



Shire of **EAST
Pilbara**
AUSTRALIA'S LARGEST SHIRE

2013

Cape Keraudren- Recreation Management Plan



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*heritage – cultural – nature-based
experience planning*

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Disclaimer:

Information presented in this report has been compiled with care, subject to constraints of time and resources. Input was provided largely by Shire staff, and management agencies, and has been accepted at face value. It was not feasible to check their accuracy. Commercial opportunities are offered as suggestions, not recommendations. They are based on third party advice, research, comparison and experience. As such they require rigorous feasibility testing before further action.

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Executive summary

A. Background

This plan was commissioned by the Shire of East Pilbara (SoEP) in June 2012 to describe, review and provide advice on recreation management on its Cape Keraudren Reserve. A preliminary draft was first presented to officers of the Shire for review on September 30 2012, and a revised version on June 20 2013. The plan was approved by Council in October 2013.

Prior to commencing inventory and research, the vision and strategic objectives below were developed in consultation with senior staff of the Shire, and set the parameters of the plan.

The set of over-arching strategic objectives has guided the recreation management principles recommended for the reserve. The vision statement provides a broad direction for recreation management within Cape Keraudren Reserve.

Vision Statement

Recreation on Cape Keraudren Reserve is managed to maintain and protect the unique natural and cultural features of the reserve for future generations, whilst providing a range of sustainable recreation experiences for visitors.

Strategic Objectives

- Recreation – Provide a range of diverse, equitable and sustainable opportunities for recreational use including camping, fishing, walking and nature appreciation.
- Conservation – Manage recreation to maintain and enhance marine and terrestrial biodiversity and ecological integrity.
- Landscape – Maintain and enhance the natural qualities and existing character of the area ensuring a “sense of place” is retained.
- Aboriginal Culture – Manage recreation on the reserve to protect and conserve the Aboriginal culture and heritage values of the area.
- Capacity – Maintain the capacity of the reserve to provide for visitors now, and into the future
- Social and environmental change - Consider the potential implications of changing use patterns, climate change and changes to the local and wider community and provide resilience in the context of this anticipated change
- Data collection and research – Monitor visitor use patterns to provide guidance for future management decisions
- Socioeconomics – Investigate opportunities for the reserve to be cost neutral or perhaps profitable for the Shire, including opportunities to offer new recreation and accommodation experiences which don’t compromise other objectives.
- Community education and interpretation – Encourage and promote community and visitor education, and involvement and support for management principles.

Method

The content of the plan is based on:

- several site visits to inventory infrastructure, landscape, management practices and issues,
- consultation with key stakeholders including Shire officers, government agencies, accommodation business operators, and past and present visitors to the reserve,
- comparison with other management regimes adjacent, and/or similar settings such as coastal camping operated by other shires, station based coastal caravan parks, and coastal national parks and station camping,
- research of current trends and best practice as advocated in academic papers and agency management plans,
- management, visitation, and financial data provided by the Shire.

B. Location and Tenure

The reserve is situated on the coast between Broome and Port Hedland and marks the western end of Eighty Mile Beach. Cape Keraudren Reserve No. 39135 (4,800ha) was originally part of Pardoo Station lease. In 1985 it was excised and vested in the Shire of East Pilbara (SoEP), for the purpose of recreation, principally to meet the needs of residents of (now abandoned) towns, Shay Gap and Goldsworthy. Cape Keraudren is at the north-western extremity of the Shire, approximately 400km from Newman (600km by sealed road) the administrative centre for the Shire. Marble Bar which is approximately 250km (by sealed road) from the Cape is the closest Shire depot to the reserve. Port Hedland in the neighbouring municipality, is closer being only 150km away.

At Low Water Mark the reserve abuts the Eighty Mile Beach Marine Park which includes the marine and coastal areas from Mulla Mulla Down Creek (known as Tidjila - approximately 30km west of Cape Keraudren) to Cape Missiessy (approximately 220km east) and is managed by the Department of Environment and Conservation (DEC). After 2015 Pardoo Station will surrender the strip of land approximately 1km wide adjacent the coast and adjoining the reserve to the east. DEC intends to add this to the formal conservation estate to become Class A Nature Reserve adjoining the Marine Park. See Maps 1 & 2.

C. Natural Values

Climate

The Cape is situated on the most arid coast in Australia, is cyclone prone and subject to the anticipated effects of climate change which include sea level rise, increased rainfall and increased intensity of storms.

Biodiversity values

The Cape is situated at the junction of three bioregions, the Eighty Mile Beach and the Pilbara Nearshore marine bioregions (IMCRA) and the Dampierland terrestrial bioregion (IMBRA). Inland some 25km is the Great Sandy Desert bioregion and the Pilbara Bioregion is some 20km to the west. This range of bioregions confirms the diversity and richness of the Cape Keraudren reserve.

Eighty Mile Beach is considered one of the most important sites for stop-over and feeding by migratory shorebirds in Australia and is listed as a Ramsar Wetland. In Australia these wetlands are managed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

(the EPBC Act). The Eighty Mile Beach Ramsar site overlays part of the reserve and extends inland to Mean High Water Mark on the eastern side of the reserve on Cootenbrand Creek.

D. Social Values

Aboriginal Values

The Ngarla people are traditionally connected to the Cape Keraudren area and although Native Title has been extinguished as a result of the vesting of the reserve, the area is still important to the Ngarla. The Department of Indigenous Affairs (DIA) Register of Aboriginal Sites records a number of significant sites within the reserve.

European and Post Settlement Heritage Values

The cape was named by the French in 1803 and the area was taken up by pastoralists in 1869 with the Rabbit Proof Fence No 1 built through the reserve in 1907. In the 1960's the creation of a harbour using a nuclear explosion was considered. Through the 1970s the area became popular with squatters with holiday shacks. In the 1990's the development of a tidal power station was also considered, but the reserve remained in recreational use

Landscape Values

The scenery at Cape Keraudren has long been an attraction for visitors due to the diversity of landform, water-form and vegetation including the Indian Ocean, estuaries, tidal creeks, and tidal flats and supra tidal flats and the mangrove lagoon; mangrove lined bays; the rugged limestone cliffs and wave cut rock platforms; and the expanse of Eighty Mile Beach. However, the openness of the landscape results in any modifications being very apparent and so a separate visual landscape assessment has been prepared, to ensure the 'sense of place' of the reserve is maintained.

The seasonal landscape elements (caravans, tents, etc.) associated with camping contrast with the natural landscape. However, they are considered to be cultural landscapes that can be seasonally accommodated within the natural landscape of the reserve.

E. Recreation Values

History of Recreation management on the Reserve

As noted, Cape Keraudren Reserve was created in 1985 to provide recreation opportunities for the residents of the mining towns of Shay Gap and Goldsworthy. As a condition of gazettal a management plan was prepared in association with the Department of Conservation and Environment. The plan proposed restricting camping east of Cootenbrand Creek and at Firewood Creek. The Shire subsequently closed those camps, and some track closures have been effective in minimising environmental damage.

A second plan in 2004 (Middle et al) made more recommendations including installation of sullage points, dogs be excluded from the reserve, and camp sites be 12 metres apart and that all vehicles must be licensed. Unlicensed trail bikes, quad bikes and other off road vehicles were not permitted. The plan also suggested the Shire investigate obtaining "power to lease" part of the reserve if commercial opportunities were to be investigated, and that cattle be removed from the reserve.

The Cape Keraudren Experience

The current camping experience, the balance between physical, social and managerial values, is valued highly by most visitors, particularly the informality and space between camps, the lack of litter, the price, the ability to have a fire, camp close to the ocean or beach, water views, good fishing and attractive natural scenery. Day users are also attracted to these attributes; however, there are no specific facilities for them, apart from some parking associated with the boat ramp.

Analysis of camping and accommodation experiences nearby indicates the Cape Keraudren experience is different to that elsewhere along this section of coast.

The more significant attributes of the Cape Keraudren experience are described below:

Naturalness -The reserve is predominantly natural, but there are significant levels of introduced flora and fauna. A mob of cattle feed in the reserve.

Access -There is a high level of access to the reserve with North West Coastal Highway only 7 km from the reserve boundary via the Cape Keraudren Road. Within the reserve most sites are 2WDrive accessible. However, most visitors to the reserve have 4WDrives, which can also access the rougher tracks. A concrete boat ramp suitable for boats up to 8m is at Boat Ramp Bay, with informal launch sites at Mosquito Creek, Firewood Creek.

Recreation Sites -There are a range of recreation sites on the reserve including six camping areas, day use sites of different types and an entry station.

Activities -The most popular activities with the long term visitors are fishing, socialising, walking and occasional mud-flat golf. Travellers and day visitors also enjoy these activities, but nature appreciation and sightseeing may be more important for younger visitor groups, and families are attracted to the beach.

Visitor Impacts - As a consequence of management efforts and controls Cape Keraudren Reserve has significantly fewer visitor impacts than many other similar coastal recreation areas in the Pilbara. However, recreation use is resulting in other impacts such as

- pressure on local fish populations
- impacts on reefs from reef walking and shell collecting; boat launching also impacts a section of reef flat;
- clearing of vegetation from camping areas, and tracks
- track duplication and inappropriate alignment or location in the Firewood Creek area and on the salt marsh,
- not human visitor impact, but cattle cause erosion of dunes, trampling of mangroves and damage to vegetation and the fragile crust of the tidal flats.

Management Support and Infrastructure - The following management support is provided

- rubbish and fish offal bins are regularly emptied;
- toilets and sullage points are provided, cleaned and emptied;
- bore water is provided at the ranger depot;
- ranger presence on site nearly all the time;
- roads are graded and maintained; and
- signs and brochures are provided.

Self reliance – This is an important component of a recreation experience. Toilets and rubbish bins are provided but visitors must bring their own water and provide any power they need, and so consider they are very self reliant. However, mobile phone coverage was recently extended to the Cape and Pardoo Roadhouse only 14km away provides water, showers, washing machines, postal services, and some shopping and these attributes significantly reduce the remoteness of the reserve and need for self sufficiency.

Publicity and Marketing - The visitors surveyed on site advised they heard about the Cape mostly by talking to other travellers, and from camping publications. The Cape is not specifically promoted at the Newman Visitor Centre; the Shire of East Pilbara website gave comprehensive information about the Cape including a downloadable copy of the brochure and a short video.

F. Economic Values

It is widely recognized that there is an economic flow-on effect to local communities from money spent by tourists. However, campers at the Cape get most of their supplies from Port Hedland, and many day visitors are also from Port Hedland, which indicates much of the economic benefit from visitors to the Cape is being obtained by the Town of Port Hedland, while the management cost is being carried by the Shire of East Pilbara.

Value adding, such as incorporating the reserve into drive trails which encourage visitors to travel through the East Pilbara may be an option for increasing economic benefit to the Shire.

G. Revenue and Expenditure

One of the over-arching objectives of the Shire for management of Cape Keraudren Reserve is to investigate opportunities for the reserve to be cost neutral or perhaps profitable.

Revenue, Fees and Visitor Numbers

From figures provided for FY 2010/11 expenditure on the reserve was \$100,000+ more than the income from visitor fees. In May 2011 fees were raised modestly. Preliminary data for FY 11/12 show lower General Expenditure of \$86,000, and higher revenue of \$107,000.

From figures supplied, a total of 9,262 people visited the reserve in 2010/11, 10,110 people visited 2011/12 and 11438 in 2012/13 - a year on year increase of around 12% p.a. However, on figures supplied, most of the increases occurred during the spring and summer months indicating more day users or short stays - probably locals from Port Hedland.

The statistic 'Number of People' is available on a monthly basis as shown below. However, the standard measure of overnight visitation in the hospitality industry is "visitor nights" and this data has not been supplied for the Cape.

Table 2 "Number of People" for July 2010 to July 2013 on Cape Keraudren Reserve

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2012/13	2598	2484	2000	915	565	240	212	219	0	356	849	1000
2011/12	2114	1853	883	850	401	256	320	319	265	547	892	1410
2010/11	2914	1149	977	555	332	125	49	49	125	644	893	1450

The Shire currently charges entry and camping fees to the reserve. Comparing fees of unpowered coastal sites from other locations indicate that Cape Keraudren fees are probably some of the lowest in the north of WA.

Expenditure

The total expenditure for the reserve for FY 2010/11 was around \$200,000, made up of around \$100,000 maintenance of onsite ranger presence (salary \$87,500, vehicle \$10,000 plus insurances and uniforms). General expenditure including infrastructure maintenance was \$102,000.

As mentioned above, preliminary data for FY 11/12 show lower General expenditure of \$86,000, and higher revenue of \$107,000. Assuming that the ranger's salary and overheads are similar, the deficit has probably reduced to around \$80,000.

H. Management Issues and Key Recommendations

The following key management issues were identified and since any commercial development proposals for the reserve will take a number of years to be implemented, key recommendations address the current issues. Should existing experiences and level of development be the preferred management option, the recommendations below (and others within the main report) will be required to sustain these experiences into the future.

Interagency Liaison

There are a number of agencies with management interests at Cape Keraudren particularly Department of Parks and Wildlife (DPaW – formerly DEC) and Department of Fisheries (DoF) who have responsibilities associated with the abutting Eighty Mile Beach Marine Park, and Department of Transport (DoT) which manages recreational boating. The Department of Planning also has a coordinating role in managing coastal access policy. To ensure effective interagency liaison the following key recommendations are made:

- Cape Keraudren recreation management plan is circulated to DEC, DoF, DoT and DoP for comment prior to wider circulation.
- The implementation of the sign plan involves all the above management agencies
- Enforcement strategies are coordinated including resource sharing.

Reduced Fish Stocks

Visitors have expressed concern over the depletion of fish stocks. The indicative management plan for the Eighty Mile Beach Marine Park notes:

'In the context of widely distributed marine species, localised depletion may not be a significant risk to fish stocks, however, it does have the potential to impact on the recreational experience of people visiting the region. Further investigation is required to determine if localised depletion is significantly affecting the social values of the area and what strategies can be employed to address the issue' (DEC).

It is therefore recommended that

- A cooperative inter-agency approach to managing marine values in the Cape Keraudren reserve is sponsored by SoEP
- The development of a voluntary 'Code of the Cape' by the visitors, Recfishwest and DoF to sustain fish stocks

- A joint approach between the various management agencies to inform visitors of marine management strategies as the reserve is a major entry point to the marine park.

Cattle

Cattle are regularly grazing on the reserve and walk through the camps damaging camping equipment; they graze sand dunes and mangroves causing habitat damage and erosion, and create road hazards and frighten some visitors. There is no simple solution to keeping the cattle out of the reserve but it is recommended that:

- A new fence is constructed on the eastern and south eastern boundaries of the reserve.
- The mobs of cattle that 'live' in the reserve are relocated or removed.

Ranger Workload

In the peak season the tasks of fee collection, waste collection (including fish offal) and maintenance of the toilets (some help is received with this from volunteers), combined with patrol work, take up 12 hours or more per day. The following efficiencies are recommended:

- self registration and fee paying is introduced;
- rubbish collection ceased, visitors required to take their waste to a central point;
- fish offal collection is ceased, and a fish composter installed.

Toilets and Sullage Points

There are two types of toilets on the reserve, 'long drop' toilets and composting toilets. The ratio of toilets to visitors is inadequate and so the toilets rarely compost during peak times. Existing sullage points have design issues - the top is too narrow for some systems leading to spillage. Since pumping out of sullage already occurs, there should be a move to sealed vault or hybrid toilets that are also pumped out. The key recommendations are:

- Sealed vault or hybrid - pump out toilets are installed progressively replacing current systems.
- Toilet /visitor ratio raised
- The tops of the sullage points (dump points) are modified to make it easy to empty all systems.
- The provision of rainwater tanks is considered for hand washing, especially in the day use areas.

Camp Fires and Firewood Collection

The campfire is the focal point for many happy family camping memories and this experience is no longer available at many other camping areas but is retained at Cape Keraudren. However, campfires are recognised as a potential ignition source for wildfires and the removal of dead wood from areas outside the reserve causes habitat loss. The key recommendations are:

- Retain the campfire experience at Cape Keraudren but progressively implement measures to improve the environmental sustainability of the activity.
- Install communal fire rings in all camping areas in the short term
- Communicate all regulatory, safety and environmental issues associated with fires to campers in the brochure, onsite interpretation and in digital media.
- Phase out individual camp fires over five years.

Visitor Risk

The reserve is a natural environment, in a hot, arid, coastal area, with associated risks for visitors such as heat stroke and dehydration due to the high summer temperatures; sand fly bite reactions, snake bite, jellyfish and cone shell stings, sea snakes and other dangerous marine creatures; and water body risks such as falling off cliffs, becoming stranded or swept away by the strong tides or waves, or caught in bushfires. The key recommendations are:

- Implement a visitor risk management system which includes maintaining appropriate records of risk management procedures
- Inform visitors how they can reduce their exposure to risk.
- Maintain an emergency management plan.

Inappropriate Visitor Behaviour

Despite signs, visitors continue to attempt to bring dogs and off road bikes and vehicles onto the reserve and there is some anti-social behaviour in groups. Maintaining the onsite ranger presence or delegated authority is recommended.

Fire Management

There is no prescribed burning program on the reserve at present, but burning on the adjacent pastoral station probably gives some protection to the reserve.

There is some risk during busy period for wildfire caused by camp fire escapes. Evidence from other places suggests that in many circumstances, people are more likely to be injured or killed trying to drive away from fire. This could conceivably be the case on Cape Keraudren with only one access road. Visitor education on wildfire should among other things, recommend people leave their assets where they are and muster on the beaches until the fire risk has passed or receded. The key recommendations are:

- Prepare a fire management plan for the reserve
- Advise visitors how to respond to wildfire and severe fire weather.

Campsite numbering and demarcation

Recent research by Curtin University found the single thing that could be done to reduce most environmental impacts on coastal camps adjacent Ningaloo Marine Park would be simply having individual campsite boundaries.

In response to conflict between campers the '12 metre rule' was instigated, which states that camps must not be closer than 12 m to each other. As well as reducing conflict between campers this creates a special camping experience as campers have a degree of separation unusual in most camping areas. Preserving this special camping experience is recommended but as some camps spread out much more than others, some visitors require smaller areas than others and there are only limited areas right on the edge of the beach, the camping areas need organizing / designing to provide appropriate camps for as many visitors as possible. The key recommendations are:

- Retain, where possible, the Cape Keraudren camping experience as it is significantly different to other caravan and camping grounds
- Retain randomness, freedom and separation where possible but implement subtle organization strategies in the interests of equity, capacity and managing visitor impacts.

- The boundary of the camp sites should be discretely marked possibly by numbered pegs or concrete discs
- Informal overflow camping areas provided for short stays in peak times, so that no one is turned away.
- Prepare site layout plans for each site which incorporate the above and other elements such as toilets, fire rings, rubbish collection points etc.

Sense of Place

An objective of this plan is maintaining and enhancing the 'sense of place' of the reserve and this can be achieved by retaining the recreation experience, the landscape character and the naturalness of the area. The key recommendations are:

- Ensure development and management proposals retain the informality and self sufficiency of the camping experience whilst meeting twenty-first century management responsibilities.
- Confirm that the proposed landscape character for the reserve is that of a natural area in which naturalness dominates but which accommodates small scale temporary, obtrusive, informal structures that form unique cultural landscapes.
- Manage views from lookouts and areas used by visitors to reinforce the proposed landscape character.
- Design camping and day use areas, locate new structures, review existing structures and manage access tracks to minimise visual impact on the naturalness of the landscape and to reflect its existing character
- Identify a palette of materials and colours that reflects and articulates the character, landscape and history of the reserve. Particularly use local materials where feasible.

Signs

Signs are an essential component of most management strategies, but they can also cause issues of cluttering up the landscape and ineffective communication if they are not appropriately planned and installed. Signs are an ongoing maintenance issue and their overall impact creates an image of the management of an area. A variety of signs are required and signs should be considered as one component of an overall communication plan. The key recommendations are:

- Adopt a communication plan for the reserve, see Appendix 12 – draft Communication Plan for Cape Keraudren
- Prepare a sign plan for the reserve which contains a coordinated suite of signs for the reserve that reflects the character of the reserve and is integrated with the communication plan

Lack of Visitor Data

Lack of detailed visitor information for the reserve makes informed decision-making difficult; good visitor data is necessary for developing commercial feasibility proposals. A number of random informal interviews were undertaken with visitors during drafting of this plan and more detailed surveys have been made of visitors via a questionnaire. Additional information that would be particularly useful includes:

- the number, time and type of vehicles entering and leaving the reserve (Metrocount data)
- day visitors and campers respectively over time;
- the number of camps at each camp ground site, each night;
- visitor preferences, use patterns and satisfaction; and
- how many residents of the SoEP use the reserve; or

- why residents of SoEP don't use the reserve.

There are a variety of ways visitor information can be collected and the methods used need to suit the resources available for data analysis. The key recommendations are:

- Install a digital traffic counter on access road at the gate – either seasonal or preferably permanent.
- Investigate options for data collection on the reserve and with regard to the feasibility of collection and analysis, collect data to inform management decisions.
- Investigate partnerships with education institutions for data collection, analysis and visitor research.

I. Commercial Considerations

In response to the key objective: *“investigate opportunities for the reserve to be cost neutral or perhaps profitable for the Shire, including opportunities to offer new recreation and accommodation experiences ...”* possible commercial development proposals for the reserve are outlined below. However, detailed feasibility is beyond the scope of this plan.

The Shire has received informal development proposals in the past few years, and the previous management plan recommended investigation of commercial development. Factors that will influence future management options are referred to below.

Future Demand

The following are some of the key factors that will affect future demand for recreation opportunities on Cape Keraudren reserve.

