Western Australia. Department of Conservation and Environment Bulletin 244: 1-35. Perth: Department of Conservation and Environment.

Simpson, C.J. and Masini, R.J. (1986). Tide and seawater temperature data from the Ningaloo reef tract, Western Australia, and the implications for coral mass spawning. Department of Conservation and Environment Bulletin 253. Perth: Department of Conservation and Environment.

Simpson, K. and Day, N. (1984). Field guide to the birds of Australia. Ringwood: Viking O'Neil.

Staff. (1994, August 30). Tourism seen as way to save the rangeland. The West Australian, p.7.

Staff. (1994, November 12). Lost for words: Mission to reconstruct the decaying language of Nhanda. The West Australian, p.12.

Staff. (1994, November 12). WA winning a tourism battle, naturally. The West Australian, p.21.

Staff. (1994, November 12-13). Welcome home:[indigenous art has come of age]. The Weekend Australian Weekend Review, p.8.

Staff. (1994, November 16). Elder claims fishing snub. The West Australian, p.9.

Staff. (1994, November 9). Tourists flock to Australia's closest secret. The West Australian Weekend.

Taskforce on Regional Development. (1993). Developing Australia: A regional perspective. Federal Government of Australia. Canberra: Taskforce on Regional Development.

Taylor, G. (1990a). The whale shark. Western Australian Naturalist. 16:34-38.

Taylor, G. (1990b). The whale shark. Australian Natural History 23:4, 282-283.

Thomson, C. and Stevens., J. (1994). A whale of a shark. Landscope, 10 (2): 29-34.

Thornbeck, J. and Jenkins, M. (1982). The dugong. In: IUCN, 1982. The IUCN Mammal Red Data Book, Part 1. Switzerland: IUCN.

Tourism Coordinates. (1994). Industry management corodination strategy. Perth: Tourism Coordinates.

Tourism Coordinates. (1995). A strategy for the co-ordination of the Pilbara tourism industry. Perth: Tourism Coordinates.

Tucker, M.J. and Puddicombe, R.A. (1988). Protection status of marine mammals in Australian waters. In: Augee, M. (ed.), 1988. Marine mammals of Australasia: field biology and captive management, 79-85. Sydney: Royal Zoological Society of New South Wales.

Veron, J.E.N., and Marsh, L.M. (1988). Hermatypic corals of Western Australia. Records of the WA Museum, Supplement 29:136.

Vinnicombe, P. (1987). Dampier archaeological project: Resource document, survey and salvage of Aboriginal sites, Burrup peninsula, Western Australia. Perth: Western Australian Museum.

Walker, T.A. (1991). Tourism development and environmental limitations at Heron Island, Great Barrier Reef. Journal of Environmental Management, 33:117-122.

Wesminco Oil Pty Ltd. (1984). WA-149-P, Offshore Oil Production: Environmental Review and Management Programme. Perth: Wesminco Oil Pty Ltd.

Wesminco Oil Pty Ltd. (1985). South Pepper - North Herald Oil Field Project: ERMP Position Statement. Perth: Wesminco Oil Pty Ltd.

West Australian Petroleum Pty Ltd. (1991). Permit area TP/3 Part 1, five year exploration and drilling programme: Consultative Environmental Review. Perth: West Australian Petroleum Pty Ltd.

Western Australia. Department of Commerce and Trade and Gascoyne Development Commission. Gascoyne economic perspective. Perth: Commerce and Trade.

Western Australia. Department of Conservation and Land Management. (1987). Cape Range National Park Management Plan, 1987-1997. Management Plan No. 8. Perth: Conservation and Land Management.

Western Australia. Department of Conservation and Land Management. (1992). A guide to turtle watching on the north-west coast. CALM Park Notes. Perth: : Department of Conservation and Land Management.

Western Australia. Department of Conservation and Land Management. (1994). Department of Conservation and Land Management Database of island vertebrate records. Perth: Department of Conservation and Land Management.

Western Australia. Department of Conservation and Land Management. Cultural interpretation activities workshops. Perth: Conservation and Land Management.

Western Australia. Department of Conservation and Land Management. Cultural interpretation activities workshops: the outcomes. Perth: Conservation and Land Management.

Western Australia. Department of Conservation and Land Management. (1991). Aboriginal activities and nature conservation in the south west of Western Australia. Perth: Conservation and Land Management.

Western Australia. Department of Conservation and Land Management. (1992). A proposal for a world class Aboriginal owned national park and marine national park in the North Kimberley. Perth: Conservation and Land Management.

Western Australia. Department of Minerals and Energy. (1990). Environmental information for petroleum operations. Perth: Department of Minerals and Energy, Environmenta Branch.

Western Australia. Environmental Protection Authority. (1994). Red book status report. Perth: Environmental Protection Authority.

Western Australia. Environmental Protection Authority. (1995). Wonnich 1 petroleum exploration well, near Montebello Islands. Bulletin 780. Perth: Environmental Protection Authority

Western Australia. Government. (1994a). New horizons in marine managment. Perth: Government of Western Australia.

Western Australia. Government. (1994b). Wildlife conservation (specially protected fauna) notice 1994. Perth: Government of Western Australia.

Western Australia. Government. Aboriginal Heritage Act 1972- 1980. Perth: Government Printer.

Western Australia. Government. Fish Resources Management Bill No. 30-2 of 1994. Perth: Government Printer.

Western Australia. Government. Land (Titles and Traditional Usage) Act 1993. Perth: Government Printer.

Western Australia. Kimberley Development Commission & Kimberley Tourism Association. (1993). Kimberley regional tourism strategy: A joint submission to the Commonwealth Government Regional Tourism Development Programme. Broome: Kimberley Development Commission.

Western Australian Tourism Commission. (1991). Developer's guide. Perth: Western Australian Tourism Commission.

Western Australian Tourism Commission. (1992). Towards a nature based tourism strategy for Western Australia. Discussion paper. Perth: Western Australian Tourism Commission.

Western Australian Tourism Commission. (1994). Tourism monitor: 1991/92 Pilbara and Gascoyne. Perth: Western Australian Tourism Commission.

Western Mining Petroleum Ltd. (1990). TP/7 and TL/2: 5 year offshore drilling programme. Consultative Environmental Review. Perth: Western Mining Petroleum Ltd.

Western Radiation Services. (1993). Radiation hazard assessment and monitoring programme for the Montebello Islands. Perth: Western Radiation Services.

Williamson, M. (1981). Island populations. Oxford: Oxford University Press.

Winn, H.E., and N.E. Reichley. (1985). Humpback Whale - *Megaptera novaengliae.* In: Ridgway, S.H. and R. Harrison (eds.). Handbook of marine mammals vol. 3: The sirenians and baleen whales, 241-274. London: Academic Press.

Woodside Petroleum Development Pty Ltd. (1979). North-west shelf development project: draft environmental impact statement and environmental review and management plan. Perth: Woodside Petroleum Development Pty Ltd.

Woodside Petroleum Development Pty Ltd. (1986). Woodside's guide to fishing on the Dampier Archipelago. Perth: Woodside Offshore Petroleum.

Woodside Petroleum Development Pty Ltd. (1989). Woodside's guide to fishing on the Dampier Archipelago: Volume II. Perth: Woodside Offshore Petroleum.

Woodside Petroleum Development Pty Ltd. (1992). Woodside's guide to fishing on the Dampier Archipelago: Volume III. Perth: Woodside Offshore Petroleum.