- Predicted increase in Port Hedland population to 50,000 by 2035. This is expected to have a significant impact on day use levels but will also influence the demand for camping.
- Day visitation from nearby camping and accommodation areas may also increase.
- There is a community wide trend of acknowledging how important nature based recreation is for communities and individuals.
- Tourism WA currently has strategies focussing on ‘Experience the Extraordinary’ and increasing visitation to regional WA.
- The reserve is on a major north / south tourism route.
- Caravan parks and camping areas across Australia are closing
- “Baby Boomers” are likely to be seeking Grey Nomad camping experiences for at least the next 10 years, though subsequent user groups may have different recreation preferences.
- The natural and cultural features of Cape Keraudren give it a ‘point of difference’ which has tourism potential.
- The continued development of electronic communication provides opportunities for improved management, communication and marketing. Even older age groups are embracing the new technologies.

Factors Affecting Commercial Viability

- The seasonality of visitation to the Pilbara/Kimberley coastal region – only four month peak season.
- A commercial operation with professional management would need more than one type of operation to make it viable (e.g. a variety of tourist accommodation units supported by accommodation for mining operations).
- The establishment period can be up to 7 years and during that time there needs to be a degree of exclusivity to secure the viability of the operation.

- A commercial large scale operation requires a large capital base due to the quantity of infrastructure that needs to be provided (e.g. water supply/treatment, waste treatment plant, power supply), which requires servicing over the establishment period. Government grants do not do this, so long term commercial partners, such as bus companies are needed.
- A 'husband and wife' type operation on a smaller scale could probably be based on one operation such as accommodation.
- Where investment relies on natural features as the attraction, it needs to be supported by a commercial component such as guided activities, retailing souvenirs, cafe etc.
- A degree of exclusivity is required if high value / high return experiences are proposed.
- The more sophisticated the infrastructure the higher the level of maintenance that is required (eg annual engineering checks).
- Marketing needs to be ongoing, no matter how popular the attraction is initially.
- The harsh environment makes material selection critical in terms of visitor comfort and ongoing maintenance, "permanent" tents have been known to burn, go mouldy and blow away in the Pilbara. The weather can also be cold as well as very hot.
- Due to the low visual absorption capacity of the Cape environment any large scale development is likely to be visually dominant.

J. Future Options

The reserve is currently recognised as being well managed, arguably this is due to the ongoing ranger presence. In order to retain this quality a ranger or similar presence of authority is required on the reserve (with associated costs). If day visitation through the summer period continues to increase, a continuous year round presence will be required. In this context management options are noted below and detailed in **Table 4 Management Options for Cape Keraudren Reserve**.

Shire Management Options

- Option 1 – Leave Things as They Are
- Option 2 - Increasing Revenue towards cost recovery by Camping Fee Increases
- Option 3 - Increase Revenue by Increasing Visitation and Reasonable Camping Fee Increases
- Option 4 – Reduce Expenditure

Commercial Management Options

- Option 5 – Management Concession to manage current visitor use on the Reserve
- Option 6 – Provide Developed Camping Facilities
- Option 7 - Luxury Large Scale Commercial Eco Accommodation Operation
- Option 8 - Niche Tourism Development - Small Scale Ecolodges
- Option 9 - Niche Tourism Development - Study Centre / Lodge Accommodation

Other Management Options

- Option 10 – Transfer Management to another Government Agency

K. Recommended Management Option

The investigation into the feasibility of a commercial tourism venture requires

- Robust visitor data to enable commercial decisions to be made e.g. accurate year round traffic data, day visit and visitor night numbers and other information about types of visitors,
- The 'power to lease' being available to the SoEP
- Cattle removed from the reserve

- The parameters of water supply and waste disposal defined (the existing tip needs to be relocated as the area of the current tip is a possible development location).

Therefore it is recommended that the Shire management option, Option 3 – Increase Revenue by Increasing Visitation, with a reasonable fee increase, is implemented as it does not require the above issues to be addressed but should go at least some way to reducing the funding deficit, without major change to the reserve or visitor experiences. The management efficiencies in Option 3 are also required for some other options to be implemented.

Once the management efficiencies and the management initiatives to support Option 3, have been implemented and evaluated, and the above issues which influence commercial investment have been addressed, the situation can be reviewed.

Table 5 Management Efficiencies and Initiatives for Cape Keraudren Reserve

Management Action	Reference for Implementation	Suggested Priority
Management Efficiencies		
Collect visitor statistics (e.g. traffic counter, record visitor nights)	Section 7.14	High
Implement a central rubbish collection facility	Section 7.5.2	High
Install a fish offal composting facility	Section 7.5.3	High
Provide adequate toilets and review design and operation of the sullage collection points.	Section 7.5.1	High
Implement sign plan (in stages)	Section 7.13	High
Implement marketing initiatives to increase number and spread over time of visitation	Appendix 12	High
Install a self registration system for fee collection	Section 7.6	High
Review camping fees		High
Review interpretation, reserve brochure and web presence as part of a coordinated communication plan		High
Communicate the proposed management strategies for the reserve with visitors and stakeholders		High
Record the role, responsibilities and conditions of those long term visitors who are contributing 'in kind' in lieu of paying fees.		High
Undertake a geotechnical visitor risk assessment of rock overhangs that are used by visitors.		High
Remove camping from the southwest shore of Cootenbrand Creek		High
Review and prepare site designs for Boat Ramp Camp and Sandy Beach to incorporate the infrastructure associated with the above efficiencies, to manage visitor impacts, to sustain capacity (and allow for some increase), to more clearly identify provision for different types of campers, to provide for the anticipated increase in day visitation and implement relevant standards.	Refer section 10. for detailed design briefs for each site	High
Implement site designs for Boat Ramp and Sandy Beach		High
Management Initiatives		
Fence the cattle out of the reserve		High
Consider commercial management options for the reserve and undertake feasibility studies as appropriate.		Medium
Progress obtaining 'power to lease' for the reserve if commercial options are to be pursued.		Medium

Review waste management including tip location		Medium
Track rationalization to minimize visitor impact on the salt flats		High
Support the formation of a 'Friends of the Cape' group to progress a Code of the Cape and other issues of concern (including fishing impacts) .		Medium
Develop and implement a visitor risk management system		High
Explore interagency resource sharing options		Medium
Liaise with the Ngarla Aboriginal group regarding the use of Aboriginal names for places		Medium
Improve the connection between the SoEP as a whole and the reserve.		Medium
Liaise with Pardoo Station leaseholders.		High
Liaise with the Rangelands NRM to determine the appropriateness of trying to remove some of the buffel grass and re-establish small areas of local vegetation.		Medium
Facility Development		
Develop an information/entry bay near Great Northern Highway		Medium
Continued sealing of Cape Keraudren Road – not required for visitor use, but appropriate if it creates management efficiencies		Low
Develop site design for Firewood Creek day use site	Refer section 10 for detail design brief	Medium
Develop a walk and cycle trail network with development of a walk around the mangrove lagoon as a priority.		Medium
Consider a short, historic drive / walk trail around the Cape.		Medium
Review Col's Beach, Rabbit Proof Fence site and Cape Camp (possibly as part of development of above Cape Trail)		Medium
Investigate linking Cape Keraudren into the rest of the SoEP through tourist drive trails.		Medium
Investigate a bird hide		Low
Review the location of the rangers accommodation and other support infrastructure		Medium

Resourcing

There are a variety of resourcing options available to SoEP (see Section 6,3) but it is beyond the scope of this plan to identify resources for specific actions. However it is envisaged that

- Management Efficiencies - will be largely undertaken by Shire staff with some specialist input and some capital funding from grants (e.g. fish composters could be funded by Recreational Boating Facilities Fund) or SoEP capital or grants.
- Management Initiatives - will be largely SoEP internal projects undertaken by council staff.
- Facility Development – capital funding required, likely sources are SoEP capital program, or grants such as walk trails funded by Lotterywest.

Commercial Development Considerations

Although it is not feasible to recommend a commercial development option at this stage, consideration of the objectives for the reserve (see section 1.3) indicate there are some preferred attributes of any proposed commercial development as follows

- Be small scale so it does not displace the existing camping and day use
- Provides for new user groups
- Reflect the character of the reserve - that is the typical low key Aussie beach holiday e.g. some serviced on site vans or shacks.
- Employ sustainability principles
- Create management efficiencies for the SoEP in terms of managing the rest of the reserve.

Specific Recreation Development Recommendations

Map 11 The Recreation Master Plan locates the sites and facilities discussed below and they are summarised in Table 6 Site Development Proposals for Cape Keraudren Reserve.

All development of facilities should

- Be in accord with relevant standards and policies
- Consider risk management including management of coastal hazards
- Incorporate the management of the visual landscape including reference to section 7.12.1
- Reflect the sense of place for the reserve, see section 7.12
- Be in accord with the management recommendations of section 7. This section particularly advises details for provision of campsites, toilets, fire rings, self registration and waste disposal
- Have signage, interpretation and other communication media in accord with the proposed communication plan.

Site specific recommendations are noted below and these should form part of the design briefs for the future development of these facilities. The facility development proposals are shown on Map 11 Recreation Master Plan. Note minor sites are up to 10 parking bays or camp sites, medium sites are up to 25 parking bays or camp sites and major sites are over 25 parking bays or camp sites. The sites are listed sequentially from great Northern Highway

1.0 Introduction

1.1 Preamble

Cape Keraudren is an attractive coastal reserve popular with Pilbara locals and visitors from around Australia, well known for its diverse scenery, rich fishing and informal atmosphere. Management by the Shire of East Pilbara has evolved over the past 25 years and continuing change in and around the reserve requires a review of current management to guide management and development of the reserve into the future.

1.2 Vision Statement

The vision statement below provides a broad direction for recreation management within Cape Keraudren Reserve and represents the East Pilbara Shire Council's future aspirations for the area.

Recreation on Cape Keraudren Reserve is managed to maintain and protect the unique natural and cultural features of the reserve for future generations, whilst providing a range of sustainable recreation experiences for visitors.

1.3 Strategic Objectives

A set of over-arching strategic objectives will guide the recreation management principles for the reserve:

- Recreation – Provide a range of diverse, equitable and sustainable opportunities for recreational use including camping, fishing, and walking and nature appreciation.
- Conservation – Manage recreation to maintain and enhance marine and terrestrial biodiversity and ecological integrity.
- Landscape – Maintain and enhance the natural qualities and existing character of the area ensuring a “sense of place” is retained.
- Aboriginal Culture – Manage recreation on the reserve to protect and conserve the Aboriginal culture and heritage values of the area.
- Capacity – Maintain the capacity of the reserve to provide for visitors now, and into the future
- Social and environmental change - Consider the potential implications of changing use patterns, climate change and changes to the local and wider community and provide resilience in the context of this anticipated change
- Data collection and research – Monitor visitor use patterns to provide guidance for future management decisions
- Socioeconomic – Investigate opportunities for the reserve to be cost neutral or perhaps profitable for the Shire, including opportunities to offer new recreation and accommodation experiences which don't compromise other objectives.
- Community education and interpretation – Encourage and promote community and visitor education, and involvement and support for management principles.

1.4 Scope of this Recreation Management Plan

This document focuses on the management of recreation on the reserve. The reserve's other values are considered in the context of how they influence recreation opportunities and how they are impacted by recreation activities.

This plan will

- record and analyse the values and recreation management issues that exist on the reserve at this period of time;
- compare the recreation opportunities provided at Cape Keraudren with other opportunities provided in the region;
- speculate on future recreation demands and trends;
- recommend future management options based on the analysis above; and
- provide procedural guidelines for current and future managers.

1.5 Planning Context

This plan has been developed in the context of the following documents that apply specifically to the reserve.

- *Cape Keraudren Coastal Management Plan* prepared by Garry Middle and Hames Sharley (Middle) tabled in 2004 which provides information about the natural and cultural values of the reserve and the management issues of that time. The recommendations of that plan will be reviewed
- *Proposed Eighty Mile Beach Marine Park – indicative management plan 2011* prepared for the Marine Parks and Reserves Authority by Department of Environment and Conservation which provides information on the future management proposals for the adjacent marine areas.
- *Shire of East Pilbara - Strategic Community Plan 2013-22* contains the following priorities and actions that are relevant to this plan

Key Priority: Implementation of Economic Development and Tourism Strategy, and;

Civic Leadership - planned actions: Action 1.1 – Efficient and effective local government.

Economic – planned actions: Action 3.1.3 Encourage tourism, Action 3.3.1 - Ensure well managed and equitable provision of community infrastructure. Action 3.3.3 – Provide infrastructure to support economic development.

Environmental – planned actions: Action 4.1 Reduce Shire ecological footprint

- *Economic Development and Tourism Strategy 2012 - 2015 tourism recommendation 4 in relation to Cape Keraudren states:*

“The Shire of East Pilbara should consider the benefits of reviewing the management of this reserve. The present arrangement competes with other Council responsibilities and its remote location is difficult for Council to provide and receive benefits. Consideration of investigating the possibilities of a “development lease” for the site may provide considerable benefits for the Council yet maintaining the low recreational balance with the environment.”

Other documents that have influenced this plan include

- *Pilbara – planning and Infrastructure framework, February 2011*, Department of Planning for the West Australian Planning Commission
- *Draft State Planning Policy 2.6 State Coastal Planning Policy*, February 2012, West Australian Planning Commission (SPP 2.6)
- *Draft State Planning Policy 2.6 State Coastal Planning Policy Guidelines*, February 2012, West Australian Planning Commission

1.6 Location and Tenure

State Planning Policy 2.6 (SPP 2.6) indicates Cape Keraudren as ‘a remote coast with limited opportunity for low key tourism and associated recreation and cultural activities’.

Cape Keraudren Reserve No. 39135 (4,800ha) was originally part of Pardoo Station Lease. In 1985 it was excised and vested in the Shire of East Pilbara, for the purpose of recreation. The recreation reserve extends to Low Water Mark (LWM). This reserve is traversed by a Rabbit Proof Fence No.1 reserve, Reserve No. 12297 and an additional small 1ha geodetic reserve, Reserve 39134, both of which are vested in the Department of Planning (DoP). Cape Keraudren Road Reserve connects the recreation reserve to the Great Northern Highway. Refer Department of Lands and Services Plan No. 16173 in Appendix 1 and Map 1 Cape Keraudren Reserve.

The reserve is situated between Broome and Port Hedland in the North West of Australia which is known as the Pilbara region, in the Shire of East Pilbara (SoEP), which at 371,696 square kilometres is Australia’s largest shire. Cape Keraudren is at the north-western extremity of the shire, approximately 400km from Newman (600km by sealed road), and the administrative centre for the shire. Marble Bar which is approximately 250km (by sealed road) from the Cape is the closest shire depot to the reserve. Port Hedland in the neighbouring municipality, is closer being only 150km away, see Map 2 Location of Cape Keraudren Reserve. The major industries of the shire are mining, pastoral and tourism.

Pardoo Roadhouse which is only 14km from the cape, near the intersection of Cape Keraudren Road and the Great Northern Highway, provides fuel, accommodation and other services. Pardoo Station Stay is about 60 km by road to the west and Eighty Mile Beach extends to the east with Eighty Mile Beach Caravan Park some 120km away. See Map 2 Cape Keraudren Context Plan.

The Eighty Mile Beach Marine Park includes the marine and coastal areas from Mulla Mulla Down Creek (known as Tidjila or Tichella - which is approximately 30km west of Cape Keraudren) east to Cape Missiessy and is managed by the Department of Parks and Wildlife (DPaW formerly DEC). After 2015 Pardoo Station will surrender the strip of land approximately 1km wide adjacent the coast and adjoining the reserve to the east. The land will revert to UCL and then DPaW intends to add this to the formal conservation estate to become Class A Nature Reserve. See Map 3 Cape Keraudren and Surrounds (the nature reserve is shown as Agreed 2015 excision area) prepared by DEC.

2.0 Natural Values

2.1 Climate

The Cape is situated on the most arid coast in Australia and is one of only five arid coasts in the world (V & C Semeniuk research group, 2000) with an average annual rainfall of approximately 370mm, which mostly falls between December and March as tropical thunderstorms or cyclones, though this varies greatly with little or no rain in some years. Average annual evaporation is between 3200mm and 3600mm.

The mean monthly summer temperatures range from mid 20° C to high 30s which is cooler than inland due to sea breezes. Winter mean monthly temperatures range from around 12° C in July to approx 30° C maximum (DEC) (mean monthly temperatures are derived by the mean of average maxima and minima –eg min 10°, max 30° = mean 20°).

Winter and summer are the main windy seasons with summer winds being mainly strong morning breezes from the northwest and southwest and in winter the cool morning breezes are generally from the east to southeast to southerly, turning north westerly in the afternoon (Middle). This area east of Port Hedland is the most cyclone prone area in Australia with Cyclone Lua passing through in April 2012 and Cyclone Rusty in February 2013, causing damage to signs and toilets on the Cape, and Cyclone Rusty in February 2013 caused some coastal erosion.

2.2 Oceanography

The Leeuwin Current flowing southward brings warm, low salinity water into the region, and is strongest in winter. The nearshore waters are generally turbid due to the strong tidal flows and episodic river runoff in the region, particularly during cyclone events. The waters further offshore tend to be clearer and water temperatures range from 30°C to 32°C in summer to 18°C to 21°C in winter (DEC).

Tides are semi-diurnal (i.e. a 12 hour cycle). A tidal power project was proposed for Cape Keraudren in the late nineties and (Middle) notes that the proponents, Tidal Energy Australia Pty Ltd and Kaiser Engineers Pty Ltd, suggested that the tidal range is as much as 9.6m; with mean high and low water spring tides being 7.7m to - 0.3m, a range of 8m. (Middle) also noted a predicted storm surge of an additional 3.3m and a recorded storm wave height for the Pilbara of 10m.

2.3 Climate Change

The Bureau of Meteorology (BOM)¹ advises that 'Australia and the globe are experiencing rapid climate change. Since the middle of the 20th century, Australian temperatures have, on average, risen by about 1°C with an increase in the frequency of heatwaves and a decrease in the numbers of frosts and cold days. Rainfall patterns have also changed - the northwest has seen an increase in rainfall over the last 50 years while much of eastern Australia and the far southwest have experienced a decline'.

The trend in mean temperature 1970 – 2011 degrees C/10 years indicates that for Cape Keraudren the mean temperature has increased by 0.15°C/10 years and the maximum by 0.1°C/10 years and there is an increasing trend of very hot days, approximately 3 more days each 10 years. Rainfall has

¹ Bureau of Meteorology <http://www.bom.gov.au>. Accessed July 2010

increased by an average of 20mm/10 years. The trend in annual cyclone density shows cyclones /degrees latitude square /decade has increased by 1-2. Sea Surface temperature is increasing by 0.12°C /10 years and pan evaporation and cloud cover are steady.

State Planning Policy (SPP) 2.6 advises that 'the allowance for sea level rise should be based on a vertical sea level rise of 0.9m over a 100 year planning time frame to 2110'. A slight increase in the intensity of tropical cyclones can be expected and these changes will likely result in tidal flooding and cyclonic flooding, moving further inland and gradually impacting mangrove communities. The recent cyclone removed sand from beaches and although this has occurred in the past and the beaches have been replenished over time, those visitors that have been visiting the reserve for many years, advised sand removal had been worse in the last 10 years. The coastal processes may be further affected if storm intensity and frequency increases.

The SPP 2.6 advises that potential coastal hazards include erosion, accretion and inundation and so evidence of these consequences of coastal processes on the reserve should be given due consideration.

2.4 International and Regional Biodiversity Significance

A Guide to the Integrated Marine and Coastal Regionalisation for Australia (IMCRA) prepared by the Department of Environment and Heritage (2006), indicates Cape Keraudren reserve is at the junction of two marine bioregions, the Eighty Mile Beach bioregion and the Pilbara Nearshore bioregion. *The Interim Biogeographic Regionalisation for Australia* (IBRA) prepared by the Department of Sustainability, Environment, Water, Population and Communities, identifies the area as having Dampierland as the terrestrial bioregion in the reserve merging into the Great Sandy Desert bioregion some 25km inland of the coast and the Pilbara Bioregion is some 20km to the west. This range of bioregions confirms the diversity and richness of the Cape Keraudren reserve. See Map 4 Bioregions within and adjacent to Cape Keraudren Reserve (Figure 3 from Proposed Eighty Mile Beach Marine Park – indicative management plan 2011 DEC).

The Convention on Wetlands of International Importance especially as Waterfowl Habitat (known as Ramsar Convention, signed in Ramsar, Iran in 1971) is an intergovernmental treaty dedicated to the conservation and 'wise use' of wetlands and provides for the listing of internationally important wetlands. Eighty Mile Beach is listed as a Ramsar Wetland and in Australia these wetlands are managed under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

National Guidelines for Ramsar Wetlands are being developed by the Australian Government in consultation with the states and territories through the Wetlands and Waterbirds Taskforce. The aim of the guidelines is to facilitate improved management of Ramsar sites and maintenance of ecological character, in line with Australia's commitments under the Ramsar Convention and responsibilities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Eighty Mile Beach Ramsar site extends inland to Mean High Water Mark and the extent of the wetland can be seen on Map 5 Eighty Mile Beach Ramsar Wetland (as provided by DEC)

2.5 Geology and Geomorphology

Eighty Mile Beach is a long sandy beach and dune system that is broken up by a few small mudflat bays with mangrove communities. Seaward of the beach are extensive fine sediment tidal flats that can span several kilometres to the ocean and support the important intertidal sand and mudflat communities. The beach and fore dunes comprise coarser calcareous sand, with a narrow floodplain covered with grasses and pindan woodland immediately inland from these. The beach, tidal flats and fore dunes are important for shorebirds and nesting turtles (DEC). This system is found in the east of the Cape Keraudren reserve and Cootenbrand Creek is likely to be the western 'end' of Eighty Mile Beach. (See Map 6 Overview of existing situation 2012.) SPP 2.6 notes that Eighty Mile Beach is classified as a sandy coast and as such an allowance of approximately 130m plus 100 times the annual movement of the dunes is required for built infrastructure.

Offshore, north of the mouth of Cootenbrand Creek is an area just beyond Low Water Mark considered special because of the high diversity of coral and filter feeding communities, as well as macroalgal and sea grass communities.

West of Cootenbrand Creek is characterised by rocky shores, with narrow sandy beaches, small tidal creeks and mangrove lined muddy bays. SPP 2.6 advises setbacks on rocky coasts should be based on geotechnical advice, with consideration given to such factors as the reduced effect of fringing reefs in terms of shore protection as sea level rises. The sandy beaches should have the same setbacks as the sandy shores.

Significant salt marsh flats occur further inland behind the mangroves (DEC) which only flood on particularly high tides or storm events. Inland of the marshes are storm beaches and ridges which give way to pindan. Allowance should be made for erosion on coastal lowlands due to inundation of the salt marshes.

Should any significant permanent structures be proposed for areas adjacent to low lying land storm surge and other appropriate studies need to be undertaken to ensure the long term viability of the structures (refer SPP 2.6). Small scale public recreation facilities with a finite (less than 30 years) lifespan are appropriate in these areas provided adaption planning measures are in place.

Middle notes that Cape Keraudren is set on the Northern Carnarvon Basin geological feature, made up of sedimentary deposits, and that limestone dominates the landscape of the cape.

2.6 Geoheritage

Geoheritage sites are natural features of the Earth that are considered to be unique within Western Australia and to have significant geoscientific and educational values. The Department of Mines and Petroleum Website indicates no geoheritage sites at Cape Keraudren.

2.7 Groundwater

Groundwater in the coastal areas is likely to be saline because of the influence of the tides and high evaporation rates. Inland there are adequate supplies of fresh confined ground water originating from the Carnarvon Basin (Middle et al). Water for the ranger station has been supplied in association with Pardoo Station with the bore actually being located on the station with water piped to the reserve. Non potable water is supplied to campers from a tap near the ranger's house.

The shire proposes to sink a bore on the reserve, funding for this work is in the 2013 / 14 budget.

2.8 Habitats, Flora and Fauna – Marine

DEC notes the following values as being significant in the proposed Eighty Mile Beach Marine Park

- water and sediment quality;
- geomorphology;
- intertidal sand and mudflat communities;
- subtidal filter feeding communities (hard and soft substrate);
- macroalgal and seagrass communities;
- coral reef communities (intertidal and subtidal);
- mangrove communities and salt marshes; The mangrove communities are part of the largest single unit of relatively undisturbed tropical arid zone mangrove in the world (Semeniuk 1997);
- waterbirds, including migratory species – Eighty Mile Beach is recognised under the RAMSAR convention as being important nationally and internationally for roosting nesting and feeding and is part of the East Asian – Australasian Flyway, October to April are the months when the flyway is most active;
- marine turtles including flatback turtles;
- marine mammals – dugongs and several cetacean species;
- invertebrates – food source for other species and the basis for fishing activities (crabbing);
- finfish; and
- sharks and rays.

2.9 Habitats, Flora and Fauna - Terrestrial

As much of the Cape Keraudren reserve consists of the interface between land and sea the main vegetation types in this part of the reserve have already been mentioned in the marine section

- mangroves – species zoned depending on inundation and substrate type;
- salt marshes.

Above the HWM there are sand dunes and storm ridges where the species are zoned dependent on shelter from coastal wind and spray. *Pilbara Coastal Flora*, 1983 by Craig, G. F. Department of Agriculture, WA, gives details of typical species occurring in these areas. There are exposed limestone outcrops on the coast where more native vegetation persists due to the environment being too harsh for the non-native buffel grass *Cenchrus ciliaris*.

Craig notes the area is in Beard's (1975) Eremean Botanical Province, Fortescue District, and forms part of Kenneally's (1982) tropical biogeographic region which extends from Cape Keraudren to Exmouth Gulf.

Inland as part of the Dampierland Bioregion 'the vegetation is characterized by acacia thickets with scattered trees and areas of grasslands and savannas'².

²<http://www.environment.gov.au/land/publications/acris/pubs/bioregion-dampierland>.

The Cape Keraudren area is part of the Pindanland subregion of the Dampierland bioregion which is 'the coastal, semiarid, north-western margin of the Canning Basin. The region has a semiarid, hot, tropical climate with summer rainfall. Quaternary sandplains mantle Jurassic and Mesozoic sandstones and support pindan vegetation on the plains and hummock grasslands on the hills. Quaternary marine deposits on coastal plains support mangal, samphire, *Sporobolus* grasslands, *Melaleuca acacioides* low forests and *Spinifex*, *Crotalaria* strand communities'³.

The environmental weed buffel grass has taken over many of the low lying sandy areas and grazing pressure from cattle is evident along the edges of the mangrove communities and the fore dunes. Caltrop (*Calotropis procera*) is reportedly spreading throughout the reserve.

Although the vegetation is disturbed, there are still pockets where wildflowers are impressive, particularly the mulla mullas (*Ptilotus sp.*) on Cape Keraudren itself and occasional flowering shrubs on the inland ridges. The absence of trees, except for mangroves, results in a very open landscape with few options for screening introduced elements.

'The Eighty-mile Beach Ramsar site is considered one of the most important sites for stop-over and feeding by migratory shorebirds in Australia. Eighty-mile Beach represents the most important site internationally for large numbers of individuals for nine species of migratory shorebird in the East Asian-Australasian Flyway, the bar-tailed godwit, terek Sandpiper, grey-tailed tattler, great knot, red knot, curlew sandpiper, greater sand plover, oriental plover, and oriental pratincole. The site is also significant for the breeding of flatback turtle.

Eighty-mile Beach supports more than 1% of the Flyway population, or 1% of the Australian population for resident species, of the following waterbirds: greater sand plover, oriental plover, red-capped plover, grey plover, bar-tailed godwit, red knot, great knot, red-necked stint, sanderling, sharp-tailed sandpiper, curlew sandpiper, eastern curlew, little curlew, common greenshank, grey tailed tattler, terek sandpiper, ruddy turnstone, pied oystercatcher; oriental pratincole, black-winged stilt and great egret.

Eighty-mile Beach is considered to regularly support in excess of 500,000 birds. There is a record of 2.8 million oriental pratincoles on the beach in February 2004'.⁴

Macropods were observed and there was a variety of bird life including raptors such as sea eagles, wedge tailed eagles, black kites, hobbies. Brolgas, jabiru and ibis are seasonally common on the wetlands. Estuarine crocodiles (*C. porosus*) have been recorded in the area. Bats are seasonally common in the mangroves around the lagoon.

Foxes and wild cats occur in the reserve.

³ <http://www.anra.gov.au/topics/vegetation/assessment/wa/ibra-dampierland>.

⁴ <http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=34>

3.0 Social Values

3.1 Aboriginal Values

The Ngarla people are traditionally connected to the Cape Keraudren area and although Native Title has been extinguished as a result of the vesting of the coastal reserve the area is still important to the Ngarla people particularly the Brown family group.

The Brown family visited the Cape as part of this planning process and a report of the outcomes of the visit can be found in Appendix 2 Summary of visit to Cape Keraudren Monday 9 July 2012. The family is keen to remain connected to the area and to contribute to management particularly interpretation projects. Providing aboriginal names for areas on the cape is another opportunity.

There are a number of significant sites for the area recorded on The Department of Indigenous Affairs (DIA) Register of Aboriginal Sites, and ongoing liaison with the Ngarla people is required to ensure these sites are appropriately managed.

3.2 European and Post Settlement Heritage Values

(Middle 2004) notes some points of historical interest associated with the Cape as follows

- Cape Keraudren was named on the French expedition of 1803 lead by Baudin. Francois Peron named the cape after Francois Keraudren, physician in charge of Naval Medical Services in Brest (France);
- Pardoo station was first taken up in 1869 by the Anderson brothers;
- Cape Keraudren is the northern end of Rabbit Proof Fence Number 1 completed in 1907 and the fence reserve is listed on the Shire Heritage Inventory. A low stone wall remains today which extends across the flats to low tide mark. A plaque and sign commemorate the project; and
- Cape Keraudren was reputed to be (refer Middle 2004) a lookout post in the Second World War and the remains of the wall that the soldiers hid behind are reputed to still be there but were not observed.
- In the late 1960s Cape Keraudren was the proposed location of a joint venture between Australian and United States governments to use a nuclear explosion to create a harbour. See Appendix 3 Nuclear Harbour Memo regarding the proposal to use a nuclear explosion to create a harbour at Cape Keraudren.

Onsite discussions with visitors indicated there may be other interesting stories associated with the area such as

- the existence of a marker beacon on one of the hill tops, this may be associated with the war time lookout;
- squatters holiday shacks that used to be at Cols Bay (near the end of the Rabbit Proof Fence);
- a shack that used to be near the boat ramp where Jimmy and Hilda Ince used to live. Hilda who'd been a 'white coolie' in the Second World war was like a 'mum' to the Goldsworthy miners who visited the reserve, giving them Christmas lunches;

- the reserve was created as a recreation area for miners living in Goldsworthy and Shay Gap, which were nearby mining towns, since abandoned;
- the bay west of the Cape was considered for a tidal power station in the late 1990's but the proposal was not approved by the shire once the scale of the proposed impact on the Cape was understood; and
- 'Stairway to the moon' –on some beaches of the Pilbara and Kimberly coasts the reflection of the moon rising over a low tide creates 'stairs' of light which connect to the moon. This occurs off Col's Beach.

Further research, including recording the stories of the visitors who have been visiting the Cape for many years, is likely to uncover more of the area's history.

3.3 Wilderness Values

Wilderness means many things to many people but the Australian Heritage Commission developed the National Wilderness Inventory in 1986 and developed a subjective process for assessing wilderness qualities based on level of remoteness from settlement, remoteness from access, apparent naturalness and biophysical naturalness. Based on these criteria Cape Keraudren Reserve does not have significant wilderness values as can be seen on the Department of Sustainability, Water, Environment, Population and Communities website⁵

3.4 Landscape Values

The scenery at Cape Keraudren has long been an attraction for visitors but the character and components of the landscape have not previously been assessed, recorded or analysed and no proposals have been prepared for the management of the visual qualities of the area.

The need to manage visual landscapes is becoming more widely recognised with policies and management plans such as SPP 6 and the Proposed Eighty Mile Beach Marine Park indicative management plan referring to the need to manage visual landscapes. *Reading the Remote: Landscape Characters of Western Australia* (CALM et al 1994), inventories the Landscape Character Types (LCTs), - descriptions of landscapes in terms of landform, vegetation, water form and land use patterns) but only gives very brief, generic descriptions of the LCTs for the Pilbara and Kimberley regions and no frames of reference for benchmarking the visual quality of these areas.

Consequently a preliminary visual assessment of the reserve has been undertaken and is available as a separate document *Preliminary Visual Assessment of the Cape Keraudren Reserve*, Winfield 2012 (unpublished). This will enable managers to ensure they are not inadvertently changing the character of the reserve when implementing other management initiatives; it will also enable opportunistic enhancement of the visual qualities of the reserve.

Cape Keraudren Reserve is on the boundary of two LCTs, The De-Grey Lowlands which extends to the west of the cape and the Eighty Mile Plain which extends east of the cape. The visual assessment identified that the area is of high scenic quality, due to the diversity of landform and water form and contains a number of visually significant natural features including

- Cape Keraudren which is noted as a significant feature by(Revell 1994) ;

⁵ <http://www.environment.gov.au/heritage/pub> Accessed August 2012

- various water forms including the Indian Ocean, estuaries, tidal creeks, tidal flats and supra tidal flats and the lagoon;
- mangroves;
- the rugged limestone cliffs and wave cut rock platforms; and
- the expanse of Eighty Mile Beach.

The seasonal landscape elements (caravans, tents, etc.) associated with camping, particularly on the elevated areas of Boat Ramp Bay Camp and Sandy Bay Camp, were assessed and although they contrast with the natural landscape they are considered to be cultural landscapes that can be seasonally accommodated within the natural landscape of the reserve. The permanent toilet structures however need to be made less obtrusive.

The proposed landscape character for the reserve is that of a natural area in which naturalness dominates but which accommodates small scale temporary, obtrusive, informal structures that form unique cultural landscapes.

Winfield details recommendations for managing visual quality and they are incorporated into the management proposals in Section 10.5.

4.0 Recreation Values

4.1 History of Recreation on the Reserve

As previously noted the Cape Keraudren reserve was created in 1985 specifically to provide recreation opportunities for the residents of the then nearby mining towns of Shay Gap and Goldsworthy. The cooler coast would have been an attraction, with fishing probably the most important activity. There were coastal shacks at Boat Ramp Bay and Col's Bay and it is likely that 'Grey Nomads' (retirees travelling up from the cold southern states to spend the winter by the warm northern coasts), were already starting to visit the area. Some of the current visitors have been travelling to the reserve each winter for more than 20 years.

Management of the reserve by the shire commenced with gazettal and a management plan was prepared in association with the Department of Conservation and Environment (DCE) a predecessor to DEC. Middle (2004) notes that the DCE plan proposed postponing camping provision east of Cootenbrand Creek and subsequently the area was closed completely and the track rehabilitated. Concerns with camping at Firewood Creek were noted and the council subsequently closed camping and (Middle 2004) supported this. Middle notes that Aboriginal people were camping in the reserve at their meeting places. The DCE plan proposed track closures and (Middle 2004) noted the success of these closures in minimising environmental damage.

Middle (2004) recommended dogs be excluded from the reserve, and camp sites be 12 metres apart (unless campers want to camp as a group and agree to camp closer) these recommendations have been implemented together with the requirement that all vehicles must be licensed which restricts access for unlicensed trail bikes, quad bikes and other off road vehicles. These strategies significantly contribute to the peace and naturalness of the area.

4.2 Recreation in Today's Society

The value of recreation to contemporary society, particularly in natural areas, is being confirmed by such Australia wide initiatives as 'Healthy Parks, Healthy People' and NaturePlay which promote the health benefits of interacting with the natural environment.

The draft Pilbara – Planning and Infrastructure Framework Summary, February 2011 prepared by the Department of Planning (DPI) for the WAPC, notes the need to improve facilities and services, if workers and their families are to be attracted to the region. Improving access to beaches and considering recreation and tourism needs and expansion opportunities are noted as specific priorities. The summary also notes that 'it is important to acknowledge the contribution natural values make to the Pilbara's liveability, health, lifestyle and economy'. The summary continues 'The Framework....will also provide momentum for a better understanding and respect for the natural environment; promote the conservation and protection of significant natural features; and ensure opportunities for discovery, recreation and a sense of meaning for the benefit of future generations.'

4.3 Recreation Settings

Nature based recreation occurs in 'settings' that consist of physical, social and managerial attributes. This means it is not just how a place looks that attracts a visitor, it is what they can do, how they got there, who they meet when they are there etc. Different combinations of these attributes create different settings and different recreation settings suit different user groups. If recreation management is to be effective and sustainable, the settings provided need to suit the visitors that use the reserve.

Examples of attributes that contribute to a recreation setting are listed below.

- Physical –degree of naturalness including past land use, views, flora, fauna, weeds, night sky, level of visitor impact, access and other infrastructure;
- Social – ease of access, degree of self reliance required, distance from facilities (such as supplies, accommodation, public transport, medical help), level of isolation, opportunities for socialising, numbers and group sizes of other visitors
- Managerial – degree of site organisation, management presence, enforcement strategies, fees and permits required, level of publicity, management of visitor risk, provision of signage and interpretation.

The summation of the attributes at any site gives the recreation setting that the visitor interacts with. These settings can vary from unmanaged natural settings to highly developed recreation complexes. This range of settings is often referred to as a spectrum of opportunities. If managers change any of the attributes of a setting they will change that setting whether they meant to or not, e.g. sealing an access road to a recreation area will increase the level and type of visitation to the area.

The various attributes of Cape Keraudren recreation setting are described below. Some attributes are slightly different for individual sites giving some variation in settings across the reserve which in turn provides for a wider range of visitors.

4.4 Recreation Setting of Cape Keraudren Reserve

4.4.1 Naturalness

Reference to Section 2 indicates the area is predominantly natural, but there are significant levels of introduced flora and fauna. The visual landscape has a number of discordant elements and recreation structures are particularly visible. Pastoral activities are also evident with stray cattle on the reserve and fences and grids on the perimeter. The only lights in the night sky are those on site.

4.4.2 Access

There is a high level of access to the reserve with the sealed North West Coastal Highway only 7 km from the reserve boundary via the Cape Keraudren Road which provides 2WD access to the reserve. Some of the reserve is 2WD accessible, but other areas require a 4WD and nearly all vehicles which access the site are 4WDs. A bus service stops at Pardoo, but no commercial operators are known to visit the reserve.

The Shire of East Pilbara manages the access infrastructure at Cape Keraudren including

- the access road to the reserve - which is a formed gravel road sealed for approximately the first half. The second section can be quite corrugated, which is challenging for some visitors;
- the main access road within the reserve - gravel surfaced road from the entry gate to the Boat Ramp Bay approx 7km and Col's Beach with a spur into Sandy Beach camp. This road was in better condition as it is regularly graded by a vehicle towed 'grader';
- firm sandy single lane tracks - most with grass down the middle provide access to Cootenbrand Creek Camp, Mosquito Creek Boat Launch and the rubbish tip and service area;
- single lane tracks that have rough rocky sections - access the Cape Camp and the track around the central lagoon;
- very rough rocky tracks - access the tip of the cape;
- seasonally inundated single lane tracks - which cross the salt marshes to access Firewood Creek and other tidal creeks; and
- beach access - to western end of Eighty Mile Beach which is managed by signs and fences.

A concrete boat ramp suitable (with skill and caution) for boats up to 8m (such as Customs and Fisheries Department boats) is provided at Boat Ramp Bay, with associated regulatory signage. Boat launching also occurs informally at Mosquito Creek, Firewood Creek and probably other small creeks in the reserve. Management of the boat ramp is the responsibility of the Shire.

4.4.3 Recreation Sites

There are a range of recreation sites on the reserve including camping areas, day use sites of different types and an entry station. Appendix 4 Cape Keraudren Recreation Sites – Field Notes July 2012 contains notes about the individual sites and Maps 1 and 6 shows the location of most of these sites.

Table 1 Existing Recreation Sites on Cape Keraudren Reserve 2012

Site	Capacity and Activities	Infrastructure	Issues
Entry on Great	2-3 vehicles Visitors stop to	Numerous signs and cattle grid	Review role of site, rationalize signs.

Northern Hwy	obtain information		
Ranger's House, Entry Station and Works Area	6 vehicles Visitors stop to pay fees obtain information and use sullage tank and tap.	House, parking, services (inc. generator), sealed entry area with separate stopping bay, information shelter, signs, work area and storage yard, water tank, tap, sullage point, speed humps	Review site with the aim of self registration and fee collection, improving interpretation, reducing visual significance of site.
Salt Flat Golf Course	2 vehicles Informal golf with an RFDS fundraiser competition	Permanent railings marking parking area. Temporary flags marking course	Review parking and sign accordingly. Parking along the road for the RFDS fundraiser in July, not a problem but may need temporary signage.
Cootenbrand Creek Camp	12-15 camps, 1 long term camp. Fishing and socialising.	1 Rotaloo toilet, 1 long drop toilet, 1 bin with extra in peak season. Dune protection fencing. Cattle fence, signs. Single lane track access.	Southern area needs to be closed removing 5-6 camps. Shore needs checking for undercutting. No allocated parking for day users. Toilet is visually obtrusive.
Eighty Mile Beach Day Use	5-10 4WD vehicles. Beach and reef walking, collecting, fishing.	Beach fencing and signs regulating vehicle access. Dune protection fencing.	At spring tides access is limited.
Sandy Beach Camp	20-21 Camps, 2 -3 long term camps. Beach activities and socialising	1 Rotaloo toilet, 1 long drop toilet, 1 sullage disposal point, 2 bins with extra in peak season. Dune protection fencing, signs. Gravel road to site.	Internal traffic flow needs reorganizing so visitors can tell more easily where sites are. Provision required for day visitors. Obtrusive toilet and prominent camp. Cattle.
The Mangrove Lagoon	No parking, Visitors walk from other camp areas	A couple of directional signs and some railing	Indicated walk trail is generally unmarked/signed and the area is frequented by cattle. Significant to Aboriginal people.
Boat Ramp Camp	25-30 Camps with up to 45 when there are group 5-7. long term camps. Fishing, boat launching socialising	2 Rotaloo toilets, 1 long drop toilet, 1 sullage disposal point, 2 bins, plus 1 for fish offal with extra in peak season. Boat ramp and boat ramp signs. Regulatory signs. Gravel road to site.	No provision for day visitors. Emptying offal bin difficult. Reef flat impacted by boat launching. Potential for accidents in busy times with mix of pedestrians, vehicles and boat launching. Toilets obtrusive, camp very prominent.
Mosquito Ridge	9 camps on ridge and 2 on shore	No facilities, sites are mown to indicate where camping should occur	Very visible from main entry road. Holes from part built toilets are a hazard.
Mosquito Creek Boat Launch	1-2 parked trailers Boat launch and fishing	No camping sign and fencing to control use along creek. Single lane track access.	Potential for conflict on 1 way access.
Col's Beach Camp	15 camps on upper track, 6 on lower track and 6 to south on beach = 27, 2 long term camps	1-2 bins, no toilets (campers must bring their own), signs	
Rabbit Proof Fence Lookout	Informal parking for 2-3 vehicles (also used as a	1 large sign, bent over by recent cyclone. GPS reference point.	Informal track needed to guide visitors to best viewing point. New signage required less prone to

	camp) Sight seeing		cyclone damage. Day use parking required.
Cape Camp	8 camps 3 long term camps	1 bin, no toilets (campers must bring their own), signs.	Some sightseer vehicles pass through camp.
Cape Keraudren Day Use Site	2-3 vehicles Sight seeing	No infrastructure except old fire ring of stones. Bare rocky turning area.	Vehicle use needs confining on cape. Interpretation needed.
Beacon Hill	1-2 vehicles Sight seeing	Trig point is in vicinity	Hills on headland need naming demarcation, track rationalization, and interpretation provided. Trig reserve is vested in DoP
Firewood Creek Boat Launch	Off road parking. Boat launch and sight seeing	Fences and signs	Fences are constricting. Function of site needs confirming and site reorganised accordingly.
Pt. Poolingerina	Fishing	Unknown	Assessment required. Part of Pardoo Sanctuary Zone. Maybe accessible from Pardoo Station
Bossut Island or Western island	Fishing	Unknown	Assessment required. Middle noted turtles nesting there and suggested Wilderness camping could be permitted if monitored. Boat and foot access across tidal flats.

4.4.4 Activities

Fishing – shore and boat fishing and crabbing are popular with most visitors, whether it is daily boating trips by campers to catch enough for a meal, or day visitors catching their bag limit. Throw netting occurs in Cootenbrand Creek for bait fish, shore fishing also occurs along the creek and off beaches, headlands and rocky shores. Boats go out from the ramp into the Boat Ramp Bay, and out into the ocean. Boats also use the natural ramps on the tidal creeks to fish the creeks and access the bays. Firewood Creek informal launch provides access to Blaze Bay. There are also stories of fishermen walking across Boat Ramp Bay at low tide, fishing on the high tide and walking back next low tide. At low tide, looking for mud crabs is another popular activity and octopus are also taken from rock pools.

Fossicking, Shell Collecting and Reef Walking – occurs on the reef flats and beaches

Walking – visitors often walk along the vehicle tracks and beaches. Some were observed carrying fishing rods indicating they were walking rather than driving to their fishing destination. Others are observed walking for exercise.

Cycling – is popular with young families however the only place to cycle is the access roads and tracks. Cycles were noticed on the back of a number of vehicles.

Sightseeing – Cape Keraudren is a feature on many maps and day visitors come to see what is there. Campers particularly appreciate the water views and were noticed in the evening watching for the ‘stairway to the moon’.

Whale Watching and Other Nature Study Activities – whales are observed off the cape during their migration seasons (spring and autumn). Turtles nest on Eighty Mile Beach (summer) and migratory birds use the beach (summer) giving viewing opportunities. There is also interest in birds

of the Cape as evidenced by artificial perches being put up near some camps to attract finches, swallows and other birds as there are so few trees.

Swimming and Beach Activities – a number of visitors hope to swim, but find the area not really suited to beach activities much of the time. High tide is the best time to swim as the water is closer to sandy shore and the steeper beaches provide easier access. There are a number of potential marine risks such as irukanji (venomous jellyfish), blue ringed octopus, stonefish and crocodiles.

Golf – golf on the salt flat is important for some visitors usually when it is too windy to fish. A tournament is held in July of each year to raise money for the Royal Flying Doctor Service.

Socialising – chatting, playing cards and catching up are common activities, particularly among the more elderly campers.

Four Wheel Driving - Although primarily used as a means of accessing the reserve, 4WD drives are also used for scenic driving on the reserve and the roughness of some tracks contribute to a “4WD experience”. Reference to CRC Desert Knowledge (see Appendix 5 Visitor Research) indicates 4WD drivers would be classified as ‘activity seekers’ and ‘group explorers’ while ‘thrill seekers’ (those seeking to test their vehicle) are discouraged by management as vehicles are required to remain on tracks at all times.

4.4.5 Types of Visitors

Informal discussions with some of the visitors who were on the reserve in the second week in July 2012 indicated the following visitor types were present. This information is indicative only, though it is supported by comment from the ranger and visits to the reserve earlier in the year.

Campers

Long Term Campers – There are 12 – 14 long stayers who may stay up to 5 months over winter and some of whom have been coming nearly 25 years. They are generally a couple, with a single camp that they have each year, come from the south of Western Australia or the southern eastern states and are concession card holders, often known as ‘Grey Nomads’. They like the views, fishing, campfires, the space, the relaxed atmosphere and the ‘freedom’. They may go visiting to other recreation sites in the general area such as Coppins Gap. Many of them assist substantially maintaining and fixing the toilets, other odd jobs and supporting the ranger. They want the reserve left as it is.

Travellers – these visitors can stay from 1 night to approximately 2 weeks, with some intending to only stay 1 night and ending up staying 2 weeks. Many are ‘Grey Nomads’ in transit from the same places above, and with generally the same preferences as the long term ‘grey nomads’, with some of them particularly appreciating the facilities compared to sites such as Ningaloo. However there are also family groups, with 2 or 3 generations of the same family travelling in 2-3 vehicles. A third travelling group are families with younger children who tend to be travelling on their own and may be travelling ‘around Australia’ for 2-3 months. A fourth travelling group is adults, generally couples with no children. Camping so close to the beach, bush camping, having fires and the space are particularly important to the latter groups. The final group of travellers observed was backpackers who were from overseas and were hitch hiking, they had been looking for a beach and were

disappointed with the beach opportunities but had enjoyed relaxing and seeing the 'staircase to the moon'. Other overseas travellers in camper vans could be expected to visit the reserve.

Weekenders – There were anecdotal reports of groups of young resource industry workers visiting the reserve on weekends, particularly long weekends, with a focus on partying and fishing but also being loud, leaving litter, speeding and disturbing the other campers. It is likely there are also family groups from Port Hedland or further away who come camping on weekends, particularly long weekends and probably in school holidays. Subsequent conversations with past residents of Marble Bar indicated that they also regularly visit for weekends, or at least used to approximately 10 years ago.

Day Visitors

Day visitors are likely to be most frequent on weekends and school holidays. Most day visitors to the reserve are from Port Hedland and over the first weekend of the July school holidays, of approximately 30 visitors; just under half were first time visitors. Day visitation is increasing. Day visitor groups include

Families – parents with school aged children, newly arrived to Port Hedland were looking around and visited the reserve hoping to swim and fish.

Groups of 'young blokes' – 20-30 year old fellows, travelling in more than one vehicle, with a focus on fishing and partying.

Visitor Profile

There has been a considerable amount of research undertaken in recent years into coastal camping in the north west of Australia, See Appendix 5 Visitor Research. Comparing the above observations to the research indicates visitors to Cape Keraudren fall into some of the categories identified by research such as

- Grey Nomads (the majority of visitors)- both short and long term stays, in 'bush' camps' with many on 'fishing escapes'
- Four Wheel Drive Tourists - 'activity seekers' and 'group explorers'

However, as Cape Keraudren is relatively close to Port Hedland and is on the Great Northern Highway there are more, younger, weekend campers than in some other coastal locations and day visitation is also significant.

The term 'Grey Nomads' generally refers to people aged over 55 years who travel for extended periods of time, have mixed budgets but are generally price conscious as the majority have low incomes (Tourism Western Australia, 2009).

Lewis(2012) notes "the top four most important campsite characteristics for bush camping along the Ningaloo Coast were 'campsite close to the beach', 'minimal litter', 'price' and 'distance to neighbour campsite'". Other important attributes were 'toilets provided', 'generators allowed' and 'dump point for sewerage'.

The attribute that was least important to most campers was 'fresh water showers provided'. The other most common, location specific, least important attributes were 'dogs allowed', 'boat launch

facilities/access' and 'campsite not exposed to wind or sun'. The other common least important attributes were 'toilets provided', 'well defined paths/campsite areas', 'generators' and 'dump point for sewerage'. So what is most important for some groups of campers is least important for other groups of campers.

Research also indicates that both long and short term campers, who regularly visit a bush camping area, develop a strong ethic of environmental stewardship, community and belonging. These characteristics are not seen in more developed locations (NRM).

Observation indicates there is a trend towards self sufficiency in camping outfits such as solar power generation, and on-board toilets and showers.

As part of the planning process associated with the preparation of this plan a visitor survey was undertaken.

4.4.6 Cultural importance

There are significant historic and cultural values (see Section 3.0) which are attractive to many visitors. In addition the current camping experience is valued highly by most visitors, particularly the informality, the ability to have a fire, closeness to the beach, water views and fishing and attractive natural scenery.

4.4.7 Visitor Impacts

Cape Keraudren reserve has significantly fewer visitor impacts than many other similar nature based recreation areas in the Pilbara (Collins pers. comm.). Impacts have been reduced in recent times by management efforts and controls (see Section 4.4.8).

However access infrastructure and other structures such as toilets does create a recreation footprint on the reserve and recreation use is resulting in other impacts such as

- pressure on the fish populations (anecdotal reports such as 'there are no octopus left on the reef');
- impacts on reefs from reef walking and shell collecting; boat launching also impacts a section of reef flat;
- clearing of vegetation from camping areas, this may be seasonal in areas of buffel grass as it is likely these areas will recover in the wet season when there is no use;
- occasional litter problems such as beer bottles in dune areas after groups of younger short stay visitors;
- damage to rock camp areas at Cootenbrand Creek due to annexe tent pegs and lights being secured into the rock;
- emptying sullage in Cootenbrand Creek;
- possible impacts from the old long drop toilets leaching into the ground water;
- evidence of the need for toilets at Firewood Creek; and
- need for track rationalization in the Firewood Creek and salt marsh areas where vehicle tracks are duplicated

4.4.8 Management Controls

The following restrictions, most of which are conditions of entry enforceable by the ranger, are placed on visitors

- camping restricted to designated camping areas; designation of camping areas and implementation of a '12m between camps rule' (unless the parties are in a group and wish to be closer);
- only permitting registered vehicles so there are no unlicensed vehicles such as trail bikes and quad bikes;
- restricting access to the large dune between Col's Beach and Sandy Bay which has enabled the 4WD track to stabilise;
- realigning the main gravel road away from the wetter area by the lagoon and allowing the old track to revegetate;
- restricting access to dunes at Cootenbrand Creek which are now stable;
- track rationalisation across the flats where the revegetated tracks are hardly noticeable;
- fencing off Eighty Mile Beach to visitors which protects the beach and intertidal zone from the impacts of visitor vehicles;
- preventing firewood collection on the reserve;
- disallowing dogs;
- fees are payable to the ranger on entry; and
- directional signage throughout the reserve advising of access, speed and other restrictions such as keep off revegetating areas etc;

4.4.9 Management Support and Infrastructure

The following management support is provided

- rubbish and fish offal bins are regularly emptied;
- toilets and sullage points are provided;
- bore water is provided at the ranger depot;
- the ranger is on site nearly all the time;
- roads are graded and maintained;
- an information brochure and fishing guide is provided to all visitors as they pay their fees; and
- boat ramp and boating regulations are provided on site

Infrastructure that is required to sustain this management support currently includes

- the ranger's house and works yard including services to support the house such as generator, communication, water and fuel tanks.
- a bore for water supply – located on the adjacent pastoral station
- rubbish disposal facilities (an open pit)
- fences – internal fencing was installed in recent years to keep the cattle out. These fences were located roughly just above High Water Mark around the tidal flats joining a section near the boundary at the road entry point. The fences are largely ineffective in controlling cattle.
- signs

4.4.10 Signage

There is a variety of signage on the approaches to the reserve and within the reserve itself, including

- instructions painted on drums by the side of the road;
- the colourful logo of the East Pilbara Shire on the comprehensive welcoming sign at the information bay on Great Northern Highway;
- Ageing interpretation panels in the information shelter at the entrance in subdued tones ;
- the map of the reserve on a separate sign;
- the varied standard regulatory signs;
- traffic signs; and
- ageing routed timber signs in mission brown with cream lettering

The ranger has requested more directional signage to help people find their way around the reserve and other observations regarding signage include

- the range of signs contributes to the informal atmosphere of the reserve but maybe a new image is needed for the reserve (which still reflects the reserve's character);
- the lack of directional signage and a site numbering system probably contributes to the sense of 'freedom' mentioned by some visitors;
- the existing signage on the reserve mostly focuses on protecting the environment rather than encouraging or facilitating visitor use. This management strategy was needed when the environment was being significantly impacted, but the focus may now need changing; and
- currently visitors receive information on what to do and where to go mostly from talking to the ranger as they pay their fees. This interaction with the ranger is a positive experience for visitors but this may not be sustainable in the future.

4.4.11 Publicity and Marketing

How visitors find out about a recreation area influences their expectations of the reserve and ultimately their recreation experience. Also the level and type of promotion and marketing influences how many and what type of visitors will visit an area. The visitors surveyed on site advised they heard about the area

- by talking to other travellers – 'word of mouth';
- when it was recommended by travellers at Pardoo Roadhouse; and
- from Camps Australia Wide publication.

Calling in to visitor centres on a casual basis on the way to Cape Keraudren revealed

- that the Cape is not specifically promoted at the Newman Visitor Centre;
- Australia's North West Guide to Holiday Experiences notes under Port Hedland - 'Eighty Mile Beach and Cape Keraudren are nature reserve areas with pristine coastline perfect for fishing, fossicking for shells or sitting back and enjoying the breathtaking sunsets. Remember to return any shells from where they came'. Under Experiences –'Visit the Cape Keraudren Coastal Reserve, a haven for marine and terrestrial animals';
- Warlu Way Brochure – notes Cape Keraudren on a map in the brochure but no site specific information was available; and
- A free map available from Marble Bar Visitor Centre had Cape Keraudren on it.

When Cape Keraudren is 'googled' the informative Shire of East Pilbara website gave comprehensive information about the Cape including a copy of the brochure. However, a short movie on site misrepresents Cape Keraudren as national park; it is a coastal reserve and not a national park.

4.4.12 Self Reliance

As noted in the above short movie, 'visitors to Cape Keraudren must be very self sufficient during their stay'. With toilets and rubbish bins being the only facilities provided, visitors must bring their own water and any other luxuries such as showers etc. Some water is provided near the sullage point at the ranger's depot, but this is really for washing associated with the sullage point and not personal use

However the Cape is not as isolated as might be expected given the level of facilities on site. Recently mobile phone coverage was extended to the Cape. Campers have the companionship and advice of other campers on the reserve. Pardoo Roadhouse only 14km away provides water, showers, washing machines, postal services, some supplies including transporting orders from supermarkets and pharmacies in Port Hedland, licensed restaurant, fuel, charging facilities for mobile phones and computers etc. and papers. Port Hedland, a town with a wide range of services including hospital and airport is only 165km away on a sealed road. These support facilities are what enable the 'long stayers' on the Cape to remain there for such lengthy periods of time.

4.4.13 Recreation Sites Nearby

Recreation sites within a few hours' drive provide opportunities for day trips for those camping at the Cape, and provide options for day visitors from Port Hedland or elsewhere to stop at other places on their day trip. Day trip destinations may include

- Eighty Mile Beach Caravan Park approx. 100km away to the east ;
- alternative coastal fishing and sightseeing opportunities such as Pardoo Station (60km) and Shellborough and Tidjila to the west on De Grey Station (approx. 120km) ; and
- inland experiences such as the old mining towns of Shay Gap and Goldsworthy, gorges such as Coppins Gap and Doleena Pool and the historic town of Marble Bar approx (150km).

Alternative coastal camping options east of Port Hedland are shown on Map 3 and described in more detail in Appendix 6 Notes on Coastal Camping and Accommodation Options near Cape Keraudren, and include

- Shellborough and Tidjila – 4WD accessible, unmanaged coastal camping with no facilities;
- De Grey Bridge MRWA roadside stop and picnic area on De Grey river with basic facilities;
- Pardoo Station – large caravan park and accommodation area close to the coast with a high level of facilities;
- Pardoo Roadhouse – small camping and accommodation area with a high level of facilities;
- Eighty Mile Beach Caravan Park – a large caravan park by the beach with a high level of facilities;
- Stanley MRWA 24Hour roadside stop– small, organized camp area with moderate facilities by the highway;
- Port Smith – large caravan park, with a high level of facilities close to the coast;
- Barn Hill – very large caravan park, with a high level of facilities on the coast; and
- Eco Beach Wilderness Resort – luxury, moderately sized, eco-friendly resort on the beach.

4.5 Comparative Setting for Cape Keraudren

The 'Whitsunday District Visitor Management Strategy' developed by the Queensland Parks and Wildlife Service contained a matrix which enabled comparison of the recreation settings of various sites. This matrix was previously adapted for use in the Pilbara by the authors of this report to give a range of nine settings which were, from least to most developed, - Wild, Self Reliant, Explorer, Adventurer, Guided, Popular, Comfortable, Integrated and Industrial. It has been calculated that Cape Keraudren has an Adventurer setting which is described as 'Natural landscapes and seascapes with medium levels of use and basic provision for activities'. This is on the lower end of the scale but by no means a wild or wilderness experience.

5.0 Economic values

5.1 Economic Flow on effects

It is widely recognized that there is an economic flow on effect to local communities from money spent by tourists. Discussions with the manager of Pardoo Roadhouse indicate the roadhouse benefits economically from visitors to Cape Keraudren, particularly from campers. However discussions with campers indicate they get most of their supplies from Port Hedland, and many day visitors are also from Port Hedland, which indicates much of the economic benefit from visitors to the Cape is being obtained by the Town of Port Hedland, while the management expenditure is being carried by the Shire of East Pilbara.

Visitation by local residents is likely to result in health and well being benefits by the community which ultimately translate into economic benefits in medical savings. Visitation by residents of East Pilbara Shire is unknown and therefore health/economic benefits cannot be quantified.

Health and well being benefits and economic savings are certainly being gained by the home towns of the visitors, particularly the home towns of the Grey Nomads, many of whom are healthier because of their winter in a warm climate.

5.2 Value Adding

There may be potential for visitors to Cape Keraudren to be encouraged to visit elsewhere in the shire by

- developing an attractive information bay at the intersection of Cape Keraudren Road and Great Northern Highway. Visitors may stop there to find out about the Cape and Eighty Mile Beach Marine Park and could also be informed of other attractions within the shire;
- developing one or more drive trails within the shire, that include Cape Keraudren, so that visitors to the Cape can then be encouraged to travel on the trails;
- the Cape could act as an attractive coastal destination for trails that originate in Newman or Marble Bar. It could also be part of an alternative through route for visitors travelling from north to south of the state;
- liaison with other Pilbara shires could create additional trails such as from Port Hedland, or round the Pilbara trails
- as the Cape is close to both sealed and unsealed through roads it could be included on trails that appealed to a wide variety of travellers; and

- trails should be of a variety of lengths and duration and focus on a range of landscape types and cultural features.

6.0 Revenue and Expenditure

One of the over-arching objectives of the Shire of East Pilbara for management of Cape Keraudren Reserve is to investigate opportunities for the reserve to be cost neutral or perhaps profitable.

6.1 Revenue, Fees and Visitor Numbers

Income information (as provided by the Shire of East Pilbara) is available for the reserve back to 1999/2000 financial year when \$40,240 was collected in total. Since then income has fluctuated, \$32,894.98 in 2001/02, \$73,379.88 in 2003/04 and in 2010/11 income was \$80,829.38. On 6th May 2011 new fees were declared for the reserve, fees for 2011/12 totalled \$107,781 –up 30% on the previous year. However ‘No. of People’ is available on a monthly basis as shown below. The standard measure of visitation in the hospitality industry is “visitor nights” and this data has not been supplied for the Cape, although a rough indication could be extrapolated from revenue.

Table 2 Number of People for 2010 to 2012 on Cape Keraudren Reserve

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2010/11	2914	1149	977	555	332	125	49	49	125	644	893	1450
2011/12	2114	1853	883	850	401	256	320	319	265	547	892	1410

This gives a total of 9,262 people for FY2010/11 and FY2011/12 there were 10,110 visitors - up 9% on the previous year. However, much of the increase occurred during the summer months indicating more day users or short stay locals from Port Hedland.

It would be useful if this could be broken down into day visitation and camping and any further details would also be useful such as number and type of vehicles for day visitors and visitor nights and visitor type. Maybe this could be done every 5 years.

The shire currently charges entry and camping fees to the reserve as follows

Vehicle entry

- \$10 per vehicle including up to 4 adults and \$2 per person thereafter
- \$5 per motor cycle
- \$20 for 4 day pass for up to 4 people

Camping Fees

- \$6.50 per adult / night
- \$40 per adult / week
- \$4.50 per adult / night for residents of the Shire of east Pilbara and Concession card holders.
- \$2.00 for all school aged children – ages 6 to 15 (inclusive). Less than 6 free.

Comparative costs to other unpowered coastal sites are shown below

Table 3 Comparison of Fees for Unpowered Coastal Camp Sites

Site	Cost / adult / night	Min. cost / site / night	Cost / adult / week	Min. cost / site / week	Cost / site for 2 conc'n / week	Facilities
Cape Keraudren	\$6.50 Conc'n \$4.50	\$4.50 (conc'n)	\$40 Conc'n \$31.50	\$31.50	\$63	Graded road access. Informality, 12m between camps, composting toilets, sullage points, rubbish and offal collection, campfires, no dogs, no ATVs.. Generators OK.
Cleaverville (Shire of Roebourne) No fees 1 st Oct to 30 th April.	\$7	\$7	\$45 (paid in advance)	\$45 (paid in advance) For 28 nights \$150 i.e. \$37.5 per week	\$90 paid in advance or for 4 weeks \$70 per week.	Gravel access road. Caretaker in season. No toilets, no water, minimal shade, no firewood collection, small cooking fires only. 4WD access boat ramp, waste collection and sullage point. Dogs allowed on leash. Campsites close to water (20-50m). Maintain 3m distance between campsites. Generators but not between 10pm and 6am. No unlicensed vehicles.
Slellborough and Tidjila	Free	Free	Free	Free	Free	Rough 4WD Track. No facilities. No management.
Pardoo Station	N/A	N/A	N/A	N/A	N/A	Only powered sites available
Pardoo Roadhouse (not on beach)	\$12	\$12	\$84	\$84	\$168	Sealed road, irrigated lawn, shade, showers and toilets, sullage point, laundry, rubbish collection, tables, supplies, fuel, restaurant, sites adjacent.
Eighty Mile Beach	N/A	\$32	N/A	\$210	\$210	Graded road, irrigated lawn, shade, showers and toilets, sullage dump, laundry, rubbish and offal collection, BBQs, tables, supplies, sites adjacent. No dogs, no campfires, ATVs.
Port Smith Caravan Park	N/A	\$35	N/A	\$81	\$162	Graded road, irrigated lawn, shade, showers and toilets, laundry, rubbish and offal collection, gas BBQs, tables, supplies, fuel, sites adjacent. Dogs on lead, no campfires, ATVs. Golf.
Barn Hill Caravan Park	N/A	\$20	N/A	\$140	\$140	Graded road, non irrigated grass, shade, showers and toilets, laundry, rubbish and offal collection, tables, supplies, sites adjacent. Dogs on lead, no campfires, bowls.
DEC Sites (e.g. Kurralong Camp Cape Range NP)	\$7 Conc'n \$5.00	\$5	\$49	\$35	\$70	Graded road access. Formal sites 5-10m between camps, pit toilets, rubbish collection, no campfires, no dogs, no ATVs. Sullage nearby. No generators.
Warroora Station (Ningaloo)	Access fee \$7.50	\$7.50	\$37.50	\$37.50	\$75	Station track access some suitable for 2WD. Informal sites some right on the beach. Sullage points across the station, campfires (bring wood, do not collect on station), limited water, showers and phone available at homestead. Dogs allowed but not in marine park.

6.2 Expenditure

The total expenditure for the reserve for 2010 /11 was around \$200,000, made up of:

- Maintenance of onsite ranger presence (salary \$87,500, vehicle \$10,000 plus insurances and uniforms)
- General expenditure including infrastructure maintenance (The infrastructure on the reserve is a shire asset that adds value to the reserve but also requires maintenance and upkeep expenditure. Such as grading, building upkeep etc)., waste disposal (emptying sullage points), insurance for volunteers etc. \$102,237.19
- Income was \$91,993.56.
- Thus expenditure from figures provided for FY2010/11 is \$100,000+ more than the income from visitor fees..
- Preliminary data for FY11/12 show lower General expenditure of \$86,000, and higher revenue of \$107,000. Assuming that the ranger's salary and overheads are similar, the deficit has probably reduced to around \$80,000.

6.3 Funding and Resourcing Options

6.3.1 Volunteers

A number of the current campers significantly contribute to the management of the reserve. This volunteer input is supported with insurance cover and with some fee concessions. Maintaining input from volunteers is considered to be important for the future management of the reserve and there may be opportunities for engaging new volunteer groups such as natural history groups, students, 4WD Drive groups etc. in busy bees or similar activities.

6.3.2 Partnerships

The following agencies / groups have responsibilities associated with Cape Keraudren Reserve. There may be opportunities for obtaining grant application support, capital funding or assistance with ongoing maintenance and management.

- Local Aboriginal groups – responsibilities for 'country'
- DPaW will manage the proposed adjacent marine park and nature reserve – mutual areas of interest may be signage and interpretation, protection of marine values, control of feral animals. DPaW also has responsibilities for terrestrial fauna management under the Wildlife Conservation Act across all tenures.
- Department of Fisheries under the Fish Resources Management Act 1994 – has responsibility for managing fishing in the Pilbara-Kimberley region.
- Department of Transport – part funding of boating facilities management of boating activities including licensing watercraft
- Department of Planning – The Rabbit Proof fence No. 1 reserve and the Geodetic Station reserves are vested in the Department of Planning and Infrastructure which was the predecessor to DoP. DoP also provides standards for planning in coastal areas.
- Department of Planning (Coastwest grant funding)
- Department of Sport and Recreation – part funding of trails and encouraging recreation and physical activity with Lotterywest grants

- Department of Tourism – encouraging tourism
- Commonwealth Government (e.g. Caring for Country funds to protect RAMSAR Wetland of Eighty Mile Beach)

6.3.3 Sponsorships

Private organisations may be interested in supporting the reserve financially or in kind. Obvious target partnerships would be with resource companies with large workforces based in Port Hedland, whose staff uses the reserve regularly.

6.3.4 Grants

External funding can sometimes be found for capital development but maintenance funding is harder to source, though Trails West may fund the maintenance of walk and other trails.

6.3.5 Current Resourcing Opportunities

There are opportunities for increasing resources while essentially maintaining the existing camping experience as follows

- increasing fees - a significant increase is likely to displace many of the current users even though all other attributes of the reserve remain the same, but a modest increase in line with other similar camping areas is likely to be acceptable to visitors;
- increasing visitor numbers (though this could create crowding and change the visitor experience, and may increase the need for management);
- increase voluntary input from the campers - particularly the ongoing involvement of long term campers;
- seek grant funding for better infrastructure to ultimately reduce maintenance (better waste management systems, self registration station etc.);
- develop partnerships with other management agencies;
- seek sponsorships;
- value add in the form of connecting the reserve to shire wide drive trails; and
- investigate development that can coexist with the existing recreation experiences.

In the medium to long term, demand may change and this may require a review of recreation infrastructure and management. Future demand and possible associated development options are discussed later.

Recommendations

- Implement the options that are available for increasing resources while maintaining the current recreation experience.
- Investigate development that can coexist with the existing recreation experience.
- Investigate future demand and possible associated development options.
- Consider producing a financial report that gives an accurate presentation of the actual annual cost to ratepayers of the reserve. Separate:
 - asset maintenance and repairs,
 - capital works,
 - recurrent expenditure such as, plant hire, consumables
 - wages and staff overheads.

7.0 Management Issues and Recommendations

A number of management issues identified in the 2004 *Cape Keraudren Coastal Management Plan* by Gary Middle and Hames Sharley have been addressed including installing sullage points and new toilets, providing e-mail to the ranger, installing fencing with grids on the entry road and providing new entry signage and regulatory signs. However, there are still some management issues that need to be addressed and a number of management issues have evolved over time.

The management issues below have been identified from the above report, in discussion with SoEP managers and the ranger, and through observation and research. The recommendations are made on the assumption that camping on the reserve will remain essentially in its present form. Should the camping experience significantly change the recommendations in the sections below will need to be reviewed.

7.1 Interagency Liaison

There are a number of agencies with management responsibilities in the Cape Keraudren area as noted in Section 6.3. with DEC's management plan for the Eighty Mile Beach Marine Park being particularly significant. The plan shows a sanctuary zone (the Pardoo Sanctuary Zone) for the western side of Blaze Bay, including Point Poolingerina. Another sanctuary zone the Cape Keraudren Sanctuary Zone is shown offshore and northeast of the mouth of Cootenbrand Creek. The rest of the coastline around Cape Keraudren is general use zone where most marine activities are permitted, except recreational coral and 'live' rock collecting, see Map 7 (Figure 4 in the plan) Proposed Zoning for the proposed Eighty Mile Beach Marine Park and Map 8 (Figure 5 in the plan) Proposed Zoning for the proposed Eighty Mile Beach Marine Park – Cape Keraudren to Mulla Mulla Down Creek and Appendix 7 (Table 1 in the plan) Activities permitted in each zone of the Proposed Eighty Mile Beach Marine Park which details activities permitted in these zones.

Recommendations

- A draft of this Cape Keraudren recreation management plan is circulated to DEC, DoF and DoT for comment prior to wider circulation.
- The preparation of a sign plan involves all the above management agencies
- Enforcement strategies are coordinated including resource sharing.

7.2 Reduced Fish Stocks

Visitors have expressed concern over the depletion of fish stocks (through fishing and collecting) but the indicative management plan for the proposed Eighty mile Beach marine park notes:

'In the context of widely distributed marine species, localised depletion may not be a significant risk to fish stocks, however, it does have the potential to impact on the recreational experience of people visiting the region. Further investigation is required to determine if localised depletion is significantly affecting the social values of the area and what strategies can be employed to address the issue' (DEC).

Recfishwest is a community based state wide organisation which represents recreational fishing interests.

DoF⁶ advises Local Government cannot restrict the take of fish, this can only be done by a decision made by the Minister for Fisheries. On this basis, below are the options for restricting fishing within the Cape Keraudren Reserve:

1. Put a proposal to the Minister for Fisheries to introduce additional restrictions on recreational fishing in the area under section 43 of the *Fish Resources Management Act 1994*. If such a proposal was put forward the Minister would want to know the views of Recfishwest.
2. Introduction of a Fish Habitat Protection Area (FHPA), as long as the area does not overlap with the proposed Eighty Mile Beach Marine Park (as marine park will only go to LWM the intertidal areas could be considered for a FHPA). FHPAs are often proposed by community members.
3. Recfishwest can recommend the declaration of 'A Wilderness Conservation Area is a specified area which aims to protect wilderness values while allowing low impact recreational fishing. Fish can be caught and consumed within the area but not taken away'⁷.
4. Develop a 'code of conduct' or similar for visitors to abide by (although this would not have any legislative backing). Recfishwest and DoF are currently developing a joint code of conduct for recreational fishing in the Kimberley area which may be of relevance

Recommendations

- A cooperative inter-agency approach to managing marine values in the Cape Keraudren reserve is sponsored by SoEP
- The visitors that are concerned about fish stocks in the intertidal area are encouraged to contact Recfishwest to discuss their concerns
- Hold an information sharing session with the responsible management agencies (SoEP, DEC, DoF), Recfishwest and visitors to the Cape (winter months are suggested when most visitors are there). Visitors should be requested to advise of the fishing concerns they have and the agencies should advise of management strategies that can be considered. The meeting should decide which management strategies are to be investigated further.
- The development of a voluntary 'Code of the Cape' by the visitors, Recfishwest and DoF to sustain fish stocks. This code should acknowledge that it is everyone's responsibility to 'police' fishing in the reserve.
- A joint approach between the various management agencies to inform the public of marine management strategies including providing information about the marine park on the Cape Keraudren Reserve as the reserve is a major entry point to the marine park.
- Integration of enforcement activities and sharing of resources as appropriate, such as the shire ranger accessing the western sections of the shire reserve in a state government vessel.

7.3 Cattle

Cattle, assumed to be from the surrounding pastoral station Pardoo, are regularly seen on the reserve and are causing the following problems

⁶ Nikki Sarginson pers.comm.

⁷ Recfishwest, Wilderness Conservation Area Policy December 2010.

- disturbing campers by walking at night through the camps, and sometimes annexes, damaging camping equipment and scaring some campers;
- being a hazard for anybody driving on the roads at night, though there are no reports of cattle being hit or near misses, possibly because few visitors drive at night;
- grazing foredunes causing habitat damage.;
- grazing mangrove trees and trampling the aerial roots (pneumatophores). This is particularly occurring around the lagoon, where the cattle also leave dung pats where visitors are directed to walk;
- creating tracks along fence lines within the reserve which could be susceptible to erosion;
- walking across tidal flats, causing damage to the surface of the flats and leaving unsightly footprints;
- possibly contributing to the spread of weeds such as caltrop; and
- needing to be let out of the reserve each day to get to water (they gather by a boundary gate, which the ranger lets them through to prevent damage to the fence – the wire is broken on sections of fence near the gate).

There is no simple solution to keeping the cattle out of the reserve, refer Map 9 Fencing Issues and the notes below

- the existing fences which are internal to the reserve both end at tidal creeks, Firewood Creek and Cootenbrand Creek, where the tidal flow makes it difficult / impossible to prevent the cattle from going round the end of the fence. At Cootenbrand Creek even if the fence was effective cattle can still cross at the creek mouth when the tide is out;
- if the fence is rebuilt on the eastern boundary it ends on Eighty Mile Beach which is also tidal and has steep dynamic foredunes;
- the alignment of this eastern fence shows evidence of past erosion along the fence line, particularly over dune crests; tyres have been scattered to help stabilize the blows;
- the cattle may not be respectful of fencing as evidenced by the damaged fence near the gate;
- a decision needs to be made whether access to Pardoo station lease through the fence near Firewood Creek is to be retained; and
- cattle are creatures of habit, once they know there is a good patch of grass they will make every effort to get to it.

Recommendations

Construct a new fence on the eastern and south eastern boundaries of the reserve. As a boundary fence its construction and maintenance are the responsibility of the Shire and the station lessee. The alignment can be seen in the field as some strainer posts remain from previous fences. However it is suggested that SoEP also meets with the Pardoo Station Lessee to discuss the implementation of the following actions to ensure the cows are kept out of the reserve

- electrify the fences near the gate so cattle are taught to respect fences;
- temporarily shutting off the water point near the reserve, so the cattle establish new grazing patterns away from the reserve;

- relocate/remove the mob of cattle that 'live' in the reserve, so that new cattle moving onto that area of the station do not know about 'the good patch of grass' in the reserve;
- liaise with DEC (post 2015) to determine if they will fence the inland boundary of the proposed strip of nature reserve along eighty Mile Beach, as this would remove the need to extend the eastern reserve boundary fence out to Low Water Mark;
- consider the construction of small sections of fence at right angles to the main fence on sand ridges, so that cattle are forced to zig zag over the ridge, which may reduce erosion along the fence line. Alternatively the main fence could deviate off the boundary to be on an alignment that is unlikely to erode (but this will make it more difficult to construct). Alternatively woody debris could be placed on eroding crests, large enough to force cattle to walk around and that would also assist with stabilizing the sand;
- consider repairing/extending the ends of the existing internal fences and retaining them in the short term to supplement the new fence;
- discuss the situation with pastoralists who have similar situations to see if there are any other suggestions;
- obtain funding from the Commonwealth Government under the Caring for Country grants program to protect Ramsar wetlands for fencing to protect the wetlands; and
- remove the internal fencing once the boundary fence is established to enable the fence line tracks to rehabilitate and to restore the naturalness of the reserve.

7.4 Staffing

7.4.1 Ranger Workload

The ranger who is based on site is responsible for the day to day management of the reserve. He is supported by the Manager of Building Assets SoEP who visits the site regularly. In the peak season the tasks of fee collection, rubbish (including fish offal) collection and maintenance of the toilets (some help is received with this from volunteers), combined with patrol work, take up 12 hours or more of the ranger's day and as visitors can arrive quite late in the day, it is a long day. Volunteers may 'staff the entry station' when the ranger has other management duties, but currently he tries to be at the entry station as much as possible to welcome visitors, collect fees and provide information. The ranger advises he rarely leaves the reserve at all in the winter months.

Recommendations

- Consider ways to enable the ranger to have a shorter working day in peak season and to have time for more involvement in other reserve management activities. The following efficiencies are recommended:
- self registration and fee paying is provided for visitors;
- rubbish collection is reviewed;
- fish offal collection is reviewed, particularly as the bins currently used can be very heavy to lift onto the back of the ranger's vehicle;
- a relief ranger is available for periods during the peak season (the relief ranger could stay at Pardoo Roadhouse until appropriate onsite accommodation is sourced);
- the work done by on site volunteers is supported (insurance is already provided by SoEP) and possibly increased; duty statements or a formal 'agreement form' are recommended; and

- once the self registration system is in place and the ranger is not required to be at the entry station to collect fees all the time, an alternative site more private location for a ranger house could be found.

7.4.2 Distance from Shire of East Pilbara Administration Centre

The remoteness of the Cape from Newman, means there are challenges in providing management support to the onsite ranger. Efforts have been made to involve Marble Bar in the management of the reserve but so far there has been little interaction.

Recommendations

- The shire organises a staff visit, for all shire staff, to the reserve as a familiarisation visit and possibly also a team building exercise. As part of this trip the shire staff could workshop ideas for their ongoing involvement with the reserve (e.g. survey or research work, revegetation projects etc.)
- Accommodation provision for such events is considered.
- The ranger is involved with some events and activities at the shire office.

7.5 Waste management

7.5.1 Toilets and Sullage Points

There are two types of toilets on the reserve, 'long drop' toilets and Rotaloo composting toilets. The long drop toilets have been installed for many years and consist of a small building at ground level over a pedestal that sits over a drum with slots in the ground. These have been recognised as being environmentally unacceptable and were replaced with Rotaloos. However the Rotaloo composting system is unable to cope with the use levels (they are designed for 15 people) and so the tanks require regular pumping. Even when they are working the toilets require the removal of a dried product which is considered an unpleasant task. The buildings are set above the composting tanks and so are very high and visually obtrusive in the landscape.

Sullage points were installed but there are problems with the top being too narrow for some systems leading to spillage and need for water to wash it through. A new design for the top of the sullage tank is required.

Discussions with other land management agencies indicate that where pumping out of sullage already occurs, such as at sullage disposal points there is a preference for sealed vault toilets that are also pumped out. There are a number of composting toilets available in addition to the Rotaloo including Gough Hybrids. MRWA successfully uses Gough Hybrids in some of their northern rest areas, but they still require some pumping out if they don't have a leach drain.

Other considerations when selecting toilets are

- maintenance requirements including cleaning of the pedestal, some systems have a flush component, V shaped shutes can be difficult to clean, need for brush and bucket etc.;
- management of the composting process;
- likelihood of break downs and system failures
- user preferences (many don't like looking down the 'hole');
- potential for flies;

- potential for bad odours;
- rock near the surface may make it difficult to install tanks that are at ground level. Exploration holes should be dug at any site being considered for a toilet, as the depth that the tanks can be set into the ground will influence the visual impact of the toilets and the ramp structure that is required to access the toilet;
- the SoEP have advised that although pump out costs are an issue they do not want any leach drain component; and
- many visitors now have their own toilets, which reduces the need for toilets to be provided on site but increases the need for sullage points (sullage dumped in composting toilets kills the composting process)

Appendix 8 Public toilets in outback and remote locations of Western Australia, contains an overview of systems in use in WA.

Recommendations

- Sullage points continue to be provided within the reserve and their use is monitored, if necessary additional sullage points can be provided, but this should be done in terms of the capacity of the pump out truck (i.e. the overall capacity of the sullage points and toilets should ideally be the same volumes as that of the pump-out truck).
- The tops of the sullage points (dump points) are modified to make it easy to empty all systems.
- The existing long drop toilets and the concrete bases at Mosquito Ridge are removed.
- The existing Rotaloos are closed as new toilets are installed, so the system can recover and establish itself again. They can be opened when there are only 15 people camped in the vicinity or when a system is devised to ensure they are only being used by 15 people. In the long term consider removal.
- Pump out toilets are installed with tanks set into the ground (as much as possible) with an unobtrusive structure above ground. The toilets are designed and located to minimise their visual impact e.g. set against a landform backdrop (so they are not silhouetted against the skyline) and painted to blend with their background.
- A triple tank system could be considered so that the pump out effluent from the final tank, which is relatively clear and safe, could be disposed on site – i.e. pump out tanker could move the fluid to a remote pit in the reserve.
- Toilet provision should be approximately 2 seats (1 per gender) for every 20 campsites and provision on a camping area basis should be confirmed with SoEP before planning is finalised. The trend toward vans with their own toilets may enable variations to this recommendation.
- All toilets should be accessible for the less able due to the prevalence of elderly visitors.
- The feasibility of volunteers assisting with toilet cleaning could be considered.
- Consider the provision of rainwater tanks for hand washing, at least for the toilets in the day use areas.

7.5.2 Rubbish Collection and Waste Disposal

Landfill Legislative framework

The Department of Environment is responsible for regulating waste management in Western Australia and administers the *Environmental Protection (Rural Landfill) Regulations 2002*. The regulations apply to landfill sites that receive more than 20 tonnes of putrescible waste per year. It is estimated by the DEC that each person in a remote setting generates around 900kg of solid waste per year. The proportion of putrescible waste varies (25-45%), although it should be noted that in many remote settings most household waste would be disposed rather than recycled. The DEC entry point of 20 tonnes of putrescible waste would seem to imply that communities with a population of or in excess of 50 people would generate enough putrescible waste per annum to require a prescribed landfill site registered with DoE. The Cape Keraudren population would not average 50 people over a year, and so should be exempt from registration.

Current Procedures

Visitors currently deposit their rubbish in standard council bins which the ranger empties manually onto the back of the utility and subsequently empties into a tip on the reserve. The rubbish is collected at least once a day in peak season and sometimes twice a day. There is no recycling.

Recommendations

- Visitors are made more responsible for their own rubbish collection and are required to take their rubbish to a central location. This central point could be discretely located on the main access road.
- Visitors are encouraged to minimise their rubbish.
- Rubbish bags are provided when camp fees are paid and extra bags could be available from the campground hosts or made available by the rubbish trailer or bag provision may not be considered necessary.
- Rubbish is deposited into a custom built trailer ready for transport to a tip. Two trailers may be required to ensure there is always one available for rubbish. See Appendix 9 Visitor Rubbish Management In Natural Areas In Outback And Remote Locations Of Western Australia for details of the trailer design.
- Service groups or community groups such as 'Care' in Port Hedland are contacted to see if they would be interested in picking up recycled aluminium cans and other recycled products. If there is an outlet for recycled products they can be collected separately at the rubbish collection point.
- Tip function is reviewed by the Shire, as water collects at the bottom of the current tip and there may be rock problems with digging tips higher in the landscape, so investigation of a new site in a sand dune area is recommended. Off site tipping facilities would be the best option. The possibility of sharing tip facilities with Pardoo Roadhouse or nearby mining centres should be investigated. (Shire staff visit Pardoo Roadhouse for water sampling regularly, perhaps they could backload the rubbish trailer to a mine site or even Marble Bar).

7.5.3 Fish Waste

Recreational Fishing Guide (DoF) states 'In general boat anglers returning from a day trip are asked to land their fish whole so that they are in a form that can be measured and counted.' Also some say fish waste should not be dumped in the sea as it attracts wildlife such as sharks and crocodiles, so there is a need for onshore facilities for fish cleaning and the removal of the resultant fish waste.

Fish waste very quickly starts to smell so if a new rubbish collection system is introduced that means rubbish is waiting for transport to a tip, a separate collection system for fish offal will be required.

There are a number of fish composting systems in operation throughout the state see Appendix 10 Fish Offal Composters in Western Australia. They are custom made, but they are basically giant fly traps, with the maggots eating the soft tissue and the residual fish bones requiring removal from time to time. There is potential for these systems to smell but the addition of a bacteria activator and /or installation of a biofilter removes this problem.

Recommendations

- Trial a fish composter, initially by the boat launch at Mosquito Creek to remove the need for fish waste to be transported to the tip.
- If this unit is successful install a second closer to Cootenbrand Creek and Sandy Beach.
- If the first unit smells, install any additional ones well away from the main recreation area, on the main access road.
- Volunteers could be rostered to add the bacteria activator.

7.6 Onerous fee Collection Procedures

Currently both day visitors and campers are required to pay fees to the ranger. On payment of fees visitors are given a receipt and a brochure for the reserve. The ranger keeps a list of those who have paid and for how long and he checks against this list as he does his daily rubbish rounds, and campers approach him when they wish to extend their stay.

This process is the most time consuming of all the ranger's duties as he is required to remain at the front gate when he is not at the camp sites. It is therefore proposed that a self registration system is installed.

See Appendix 11 Entry Fee and Camping Fee Collection Systems in Natural Areas Like Cape Keraudren for details.

The self registration system should be installed in the existing interpretation shelter at the entrance. The existing interpretation should be removed and replaced with welcome information, such as 'welcome to country' from the Ngarla people and welcome from the SoEP. The map of the reserve should be in the shelter and should illustrate the recreation opportunities available on the reserve along with associated codes of conduct and where appropriate, the regulations. The fee structure should also be displayed along with instructions of how to pay fees.

7.6.1 Day Registration Process

- Envelopes available from a dispenser
- Envelopes would have completion instructions on them and require vehicle registration number, vehicle type, date of entry, number of passengers and concession card type. Additional information such as first visit or not and home post code could also be requested (refer DEC Day entry pass envelope).
- The day pass is detached from the envelope and placed on the dashboard.
- Fees are then placed in the envelope which is then sealed and placed in a fee pillar which is regularly emptied.

- A brochure about the reserve is also available from a dispenser.

7.6.2 Camp registration process

There are a number of variables associated with a camper self registration process depending on whether electronic registration is to be considered, whether the individual campsites are to be numbered or not and where the onsite registration station is located. It is proposed that the following system is trialled

- Campers staying one week or more are encouraged to pay online through the main shire website. They should be able to do this from their own computers or phones and should be eligible for a discount for paying this way.
- The onsite self registration system should be located at the entry point to the reserve (where there is a surveillance system) to reduce the likelihood of theft.
- Using an envelope similar to that used for day passes campers can pay on the way in or enter, select a site and return to the registration station to pay.
- There will be an overflow camping area made available so that there is always somewhere for people to camp (this can be reviewed in due course)
- Those extending their stay will be required to return to the entry station to pay for their extra days (this should discourage campers from paying for an extra day at a time).
- Campers leaving should be required to leave by a set time, such as 10.00am so that it is clear that those still on site are intending to stay another night and are expected to have their fees paid.
- Campers will be required to display the receipt component of their ticket in a prominent location at their site. If sites are to be delineated and numbered a special ticket holder can be incorporated into the delineation structures (pegs or similar markers). If sites are not numbered the tickets can be made large, brightly coloured and weather resistant and be required to be attached to the camp in a location where the ranger can inspect the ticket without disturbing the campers.
- The ranger will be required to regularly empty the collection box to check all is in order and to check tickets on site at regular intervals, so campers know their tickets are likely to be checked.
- Volunteers could assist with checking tickets.
- **Note:** since visitors don't always have correct fee denominations, a note explaining any surplus will be donated to the Flying Doctor Appeal may reduce non-compliance.

Recommendation

- Self registration systems for payment of day use and camping fees are installed.
- The self registration systems will consist of a registration and fee paying facility for day use and camping installed in the existing shelter at the entry to the reserve.
- The onsite fee paying facility will be supplemented with an online booking option administered by the main shire office.
- Visitor data is collected as part of the fee collection process.

7.7 Camp Fires and Firewood Collection

The campfire is the focal point for many happy family camping memories and this experience is no longer available at many other camping areas but is retained at Cape Keraudren.

However, campfires are recognised as an ignition source for wildfires and the removal of dead wood from an area causes habitat loss (Warroora, a coastal pastoral station adjacent Ningaloo coast does not allow campers to collect firewood on the station). Firewood collection is not permitted on the reserve, but the piles of wood observed adjacent to some camps indicates significant off reserve collection which is likely to be damaging habitats in other areas, for example large diameter eucalyptus logs were observed in camps. These have usually survived bushfires and are likely to be very important habitat trees.

The Fire and Emergency services website www.fesa.wa.gov.au notes there needs to be a clearing of 3m around all campfires (as detailed in the Bush Fires Act 1954) and details steps to take to avoid children getting burnt from hot coals. It was noted on site that long term campers were most likely to have fires.

There are a number of factors that can contribute to the sustainability of campfires as follows

- Waste timber is imported from southern areas and sold on site
- Restricting campfire use until the cool of the evening
- Education and interpretation on the negative environmental aspects of the use of certain types of firewood e.g. local eucalypts
- Prohibiting the use of sawn local firewood.
- Ensuring the 3m clearance around the fire is maintained at all times. Limiting the amount of firewood that can be at a camp at any one time??
- Installing small fire places (as found in MRWA roadside stops) at some sites to limit fire size, or requesting all campers bring a fire container.
- Having communal campfires where more than a couple of people can appreciate a fire
- Phasing out individual campfires over five years, enabling those without alternative cooking options to purchase an appropriate stove.

Recommendations

- Retain the campfire experience at Cape Keraudren but progressively implement measures to improve the environmental sustainability of the activity.
- Install communal fire rings in all camping areas in the short term
- Investigate provision of firewood from the south on a cost recovery basis, at least for peak times. A secure storage place will be required.
- Implement 3m clearing requirements around all fires.
- Communicate all safety and environmental issues associated with fires to campers in the brochure and onsite interpretation and in digital media.
- Implement restrictions of type and quantity of firewood allowed on the reserve
- Phase out individual fires over five years. If the above measures have been successful in reducing the excessive use of firewood it may be possible to retain individual campfires for

10 years, which will likely be long enough for the current generation of 'Grey Nomads' to have individual fires for as long as they need them.

7.8 Visitor Risk

The reserve is a natural environment, in a hot, arid, coastal area, with the following associated risks for visitors

- heat stroke and dehydration due to the high summer temperatures;
- snake bite, jellyfish stings, blue ringed octopus and other poisonous creatures;
- mosquito borne illnesses such as Ross River Virus and Dengue Fever;
- crocodiles – have been sighted in the area, removal of troublesome crocodiles is permitted south of Broome;
- sharks;
- water body risks such as falling in, becoming stranded or swept away by the strong tides or waves;
- fishing risks, particularly fishing off rocks and risks from the tides;
- risks of undercut limestone collapse on the coast and along creek edges;
- cyclones;
- tsunamis;
- fire;
- safety issues associated with pedestrians and cyclists using the vehicular access network of gravel roads and sand tracks; and
- potential for conflict between user groups, such as day visitors and campers.

A risk management system is likely to include at least

- regular inspection of the reserve to identify risks
- analysis and evaluation of the severity and likely frequency of the risk
- identification of strategies for mitigating the risks
- prioritising of risk mitigation measures
- implementation of risk management procedures
- reviewing the success of these procedures
- recording all of the above to ensure there is a 'paper trail' which records how risk has been managed.

The SoEP has a Fire Management Plan, and a Cape Keraudren Reserve Tropical Cyclone and Severe Storm Procedures document.

SPP2.6 refers to 'coastal hazard' as the consequence of coastal processes that affect the environment and safety of people. Potential coastal hazards include erosion, accretion and inundation. Should coastal hazard be identified, adaption measures are required such as avoid the risk, plan or manage retreat, accommodation of the risks in the proposals or installation of protection structures.

Recommendations

- Implement a visitor risk management system which includes maintaining appropriate records of risk management procedures
- Inform visitors how they can reduce their exposure to risk by using a range of appropriate media such as brochures, the shire website, and onsite interpretation and warning signs. As visitors are already advised that they need to be self reliant off site interpretation should suffice for many situations.
- Implement a geotechnical survey of all undercut limestone areas that are high frequency recreation use.
- Plan facilities such as campsites and trails to minimize conflict between user groups and to avoid risk, particularly coastal hazards.
- Assess the long term feasibility of Cootenbrand Creek for recreation use in terms of coastal hazard.
- Acknowledge that the season of peak recreation use has minimal overlap with the storm and cyclone season, so that temporary recreation use close to the coast can be accommodated, provided there is a system in place to warn visitors of any out of season storm events and what to do when visiting in cyclone season.
- Consider coastal risk when siting permanent structures such as toilets, signs and car parks.
- Maintain an emergency management plan.

7.9 Inappropriate Visitor Behaviour

Visitors continue to attempt to bring dogs and off road vehicles (such as quad bikes and motor cycles) onto the reserve despite signage advising they are not allowed,. There are also issues with 'hooning' and groups of rowdy visitors.

Recommendations

- Maintain the onsite ranger presence.
- Develop group campsites some distance from other visitors.
- Establish communication procedures for dealing with troublesome visitors including appropriate regulations and links to the Port Hedland police station. Ensure staff receive appropriate training in dealing with 'difficult' visitors.

7.10 Fire Management

There is no prescribed burning program on the reserve at present, but burning on the adjacent pastoral station probably gives some protection to the reserve, though the recent burn caused concern on the reserve as the campers thought it was a wildfire. However, escapes from campfires during the dry season could result in wildfire on the reserve when there are many visitors on site. When dry, buffel grass, the predominant grass on the reserve, burns intensely and with a high rate of spread. There is evidence that in many circumstances, people are more likely to be injured or killed trying to drive away from fire. This could conceivably be the case on Cape Keraudren with only one access road. Visitor education should among other things, recommend visitors leave their assets where they are and muster on the beaches until the fire risk has passed or receded.

The SoEP Fire Management Plan does not mention Cape Keraudren specifically but does mention the need for education of stakeholders including travellers and tourists. It is suggested that advice is sought on how to manage fire for optimum conservation outcomes, to preserve the natural setting of the reserve.

Recommendations

- Prepare a fire management plan for the reserve
- Advise visitors how to be informed of fire danger ratings, how to respond to fire danger ratings and total fire bans and what to do in emergencies.
- Communicate the timing of managed burns on the adjacent station to visitors and as necessary, ensure smoke hazard signage (and need to put on headlights signage) is provided by the manager of the burn, on the Cape Keraudren Road.

7.11 Separation of Campsites

In response to conflict between campers resulting from them being too close to each other in certain areas, the '12 metre rule' was instigated, which states that camps must not be closer than 12 m to each other. As well as reducing conflict between campers this creates a special camping experience as campers have a degree of separation unusual in large camping areas.

The preservation of this special camping experience is recommended but as some campers spread out much more than others and there are limited areas right on the edge of the beach, there needs to be some rationalisation in terms of equity.

Another factor that contributes significantly to the sense of freedom on the reserve is the lack of bollards or other elements defining the camping bays. As well as 'organising' a site, bollards are often a hazard for backing vehicles. However, random use of an area results in the impact of visitors (such as clearing of vegetation) spreading over a much wider area and if sites are not defined some campers can be 'greedy' in terms of how much space they take up. Lack of camp site definition can restrict self registration systems as defining and / or numbering of sites is difficult.

Recent research by Curtin University found the single thing that could be done to reduce most environmental impacts of camping would be simply having a campsite boundary (Lewis 2012).

Recommendations

- Retain, where possible, the Cape Keraudren camping experience as it is significantly different to nearby caravan and camping sites and so contributes to overall range of camping experiences and the ability of the region as a whole to provide something for nearly everyone.
- Retain randomness, freedom and separation where possible but implement subtle organization strategies in the interests of equity, capacity and managing visitor impacts (see below).
- Allocate a specific area to each camping unit that allows for an average size rig and space between neighbours.

- Larger sites are to be provided for camp carers/helpers at each camping area on the beach front. The helpers will have an agreed list of duties that they carry out (similar to the support they already supply to the ranger) in return for these prime sites (approx 25m x 20m).
- Other sites along the beach front will be of a standard size and shape which optimises the number of camps in this prime location while still maintaining separation (however very large camps will be closer to their neighbours) approx 20m by 20m deep.
- Sites set back from the beach will be 25m x 20m, this is larger than the coast sites to compensate for the reduced view.
- A few small (5m x 5m) walk in tent sites for back packers will be identified in prime locations.
- A few medium (10m x 10m) sites for campervans will be provided in prime locations
- Areas suitable for groups of 3-5 camps will be identified and where feasible these will be set back from other campers.
- Should commercial 'outback' camping tours start to visit the reserve, consider their specific camping needs (likely to be a site for 1-2 parked coaster buses and 6-10 tent sites grouped around a fire ring). These groups tend to be noisy, so preferably some distance from other campers.
- The locations for the campsites will generally be indirectly indicated by provision of roads and/or tracks, mown grassed areas and providing fire rings in group areas. However the extent of the sites will also be marked by pegs or concrete discs, driven in or set on to the ground, on the edge of the road/track, so that they are flush (like surveyor's pegs). Numbers could be placed on top of these pegs flush with the ground if needed. The depth of the bays will be generous and as there will be additional space between areas of camps, the backs of the bays should not need marking. The centre of the bays can be mown to direct visitors to camp in the middle of their bay.
- Informal overflow camping areas will be provided for short stays in peak times, so that no one is turned away. The layout will allow for vehicles to 'drive through' most of these sites so they do not need to unhitch.
- Prepare site layout plans for each site which incorporate the above recommendations and which include the other elements recommended elsewhere in the report such as toilets, fire rings, rubbish collection points etc.

7.12. Sense of Place

An objective of this plan is maintaining and enhancing the natural qualities and existing character of the reserve. A primary component of achieving this objective is the preservation of the recreation experience which is addressed in section 4.3. Another component of maintaining the 'sense of place' is ensuring that all proposed changes are in accord with the existing and / or proposed character. The reserve is typical of coastal camping areas that were common around Australia in the mid to late twentieth century. The areas were generally set in attractive natural landscapes. They were unmanaged, informal and showcased the resourcefulness of the campers. Some areas had permanent shack structures; others were seasonal camps where only bare patches of sand and a fireplace could be found in the off season.

Recommendation

Maintain the 'sense of place' by retaining and enhancing the naturalness of the area and by ensuring development and management proposals retain the informality and self sufficiency of the camping experience whilst meeting twenty first century management responsibilities.

7.12 1 Priorities for Improving the Naturalness of the Visual Landscape

The proposed landscape character for the reserve is that of a natural area in which naturalness dominates but which accommodates small scale temporary, obtrusive, informal structures that form unique cultural landscapes.

Management of the views from lookouts that are used by visitors is particularly important Winfield (2012) identifies and analyses these views. General guidelines are

- When introducing elements into the landscape borrow from the form, line, colours and textures of the natural landscape.
- Remove or reduce the visual impact of discordant elements.
- Ensure roads, trails and other lines that are introduced to the landscape, reflect the natural lines in the landscape, which are generally curvilinear.
- Reduce visual clutter, particularly small structures, or disturbances in areas that are otherwise natural.
- Increase the visual absorption capacity of the landscape if feasible. The expanse of buffel grass and / or spinifex has low capacity to absorb new landscape elements. Introducing shrubs (where practical and ecologically appropriate) will give some visual absorption capacity. This may happen naturally when the cattle are removed, or it may be very difficult to achieve, particularly where there is buffel grass as it is reputed to inhibit growth of native plants.

Recommendations

- Confirm that the proposed landscape character for the reserve is that of a natural area in which naturalness dominates but which accommodates small scale temporary, obtrusive, informal structures that form unique cultural landscapes.
- Manage views from lookouts and areas used by visitors to reinforce the proposed landscape character.
- Locate access tracks in the camping areas to give an informal, curvilinear form to the camping area and also to encourage the vans and camps to cluster, so the camp as a whole has a more compact form when viewed from a distance. This form should not dominate the landscape, but be of the same scale as other landscape elements such as hollows or vegetation patterns.
- Reduce the visual impact of the toilets as they are permanent structures. Set them off ridgelines, low in the landscape, of a shape that sits down into the landscape and paint to be the same colour as the background buffel grass and Spinifex.
- Rationalise tracks so there are as few as possible disturbing the appearance of the landscape.
- Minimise the visual impact of the ranger's residence as it's skyline location is very prominent.

7.12.2 Colours and Materials

The selection of colours and materials should reflect the natural landscape and the history of the area. The following is suggested

- Continued use of steel fence posts; black plastic star pickets may be worth trialling for short rehabilitation fences. The continued use of railway line for the strainers is supported as this reflects the heritage of the nearby mines. White sighter wire should be used for the top wire in areas of pedestrian usage so people don't walk or drive into the fences
- Rusting iron – given the nearby iron ore mines, the red colour of nearby rocks and the use of this material throughout the northwest it is considered suitable for use on the reserve as needed.
- Local limestone rocks – removal of large quantities of rock should not occur as the rocks are part of the natural ecosystem probably providing habitat for many creatures. However a few rocks carefully placed in an informal manner are suitable for defining vehicle areas and guiding pedestrians. If a number of rocks are available (possibly as a result of excavation for toilets or similar) the rock may be sufficient for low retaining walls/ seats at lookouts or steps along walk trails.
- Concrete, tinted where necessary to reflect the local rocks, possibly textured to reflect local shells etc.
- Local igneous rocks – found on the southern ridge, should be considered for use in that area.
- Red gravel- reflects the colour of the local rock and is appropriate to use for roads and other use areas.
- Timber sleepers (jarrah) may be available from the nearby disused rail lines and although their use is limited due to their splinters and susceptibility to termites they could be considered for seats or steps etc. due to the cultural connection to the reserve.
- Marine debris such as rope, floats etc. is already used for fences on the reserve and its continued use is recommended where appropriate.
- Building materials –locally sourced materials are generally not practical due to availability, but the use of branches etc. (gathered off site) for temporary structures such as screen fences may be appropriate. Also corrugated galvanised iron has long been used in the northwest and so its modern day equivalents are considered appropriate.
- Colours – subtle colours found naturally on the reserve are recommended such as the pinks of the mulla mullas and limestone rocks, the browns and beiges of the spinifex and buffel grass, grey greens of the bushes. Highlight colours such as the turquoise of the sea or the white of the sand. Using the terra cotta colour that is found throughout the northwest is not preferred for signs as it is so prevalent elsewhere and a unique identity for the Cape Keraudren is preferred. Also see Appendix 13 – Communication Plan

Recommendation

- Ensure development proposals and management actions on the reserve reflect the natural landscape and the history of the area and consider the use of the colours and materials suggested in this plan.

7.13 Signs

Signs are an essential component of most management strategies, but they can also cause issues of cluttering up the landscape and ineffective communication, if they are not appropriately planned and installed. Signs should be considered as one component of an overall communication plan. Where possible on site signage should be minimised as it is an ongoing maintenance issue. The overall impact of signs creates an image of the management of an area and can significantly change the recreation experience.

Signs that are likely to be required on the reserve include

- Road traffic signs
- Regulatory signs
- Directional signs
- Welcome and orientation signs
- Site identification signs
- Campsite numbers
- Trail markers
- Interpretation signs

Also see Appendix 12 – Communication Plan for Cape Keraudren

Recommendations

- Implement the communication plan for the reserve
- Implement as resources are available, the sign plan for the reserve which is integrated with the communication plan
- Develop an integrated suite of signs for the reserve, except those that are required to be in accord with certain standards such as road traffic signs. Use of a suite of signs may seem contrary to the character of informality elsewhere on the reserve, but the sign graphics can reflect the eclectic nature, informality and history of the reserve while still subtly reflecting the presence of management; caravans may even feature in the graphics.
- The signs should reflect the colours and materials used elsewhere in the reserve

7.14 Lack of Visitor Data

Lack of detailed visitor information for the reserve makes informed decision making difficult; good visitor data is necessary for developing commercial feasibility proposals. Information that would be particularly useful includes

- the number, time and type of vehicles entering and leaving the reserve
- the numbers of day visitors and campers respectively over time;
- the number of camps at each site, each night;
- visitor preferences, use patterns and satisfaction; and
- how many residents of the SoEP use the reserve; and
- why residents of SoEP don't use the reserve.

It is acknowledged that there is no point in collecting information unless you have the resources to analyse it. The following are options for data collection

- Visitor survey – a short 4 week survey using paper forms was undertaken as part of this planning process with the aim of confirming onsite observations and comparing Cape Keraudren visitors to region wide visitor profiles. See Appendix 13 for the visitor survey form.
- Long term visitor surveys – appropriate if there are resources to analyse the information, these could be online.
- Manual collection of data using the receipts from current fee collection system and subsequent analysis by the ranger
- Collection of data via the self registration process and subsequent analysis by SoEP staff
- Vehicle traffic counter – computer analysis, possibly as part of the Shire’s overall road usage monitoring program
- Survey sent out to all ratepayers (with their rates notice?) to enquire whether they use Cape Keraudren and if not, why not?
- Community workshops

Recommendations

- Install a digital traffic counter on access road – either seasonal or preferably permanent.
- Investigate options for data collection on the reserve and contingent on the feasibility of collection and analysis, collect data to inform management decisions.
- Investigate partnerships with Tertiary education institutions for data collection and analysis.

7.15 Preservation of the Recreation Experience

7.15.1 Balancing the attributes

Preliminary discussions with visitors indicated nearly everybody likes Cape Keraudren as it is and didn’t want any change. This was to be expected as if visitors didn’t like the area they wouldn’t be there and most people don’t like change anyway. Unfortunately the existing situation at the Cape is not economically sustainable and the campers themselves have noted other issues such as the ranger’s workload and reducing fish stocks.

As has already been noted a recreation setting is made up of the ‘sum’ of a number of attributes, see Section 4.3. This indicates there is potential to adjust some of the attributes of the site in a balanced way, so that management issues can be addressed, but the recreation opportunity will essentially be the same. For example an increase in the naturalness of the site through the removal of the cattle may compensate for increased organisation through the provision of walk trails. Reduction in the presence of the ranger may be balanced by more interpretive signage, or an increase in visitor risk management may be offset by visitors being required to be more responsible for their rubbish disposal. The above actions should result in the overall sum of the attributes of the reserve being much the same giving a similar, albeit slightly different, recreation experience to what already exists.

7.15.2 Important Attributes

Research into camper preferences along the Ningaloo Coast (Lewis) indicates there are some attributes that are very important to most campers along that coast and other preferences that are location specific. Lewis notes “the top four most important campsite characteristics ...were ‘campsite close to the beach’, ‘minimal litter’, ‘price’ and ‘distance to neighbour campsite’”. Other important attributes which were important to some and not others were ‘toilets provided’,

'generators allowed', 'dump point for sewerage', 'dogs allowed', 'boat launch facilities/access' and 'campsite not exposed to wind or sun'. The attribute that was least important to most campers was 'fresh water showers provided' and 'well defined paths/campsite areas' was also not popular.

The above results show that Cape Keraudren has all of the attributes that were most popular along the Ningaloo Coast, and that variation in the other attributes across a region, is important if all visitors are to be provided for.

Recommendations

- Change at Cape Keraudren needs to be undertaken in a balanced way if the overall recreation experience is to be retained
- If the retention of the current visitor types is proposed, retain the characteristics that are particularly important to coastal campers - proximity to beach, minimal litter, low price and distance from neighbours.
- Retain the characteristics that differentiate Cape Keraudren from other camping areas in the region if it is to maintain its current visitor groups such as generators allowed, no dogs, no off road vehicles.

8. Commercial Considerations

One of the over-arching objectives of the Shire of East Pilbara for management of Cape Keraudren Reserve is to investigate opportunities for the reserve to be cost neutral or perhaps profitable. Management efficiencies have been investigated in the previous Section 7. (Middle) recommended that the 'Power to Lease' was obtained from DOLA in order to attract economic interests such as lessees and development partners. This section investigates the implications and considerations associated with commercial ventures for Cape Keraudren Reserve.

8.1 Future Demand

Predicting what will happen to future visitation at the Cape is complex. It will be influenced by factors in the wider world and by other state-wide implications. Future management decisions for the reserve will also influence visitation.

8.1.1 General factors influencing visitation

- The *Pilbara Planning and Infrastructure Framework Summary* indicates that by 2035 Port Hedland will have a population of 50,000, which is likely to significantly impact on the reserve bringing more day visitors and short term campers such as those staying for a weekend (confirmed by onsite observation)
- The population for the state and country as a whole is steadily increasing and so usage is unlikely to diminish.
- There is a community wide trend of acknowledging how important nature based recreation is for communities and individuals.

8.1.2 Tourism Strategies

Tourism Australia⁸ indicated their current target market is Experience Seekers who can be found among all age groups, income levels and geographic locations. They have been identified as a high yielding consumer segment that is looking for unique and involving personal experiences from their holidays.

The *draft State Government Strategy for Tourism in Western Australia 2020*, (Tourism WA) proposes the following seven outcomes

- Firmly establish the 'Experience the Extraordinary' brand
- Expand hotel, aviation and workforce infrastructure to support the growth
- Increase the contribution and leverage of business travel to WA
- Grow WA's share of high yield Asian markets
- Position WA as a recognised events destination for locals and visitors
- Increase visitation to regional WA
- Provide every visitor with the opportunity to have an Aboriginal tourism experience

A copy of the *draft State Government Strategy for Tourism in Western Australia 2020, Strategy at a glance* (Tourism WA) can be found at <http://www.tourism.australia.com>

8.1.3 Camping and Accommodation Trends

- 'Grey Nomad' numbers are likely to continue to increase for approximately the next 10 years, but by 2020 the first 'Baby Boomers' will be 75 and so numbers may start declining. Later 'Baby Boomers' may also have different camping preferences.
- The increasing level of facilities on-board some caravans decreases the need for onsite infrastructure, so visitors may be seeking a low level of facilities and expect to have proportionally low fees.
- Demand for camping and caravan areas at Cape Keraudren is probably going to continue, if for no other reason than caravan parks are closing in many locations.
- The number of caravans may decrease over time (due to the expense of caravans) and the proportion of camper trailers and tents increase. Alternatively there does seem to be a demand for increased levels of comfort.
- Tents are favoured by younger age groups, while those more 'middle' aged may prefer cabins.
- Due to accommodation shortages in Port Hedland, accommodation locations commuting distance away from the town (such as Pardoo Roadhouse) are often used for short term accommodation for workers, limiting the availability for tourists.
- The reserve location on the main north/south travel route in the state and the 'round Australia' route provides tourism opportunities
- The *draft State Government Strategy for Tourism in Western Australia 2020*, has a strategy of improving caravan, camping and self drive experiences and of improving nature based experiences.

⁸ <http://www.tourism.australia.com> (accessed 24th August 2012)

8.1.4 Day Visitors Trend

- Likely increase in day visitation due to Port Hedland's increasing population.
- Adjacent camping and accommodation areas such as Pardoo Station, Pardoo Roadhouse and Eighty Mile Beach result in day visitation to Cape Keraudren, and as the capacity of these places increases so will day visitation to the Cape.
- Increased mining camps in the area may increase day visitation
- Development of day-long drive trails from Port Hedland could increase day visitation.

8.1.5 Tourism Potential

- The type of visitors arriving from Port Hedland may evolve to include overseas travellers arriving through the airport or resource industry executives seeking a few days of rest and relaxation.
- The exposed nature of Cape Keraudren, the diversity of land and water forms, and the lack of infrastructure combined with the security and order provided by management, result in it providing a unique experience along the coast from Port Hedland to Broome. This 'point of difference' has some tourism potential.
- The continued development of electronic communication provides opportunities for improved management, communication and marketing. Even older age groups are embracing the new technologies.
- Change is a continuum and planning, at best, seeks to guide that change. Adaptive management is required to learn from and accommodate change.
- Resilience is best provided by diversity, and in terms of visitation to the reserve this means providing a range of opportunities so that there is some capacity available to accommodate changing visitor groups. Management can then evolve to provide for the new priority user groups.

8.1.6 Effect of Shire Management Strategies

The SoEP management strategies can significantly influence demand for recreation on the reserve. See Section 4.3 for attributes of the reserve that are important for current visitors. Type of promotion and marketing of the reserve will affect visitor numbers and type as will the facilities and management presence provided on the reserve.

8.2. Commercial Considerations

8.2.1 Previous Development Proposals

In response to the key objective: *"investigate opportunities for the reserve to be cost neutral or perhaps profitable for the Shire, including opportunities to offer new recreation and accommodation experiences ..."* possible commercial development proposals for the reserve have been outlined below. However, detailed feasibility is beyond the scope of this plan.

The SoEP has received enquiries about development at Cape Keraudren reserve in recent years and these include

Ecotourism proposal with accommodation and visitor centre facilities.

The 'Expression of Interest: Ecotourism Proposal for Cape Keraudren (December 2007)' was prepared by Ruth O'Dwyer, then a student, who sought to project manage the proposal on behalf of

the shire. The aim of the proposal was 'to provide educational experience that improves visitor interpretation of the area, to ensure that Cape Keraudren remains in pristine condition for future generations to enjoy'. The proposal was to

- be funded by grants;
- consist of 14 permanent , serviced tent structures, staff accommodation, self cooking facilities and ablutions;
- focus on an education and indigenous cultural arts centre (with a sales outlet)
- include a horticultural centre for growing native plant species
- use sustainable technology.

While the aims of the proposal were commendable in terms of environmental, social and economic sustainability it gave little detail, particularly economic feasibility or how the proposal would affect the reserve as a whole.

Caravan Park Development

An informal approach was made to the Shire to develop a caravan park and camping area on the southern slopes of the reserve above the tidal flats. The proposal involved removing camping from the coastal locations to the caravan park and creating coastal day use facilities. The concept was for a joint funding proposal between the proponent, local Aboriginal groups (supported by the resource sector) and the Shire. As at August 2012 the proponent remains "interested".

8.2.2 Factors affecting Commercial Viability

There are many factors affecting the commercial viability of ecotourism enterprises and some general comments have been received from operators with nature based tourism industry experience in the Pilbara as follows

- Location of Cape Keraudren approximately midway between Karijini National Park and Broome indicate there is potential for use by through travellers. These travellers may be seeking experiences such as Karijini Eco Retreat and Eco Beach
- A commercial operation with professional management would need more than one type of operation to make it viable (e.g. a variety of tourist accommodation units supported by accommodation for mining operations that could ultimately become a tourism operation)
- The establishment period can be up to 7 years and during that time there needs to be a degree of exclusivity to secure the viability of the operation. After that time diversity and competition contribute to sustainability.
- A commercial large scale operation requires a large capital base due to the quantity of infrastructure that needs to be provided (e.g. water supply and treatment plant, waste treatment plant, power supply), which requires servicing over the establishment period. Government grants do not do this, so long term commercial partners, such as bus companies are needed.
- A 'husband and wife' type operation on a smaller scale and could be based on one operation such as accommodation.

Other experiences with nature based tourism operations indicate

- Experiential enterprises where an activity or natural feature is the attraction need to be supported by a commercial component such as retailing, of souvenirs, cafe guided experiences.
- A degree of exclusivity is required if high value / high return experiences are proposed.
- The more sophisticated the infrastructure the higher the level of maintenance that is required (e.g. annual engineering checks).
- Location on existing tourist routes is required as even free, high class facilities will not attract visitors if they are too out of the way.
- Marketing needs to be ongoing, no matter how popular the attraction is initially.
- The harsh environment makes material selection critical in terms of visitor comfort and ongoing maintenance, semi-permanent tents have been known to burn, go mouldy and blow away in the Pilbara. Climate can be cold as well as very hot.
- Due to the low visual absorption capacity of the Cape environment any large scale development is likely to be visually dominant if sited incorrectly.

8.2.3 Suitability of Cape Keraudren for Tourism Development

Consideration of the tourism or development potential of Cape Keraudren reserve indicates it has positive and negative attributes in terms of tourism potential

Positive Attributes

- Attractive, diverse, landscape features with a rugged natural character reflective of the iconic northwest
- Special marine qualities adjacent as marine park.
- Warm winter climate
- Wildlife observation - turtle nesting and bird watching migratory waders give potential out of season attractions
- Aboriginal values
- Heritage values
- Proximity to Great Northern Highway
- Proximity to the population centre of Port Hedland only 165km away
- A partly sealed access road
- Potential to be on a variety of drive trails
- Management by SoEP and opportunities for management synergies
- Stable tenure
- Complimentary services available at nearby Pardoo Roadhouse
- Potential for solar, tidal and wind energy options

Negative Attributes

- Lack of services infrastructure, particularly lack of power supply, and waste disposal and water supply issues.
- Lack of vesting for commercial development/ leasing
- Nearby commercial developments may overlap / compete with components of development on Cape Keraudren
- Seasonality of visitation

- Harshness of the environment in terms of its extreme summer heat and aridity,
- Isolation from services, infrastructure and accommodation for staff
- Resource sector demands which create labour shortages in service industries and scarcity of construction industry workers
- Remoteness from large centres of population who are potential clients
- Cyclones
- Potential for bushfire

9.0 Future Options

In 2011 Western Australian Planning Department conducted an aerial survey of the entire Pilbara coast recording degradation believed to be caused by access for recreational fishing, camping and tourism.

“The Shire of East Pilbara has relatively short coastline and the number of access points used by off-road vehicles (recorded during aerial photograph interpretation) is significantly less intense than elsewhere in the Pilbara.

The effect of coastal management adjacent to the Cape Keraudren Reserve is also noticeable with only one coastal access track recorded between the Reserve and the north eastern local government boundary, a distance of approximately 30 kilometres.” Dr John Collins, WAPD pers. Comm.

Currently the major expenditure is the recurrent costs associated with having a ranger on site. Arguably, the presence of the ranger is why the reserve is in such comparatively good condition, and contributes to the enjoyable experience sought by campers.

In order to retain this quality a ranger or similar presence of authority is required on the reserve (with associated costs). If day visitation through the summer period continues to increase, a continuous year round presence will be required. In this context management options are detailed below and in Table 4 Management Options for Cape Keraudren Reserve.

9.1 Shire Management Options

9.1.1 Option 1 – Leave Things As They Are

Many visitors to the reserve want ‘things left as they are’.

Proposed Visitor Experience: To remain as it is

Expected Visitor Types: Would remain the same, except the increase in day visitors is likely to continue.

Infrastructure Required: New toilets are the only infrastructure likely to be required.

Reserve Management and Maintenance: The ranger would continue to be under pressure managing recreation, though volunteer input would assist. There would be no time for other reserve management duties.

Financial Implications: The Shire will continue to lose \$80,000+ per annum, and as few shire residents visit the reserve, and the visitors to the reserve do most of their shopping outside of the shire, and so are not supporting the ratepayers who are subsidising management of the reserve.

Management costs cannot be reduced significantly, unless the year round management presence is discontinued and this is not a viable option, if the environmental values and experiences are to be sustained. Even increasing volunteer input does not enable major reductions in management costs as the authority of the ranger is still required in many management situations, so the ranger still needs to be onsite.

9.1.2 Option 2 – Increasing Revenue through Camping Fee Increases

If management costs are to be covered by revenue, assuming total visitation stayed stable, camping fees would need to more than double to cover costs. The fees would be comparable to Barn Hill and Port Smith fees for unpowered sites, but they have flushing toilets, showers and water supply and other facilities..

Proposed Visitor Experience: To remain as it is except for the fee increase

Expected Visitor Types: Those who come because it is cheap would likely go elsewhere. Those long term visitors who had more disposable income and valued the special Cape Keraudren experience would probably continue to visit. There may possibly be a shift to short term visitors. Day visitation is likely to continue to increase.

Infrastructure Required: The infrastructure would remain as it is except for essential works such as upgrading the toilets.

Reserve Management and Maintenance: Would remain as it is with the ranger carrying out all fee collection and maintenance, and it is likely there would be less volunteer input. Reduced visitor numbers may mean less day to day maintenance and more time for general reserve management.

Financial Implications: The reserve may be cost neutral, but depending on how much the fees were increased, visitation may go down, requiring more fee increases.

9.1.3 Option 3 - Increase Revenue by Increasing Visitation and Reasonable Fee Increase

Visitation to the reserve could be increased by marketing and promotion including the development of drive trails. Day and short stay visitation is also likely to increase as Port Hedland's population increases, especially if the Cape values and experiences and accessibility were marketed.

Proposed Visitor Experience: Due to increased visitor numbers and management efficiencies including some increases and changes to infrastructure there would be some changes to visitor experience, but the aim would be to balance the changes to retain the same overall experience. Targeted marketing to increase visitation in off peak times, and extend rather than increase peak visitation would also assist in maintaining the current experience. As the reserve offers a different experience to nearby caravan parks the Grey Nomad visitor numbers should remain constant at least for the next 10 years until baby boomer numbers decline.

Expected Visitor Types: Existing visitors (particularly the long term Grey Nomads) are expected to continue, as the key attributes that attract them of low price, proximity to the coast, minimal litter

and distance from neighbours, will be retained. However, other visitor groups and markets such as adventure and experience seekers and those with nature-based interests could be attracted to the reserve. Day visitation is also likely to increase. Low fees will be equitable across a range of visitor types.

Infrastructure Required: Infrastructure to enable management efficiencies will be required and some reorganisation of sites to provide for new user groups such as day visitors and backpack/wicked van campers. As there is a trend towards self sufficient camping units, camping areas with minimal facilities may become more popular, and there may be less demand for additional toilet infrastructure beyond correcting the current deficiency; but perhaps more sullage points.

Improvements like day-use shelters with interpretation and more walk trails would encourage new user groups to visit and probably be appreciated by existing user groups. An information bay may be required on the highway and at Pardoo Roadhouse, and some promotional material for visitor centres. See Appendix 13, Communication Plan.

Reserve Management and Maintenance: Efficiencies will be needed if the increased service and maintenance resulting from the increased visitation is to be achieved with existing resources. These will include self registration and waste management efficiencies. The infrastructure proposals should also result in improved management of the reserves values by reducing visitor impact. The retention of the existing visitor groups will foster the stewardship felt by those groups towards the values of the reserve.

Financial Implications: It is difficult to model the financial outcome given the variables. As a guide; partnered with a reasonable increase in camping fees (say 25%), and minimal change to staff and service fees, if marketing increased visitation by 20% on 2011/12 numbers, and if most new visitors stayed just one night, revenue could increase by 30% to around \$140 000 pa.

Some capital investment will be required for infrastructure improvements but grant monies should be available for some of the work e.g. through Lotterywest for walk trails or sponsorship. Some Shire resources will be required for coordinating the marketing of the reserve, but existing communication networks can be used (e.g. visitor centres, websites etc) resulting in little capital cost. Reserve management costs should remain relatively constant, though sullage and toilet pump out costs may increase, particularly with increased day visitation. Fees can remain affordable enabling all to visit the reserve.

9.1.4 Option 4 – Reduce Expenditure

Based on the information currently available the only feasible significant reduction in expenditure is to reduce the management presence on the reserve as other costs are for essential infrastructure maintenance and costs such as pumping out the sullage dumps. This reduction could be achieved by the ranger only being on site in peak season and only working standard hours (if the ranger works overtime in peak season, or has annualised hours there are no savings).

Proposed Visitor Experience: The management efficiencies required to enable the ranger to only work standard hours in peak season would result in some changes in peak season. In the off season when there was no ranger presence unacceptable behaviour such as taking dogs on the reserve, off road driving etc are likely to occur, changing the experience for other visitors.

Expected Visitor Types: An increase in visitors who are less respectful of the reserve's values can be expected. This may displace visitors who value the current 'order' on the reserve.

Infrastructure Required: Infrastructure for management efficiencies such as self registration and waste disposal efficiencies will be required to enable the ranger to work standard hours in peak season.

Reserve Management and Maintenance: maintenance efficiencies will be achieved in peak season but there will be no capacity to improve reserve management. Unacceptable behaviour such as littering in the off peak season may result in depreciation of the reserves values. There may be an opportunity for other shire rangers to visit the reserve occasionally in the off season (when their duties elsewhere are reduced) to maintain at least some management presence.

Financial Implications: There may be savings in running costs, but damage to infrastructure through misuse or vandalism may result in increases to capital and infrastructure costs. It is proposed the visits by other Shire rangers are included in their current works program (at little extra cost to the shire).

9.2 Commercial Management Options

Map 10 Preliminary Potential Locations for Commercial Development Options shows locations that can be considered for some of these options. The sites have not been inspected with the intent of determining their commercial potential, it is only from a desk-top analysis they have been selected and so should be considered very preliminary proposals

9.2.1 Option 5 – Management Concession to Manage Current Visitor Use on the Reserve

This option consists of the Shire contracting others to manage the reserve and to be responsible for a level of maintenance. A comprehensive agreement between the Shire and the contractors would be needed, clearly detailing maintenance responsibilities and standards of reserve management including campsite number ceiling. The contractors would collect all fees on behalf of the shire and could be paid a retainer or a percentage of the income. Incentives for managing visitor impacts, visitor satisfaction and increasing visitation could be included and the Shire would remain responsible for larger maintenance items such as road grading, accommodation provision etc. This option would need further thorough investigation before it could be implemented.

Proposed Visitor Experience: The experience should remain the same, depending on the detail of the agreement. Incentives may result in the contractors increasing visitation to a degree. There is some risk in contractors reducing services to save outlay.

Expected Visitor Types: Remain the same.

Infrastructure Required: It is proposed infrastructure would remain essentially the same, though the contractors may seek to implement management efficiencies such as self registration and rubbish handling over time.

Reserve Management and Maintenance: Would depend on the standards set out in the agreement, but maintenance of the existing standards should be seen as a minimum. The level of authority given to the contractors will be critical in maintaining standards of reserve management.

Financial Implications: There may be savings for the Shire if a husband and wife team was seeking a lifestyle rather than a lucrative business. However, there would be significant overheads in setting up the contract and some support and supervision costs. Some maintenance and the capital expenditure would still be required to maintain the infrastructure on the reserve.

9.2.2 Option 6 – Provide Developed Camping Facilities

A ‘typical’ caravan park with onsite power, shade, and developed facilities including flushing toilets, showers, washing machines and additional accommodation types such as cabins.

Proposed Visitor Experience: The visitor experience for campers would change to that of a serviced caravan park. The coastal day use sites would be quite different from the current coastal camping areas with more facilities and site organisation and more traffic on the roads.

Expected Visitor Types: Long term campers may continue to visit, but only those that prefer caravan parks. Other visitor types may increase (such as through travellers, commercial tour operator groups) and workers from Port Hedland may also seek accommodation. The lack of good beach facilities may limit the attraction of the area to families. Consideration could be given to a new beach access point in the northeast of the reserve, but providing a stable access point would be a challenge and the road development expensive.

Infrastructure Required: A high level of infrastructure will be required in terms of site development, reticulation, tree establishment, facility provision such as ablution blocks, laundry, retail area and staff quarters and particularly services (power, water, waste disposal) to provide the caravan park. The site would need to be relatively level and big enough for approximately 100 camp sites, above predicted flood and tide levels (with consideration for sea level rise), have year round access, be relatively close to existing facilities and not intrude on areas viewed by visitors so the natural appearance of the reserve is maintained. There are some difficulties finding such a site on the reserve.

Sites on the Cape Keraudren peninsular/island are vulnerable to being ‘cut off’ for long periods of time due to flooding and the area near the boat ramp is the only large level area on the peninsula, and a campground there would remove the feeling of naturalness from the vicinity of the Cape, so development north of the causeway is not recommended. On the ‘mainland’ side of the causeway Locations 1, 2 and 3 on Map 10 are possible locations. Port Smith and Pardoo Station caravan parks are set back some distance from the coast and are still popular so these locations away from the coast should still be viable. Location 1 is a valley between sand dunes and Location 2 is east of the current reserve entry area. Location 3 is an assumed (from air photos only, the site was not inspected) level area set behind the southern ridge that is south of the tidal flat areas. Location 4 was suggested by Middle for commercial development, but it will impact on the naturalness of views from the Cape as would Location 5 so these are not preferred sites. The existing coastal camping areas will also need redeveloping as day use areas, with greater parking capacity, boat trailer parking, fish cleaning stations, toilets and shelters.

Reserve Management and Maintenance: Either the management of the reserve values and the day use areas could be included in the responsibilities of the caravan park management as part of the leasing arrangement, or the ranger role retained with a day use service and compliance role.

Financial Implications:

- A private commercial development is suggested. However, lease returns to the Shire could only be derived by testing the market - i.e. calling for expressions of interest – in general, lease returns for local government owned caravan parks do not seem lucrative.
- A relatively long lease would be required to justify the level of investment required for example DPaW offers 21 year lease with further 21 year option on selected “Naturebank” sites on conservation reserves.
- A cursory financial appraisal suggests that the establishment and operation of a new 100 bay caravan park in the Reserve would struggle to be viable as the Internal Rate of Return (IRR) would be far too low on the estimated \$5million plus required to be spent on establishing competitive infrastructure. However, if this option is considered, a more rigorous feasibility study is recommended.
- Cape Keraudren would be competing with the nearby Pardoo Roadhouse, and “station stay” caravan parks and accommodation areas at Pardoo and Wallal Stations and others further north, that provide a similar type of facility. However, according to Tourism WA, caravan parks elsewhere are closing and there may be sufficient demand for more caravan parks.
- The SoEP may be required to retain ranger services and maintain infrastructure such as roads, depending on the terms of the lease agreement.

9.2.3 Option 7 - Luxury Large Scale Commercial Eco Accommodation Operation

A large scale, privately leased and operated accommodation area (similar to Karijini Eco Retreat or Eco Beach Broome)

Proposed Visitor Experience: The experience will be a relatively expensive, luxurious (visitors will not need to bring anything), nature based eco experience. There will be a focus on guided fishing, nature appreciation (including whale watching) and bird watching in the summer. The naturalness of the reserve as a whole will be reduced by the proposed siting of the development (see below)

Expected Visitor Types:

- The location would suit experience seekers and travellers, but families and couples are likely to use the accommodation for annual holidays and events such as functions and weddings could be held there. However, the lack of good beaches will be a significant deterrent for families.
- Visitors are expected to be short term, up to 1-7 days, from Port Hedland and other Pilbara towns, or fly into Port Hedland (including internationals, particularly those from Asia), or they may have driven from Perth, Kimberley or beyond.
- Long term accommodation (for the local mining workforce in the short term, ultimately for more tourists) is likely to be needed to ensure viability of the development.
- In order to compliment (in terms of visitor types attracted) and not compete with nearby developments an “eco development”, certified accordingly is suggested.
- Ongoing public access to the foreshore for day visitors would be a condition of development.
- Existing campers are likely to be displaced so that the foreshore areas are available for day use.

Infrastructure Required: The following considerations are noted

- This style of development would have similar siting considerations to those discussed in Option 6, except they would also be looking for the 'wow' factor as guests would be expecting something special. Locations 4 and 5 on Map 10 have views across the reserve, but this would significantly impact on the naturalness of the reserve. Also Middle noted there were Aboriginal values in this area of the reserve, and although recent consultation with Ngarla did not confirm this, it would need to be investigated as a priority. A site north of location 1 nearer the coast in the dunes could give views across Eighty Mile Beach to the ocean but this dynamic environment would require a rigorous assessment because of potential environmental impacts and compliance with SPP 2.6.
- An option may be to locate the accommodation infrastructure in less obtrusive locations with the communal areas, such as restaurants set in obtrusive areas to appreciate views.
- The existing camp areas would be needed as day use areas for users of the facility and other day visitors, and also to give a level of exclusivity to the new accommodation area.
- The appearance of the development should reflect the vernacular architecture of coastal shacks and / or caravans to continue the character of the 'Aussie summer holiday'. Tents could also be considered if they were proved durable and feasible.
- Considerable service infrastructure would be required; this could be situated some distance from the accommodation areas.
- This development proposal is yet to be considered on site and so is conditional on the suitability of the sites as well as Aboriginal clearances.
- The day use areas would need to be developed to accommodate use levels and provide for the less able and those unfamiliar with natural environments

Reserve Management and Maintenance: The lease agreement would need to contain environmental offsets in terms of reserve management and community education. Management arrangements between the Shire and the developers would be required regarding the development and maintenance of the day use areas.

Financial Implications:

- A relatively long lease would be required to justify the level of investment required for example 21year lease with further 21 year. However, lease revenue to the Shire could only be derived by testing the market - i.e. calling for expressions of interest.
- Seasonality of the tourist traffic and interruptions to operations by cyclones will be a major consideration in determining viability. For example, Eco beach closes for three months in cyclone season.
- The same or low internal rate of return (IRR) to a caravan park, and expensive infrastructure in a cyclone prone environment suggests this type of development would also struggle to be viable.
- The SoEP may be required to retain ranger services and maintain infrastructure such as roads, depending on the terms of the lease agreement.
-

9.2.4 Option 8 - Niche Tourism Development - Small Scale Luxury Ecolodges

The topographical limitations of the reserve and the special qualities of the natural environment suggest that a small scale high value tourism operation may be appropriate, building on the Tourism WA “Experience the Extraordinary” brand. Such a small scale operation could co-exist with the existing camping and day use on the reserve, at least to a degree, particularly as the existing camping is considered to be part of the cultural landscape of the reserve.

Proposed Visitor Experience: The existing camping experience will remain and essentially be part of the attraction for the ‘experience seekers’. This proposal focuses on the understanding of ‘ecos’ meaning place and so the accommodation should reflect the style of the existing caravans and the Aussie holiday experience.

Getting away from it all and appreciating nature are expected to be the main attractions. The units can either be located in a separate area on the Cape such as Cape Camp, to give a degree of exclusivity to the development, or the units could be in the existing camping areas to facilitate guests interacting with other campers to give the true camping experience (both locations could be trialled). There would be camp fires and options for guided experiences such as drive tours of the reserve, fishing trips, bush tucker tours, bird watching etc or visitors could just enjoy the scenery, go for walks, chat to locals or get away from it all.

Expected Visitor Types: The existing visitor types will remain in the camping areas. The new development will aim to attract new types of visitors to the reserve, who appreciate the special values of the reserve, including the current recreation experiences, but want an increased level of comfort and are prepared to pay for it. They are expected to be short term, up to 2 weeks, and either fly into or be from Port Hedland. Some may be travellers from further afield.

Infrastructure Required: Luxury caravans (approximately 6) or similar could be set in the existing camping areas, in prime locations (high quality views will be important) with both 2WD and 4WD access. They would be serviced with linen and have ensuite facilities (chemical toilets, showers etc. as in other private caravans). Alternatively the accommodation unit could be more in the style of a movable version of a coastal shack as relocation to a more sheltered position will probably be required over cyclone season. Tents are not recommended due to the exposed nature of the site and climatic variations.

The lodges should be designed to have minimal environmental impact. Water, firewood and supplies would need to be regularly brought in, power generated on site and waste carted away and they would have eco accreditation.

Reserve Management and Maintenance: Synergies between management of the existing camping areas and the new caravan or shack eco lodges (such as on ground management, water supply provision) could be achieved depending on the terms of the concession. An eco lodge ‘host’ is expected to be on site when guests were there. The managers of the eco lodges would need to contribute to reserve management either financially or in kind. If management efficiencies were in place for the existing camping areas, it would be more practical for the managers of the concession to also manage the reserve.

Financial Implications: The operation could be a concession rather than a lease, and the caravans could be owned and serviced by people (possibly a couple) also seasonally living on-site. The capital investment in this option is far less, but the returns to the shire will be commensurately less too. This option may work better as an add-on element of Option 9 below. Shire will likely need to continue to resource ranger services and maintenance of camping area infrastructure, but could retain camping fees though this will all depend on the agreement.

9.2.5 Option 9 - Niche Tourism Development - Study Centre / Lodge Accommodation

The natural diversity of the reserve and its proximity to the proposed Eighty Mile Beach Marine Park and Ramsar Wetland suggests there may be an opportunity for nature-based tour operators and other nature based interest groups wanting to visit the reserve for extended periods of time.

Proposed Visitor Experience: The existing camping experience would be retained. The new experience would be serviced, but affordable and have a focus on passive nature-based activities and appreciating the values of the reserve. Focusing on the natural aspects of the reserve will give year round attractions to visitors with the migratory waders, and turtles giving summer attractions to complement the pleasant weather of winter and the whales visiting in the shoulder seasons.

Expected Visitor Types: Visitor types could range from commercial nature-based tour operators, specialist groups or school groups to from Port Hedland folks wanting to get away from it all for a weekend. The existing campers would be retained. SoEP may appreciate a coastal venue which staff can head to for conferences, workshops and team building exercises. This option would co-exist with the existing camping opportunities and could also coexist with Option 5.

Infrastructure Required: This style of development would have similar location and siting considerations to those discussed in Option 6, except that it is smaller in scale and although it needs an attractive natural environment, it does not need a 'wow' factor. Locations 1, 2 and 3 would be suitable. Management might suit a husband/wife or partnership operation - living on-site year round.

It would be a permanent facility, visited year round. Visitors would stay in one larger building which could contain a variety of sleeping units. It could be relatively luxurious fully serviced homestead style bed and breakfast, or may reflect the 'coastal shack style'.

It could also have bunk house / dormitory style accommodation (relatively low cost) with shared ablution facilities to accommodate school groups, or an overflow camping area for large groups. An outside "campfire and barbecue cooking area could be a focal point, and a meeting room/class room/laboratory may provide for other activities. Washing machines and supplies would still be available from Pardoo Roadhouse.

Market Research would be required to determine what would work best. Eco friendly but cost effective services such as power, water and waste disposal would need to be provided. The existing camping areas would be retained and management efficiencies implemented. Management accommodation would also be required and new ranger facilities may also be included depending on the management model for the reserve.

Reserve Management and Maintenance: Private or Shire management of this facility or a combination of both would be feasible, but whichever model was selected the management

responsibilities would extend over the existing campers and general reserve management, as well as management of the lodge and associated service provision. Co-location of management accommodation and infrastructure such as works yard could give synergies in the provision of services

Financial Implications: The relatively high set up cost might limit commercial proposals from individuals. However, the Shire could seek sponsorship funding (with naming rights) and develop the facilities itself as a community asset to be used by all – e.g. the “XYZ Mining Company 80 Mile Beach Study Centre”.

There may be options for other management agencies such as DPaW and DoF to partner or support the proposals in return for management support such as accommodation, office, laboratory and possibly workshop infrastructure. Responsibilities for maintenance of camping area infrastructure and retention of camping fees would be dependent on lease or licence agreement.

9.3 Other Management Options

9.3.1 Option 10 – Transfer Management to another Government Agency

Cape Keraudren Reserve occupies part of the Ramsar Wetland and is adjacent to the Eighty Mile Beach Marine Park, both of which are managed by Department of Parks and Wildlife (DPaW). The Conservation Commission could be approached to consider including the reserve in its conservation estate, with DPaW taking over management of Cape Keraudren Reserve as a Conservation Park.

Factors in favour of this option:

- The proposed marine park goes to High Water Mark elsewhere along the coast but abuts the reserve at Low Water Mark, and the mangroves in the reserve have high conservation value.
- Most visitors to Cape Keraudren reserve will interact with the Ramsar Wetland and Marine Park, so the reserve functions as an entry point to both
- The camping and recreation opportunities on the reserve could be made similar to the style of facilities DPaW provides in other coastal national parks.

However, as DPaW managers for this area are based in Broome it is likely there would be a number of issues to address before DPaW could take over management of the reserve, particularly the resourcing of this management.

10 Recommended Recreation Management

10.1 Recommended Management Option

The investigation into the feasibility of a commercial tourism venture requires:

- Robust visitor data to enable commercial decisions to be made e.g. accurate year round traffic data, day visit and visitor night numbers and other information about types of visitors,
- The ‘power to lease’ being available to the SoEP
- Cattle removed from the reserve
- The parameters of water supply and waste disposal defined (the existing tip needs to be relocated as the area of the current tip is a possible development location).

Therefore it is recommended that the Shire management option, Option 3 – Increase Revenue by Increasing Visitation and Camping Fees is implemented as it does not require the above issues to be addressed but should go at least some way to reducing the funding deficit, without major change to the reserve or visitor experiences. The management efficiencies in Option 3 are also required for some other options to be implemented.

Once the management efficiencies and the management initiatives to support Option 3, have been implemented and evaluated, and the above issues which influence commercial investment have been addressed, the situation can be reviewed.

10.2 Management Efficiencies and Initiatives

The management efficiencies and initiatives required to implement Option 3 and prepare for the consideration of other options, are listed in Table 5 Management Efficiencies and Initiatives for Cape Keraudren Reserve.

Table 5 Management Efficiencies and Initiatives for Cape Keraudren Reserve

Management Action	Reference for Implementation	Suggested Priority
Management Efficiencies		
Collect visitor statistics (e.g. traffic counter, record visitor nights)	Section 7.14	High
Implement a central rubbish collection facility	Section 7.5.2	High
Install a fish offal composting facility	Section 7.5.3	High
Provide adequate toilets and review operation of the sullage collection points.	Section 7.5.1	High
Implement sign plan	Section 7.13	High
Implement marketing initiatives to increase number and spread over time of visitation	Appendix 12	High
Install a self registration system for fee collection	Section 7.6	High
Review camping fees		High
Review interpretation, reserve brochure and web presence as part of a coordinated communication plan		High
Communicate the proposed management strategies for the reserve with visitors and stakeholders		High
Record the role, responsibilities and conditions of those long term visitors who are contributing 'in kind' in lieu of paying fees.		High
Undertake a geotechnical assessment of rock overhangs that are used by visitors.		High
Remove camping from the southwest shore of Cootenbrand Creek		High
Review and prepare site designs for Boat Harbour Camp and Sandy Beach to incorporate the infrastructure associated with the above efficiencies, to manage visitor impacts, to sustain capacity (and allow for some increase), to more clearly identify provision for different types of campers, to provide for the anticipated increase in day visitation and implement relevant standards.	See below for detailed design briefs for each site	High
Implement site designs for Boat Harbour and Sandy Beach		High
Management Initiatives		
Fence the cattle out of the reserve		High
Consider commercial management options for the reserve and undertake feasibility studies as appropriate.		Medium

Investigate obtaining 'power to lease' for the reserve		Medium
Review waste management including tip location		Medium
Track rationalization to minimize visitor impact on the salt flats		High
Support the formation of a 'Friends of the Cape' group to progress a Code of the Cape and other issues of concern (including fishing impacts) .		Medium
Develop and implement a visitor risk management system		High
Explore interagency resource sharing options		Medium
Liaise with the Ngarla Aboriginal group regarding the use of Aboriginal names for places		Medium
Improve the connection between the SoEP as a whole and the reserve.		Medium
Liaise with Pardoo Station leaseholders.		High
Liaise with the Rangelands NRM to determine the appropriateness of trying to remove the buffel grass and re-establish small areas of local vegetation.		Medium
Facility Development		
Develop an information/entry bay near great Northern Highway		Medium
Continued sealing of Cape Keraudren Road – not required for visitor use, but appropriate if it creates management efficiencies		Low
Develop site design for Firewood Creek day use site	See below for detail design brief	Medium
Develop a walk and cycle trail network with development of a walk around the mangrove lagoon as a priority.		Medium
Consider a short, historic drive / walk trail around the cape.		Medium
Review Col's Beach, Rabbit Proof Fence site and Cape Camp (possibly as part of development of above Cape Trail)		Medium
Investigate linking Cape Keraudren into the rest of the SOEP via drive trails.		Medium
Investigate a bird hide		Low
Review the location of the rangers accommodation and other support infrastructure		Medium

10.3 Resourcing

There are a variety of resourcing options available to SoEP (see Section 6,3 but it is beyond the scope of this plan to identify resources for specific actions. However it is envisaged that

- Management Efficiencies - will be largely undertaken by Shire staff with some specialist input and some capital funding from grants (e.g. fish composters could be funded by Recreational Boating Facilities Fund) or SoEP capital or grants.
- Management Initiatives - will be largely SoEP internal projects undertaken by council staff.
- Facility Development – capital funding required, likely sources SoEP capital program or grants (such as walk trails funded by Lotterywest)

10.4 Commercial Development Considerations

Although it is not feasible to recommend a commercial development option at this stage, consideration of the objectives for the reserve (see section 1.3) indicate there are some preferred attributes of any proposed commercial development as follows

- Be small scale so it does not displace the existing camping and day use
- Provides for new user groups
- Reflect the character of the reserve that is, the typical low key Aussie beach holiday, though this experience can be serviced to reduce the degree of self sufficiency required by the visitor and to justify providing a fee for service
- Employ sustainability principles
- Create management efficiencies for the SoEP in terms of managing the rest of the reserve.

10.5 Specific Recreation Development Recommendations

Map 11 The Recreation Master Plan locates the sites and facilities discussed below and they are summarised in Table 6 Site Development Proposals for Cape Keraudren Reserve.

All development of facilities should

- Be in accord with relevant standards and policies
- Consider risk management including management of coastal hazards
- Incorporate the management of the visual landscape including reference to section 7.12.1
- Reflect the sense of place for the reserve, see section 7.12
- Be in accord with the management recommendations of section 7 This section particularly advises details for provision of campsites, toilets, fire rings, self registration and waste disposal
- Have signage, interpretation and other communication media in accord with the proposed communication plan.

Site specific recommendations are noted below and these should form part of the design briefs for the future development of these facilities. The facility development proposals are shown on Map 11 Recreation Master Plan. Note minor sites are up to 10 parking bays or camp sites, medium sites are up to 25 parking bays or camp sites and major sites are over 25 parking bays or camp sites.

The sites are listed sequentially from Great Northern Highway:

10.5.1 Entry Bay at Intersection of Great Northern Highway and Cape Keraudren Road

Function: To provide information to visitors and travellers along the highway about Cape Keraudren Reserve and in the future, provide information about drive trails in the East Pilbara Shire.

Facilities

- The existing signage needs rationalising to ensure it provides the desired image of the reserve and efficiently conveys management messages.
- The provision of a shelter is recommended to attract the visitor's attention and to provide shade, which will encourage visitors to stop.
- This important location on the Great Northern Highway is an opportunity to inform highway travellers about the attractions of the whole of the SoEP and encourage them to stop a while

and explore or come back another time to experience the diversity of the shire. Drive trails are recommended to guide visitors to ensure they have an enjoyable experience.

- Providing information at Pardoo Roadhouse should also be considered.

10.5.2 Ranger's House and Entry station

Functions: Combined functions of arrival point, ranger's residence and works depot area. This area needs review and if there is to be tourism development on the reserve the review should occur as part of the planning for the new development. If there is to be no tourism development the area should be reviewed anyway in the medium term.

Facilities

- In the short term install a self registration system at the main arrival point and review information provided to visitors
- Review the works yard to ensure visitor access to the sullage point and water is appropriate.
- As this is the main arrival point to the reserve, consider the first impressions the visitors are receiving in terms of signage and views (of the reserve and of the works yard).
- Review the ranger's accommodation and if it is to be upgraded consider relocating it to a less visually obtrusive area, such as below the ridgeline or separate from the entry area.
- Consider road realignments as the part of the review of the area.

10.5.3 Salt Flat Golf Course

Function: This seasonal activity is another expression of the culture of the visitors to the reserve and is to be retained unless it becomes evident that unacceptable environmental damage is occurring. Patrons should be dissuaded from parking on the tidal mud flats for both environmental and visual amenity.

Facilities

- The small parking bay / turnaround by the road is to be tidied up and less obvious, lower profile, vehicle barriers, such as rocks use to define the area.
- The adequacy of the parking and damage to the flats is to be monitored and changes implemented as necessary
- The annual fund raiser for the Flying Doctor is to be managed as an event with appropriate traffic signs to manage parking along the road for that day. Portable toilets may also be required for the event
- In the long term a parking bay or lay by should be provided close to the salt flat. This could be provided when other works/realignments are occurring along this main section of road.

10.5.4 Cootenbrand Creek

Function: This restricted site has a number of functions including camping, day use and through access to Eighty Mile Beach. These functions are to be rationalized and a priority given to day use due to the special features of the area. 2WD access should be provided to the site, but this may just be the mowing of the current median strip on the track, at least in the short term. Consider renaming to creek to the Aboriginal name it was derived from.

General

- The stability of the limestone shoreline at Cootenbrand Creek should be assessed by a geotechnical engineer.

Day Use Facilities

- Options for removing the toilet back from the edge of the creek are to be investigated. A new toilet would be provided rather than relocation the existing toilet.
- The feasibility of providing a stable lookout over the Eighty Mile Beach should be investigated. Interpretation should be provided at the lookout. If a lookout is not feasible an alternative location for providing interpretation is to be identified.
- Parking for day visitors (approximately 6 vehicles) is to be delineated, but surfacing should not be necessary due to the hard limestone surface. Also, surfacing is likely to be washed away in spring tide and storm events. In the long term the feasibility of providing parking back from the creek edge should be investigated to free up the edge of the creek for fishing and other activities.
- The through access to Eighty Mile Beach is to be retained, though the feasibility of setting this back from the creek edge should also be investigated in the long term.
- The area will link into the walk and cycle trail network if feasible with trail information provided.

Camping Facilities

- The area south of the track along the west bank of the creek is to be closed to camping
- Camping (6-8 sites) in the central area south of the toilet can be retained in the short term dependent on the outcome of the geotechnical report and the pressure for day use.
- To allow for increased day use, camping is to be removed altogether in the medium term when other sites have increased capacity.,,
- The old long drop toilets are to be removed, and the Rotaloo toilet retained though its use will be managed to ensure its capacity is not exceeded and its visual impact is to be reduced. A new 2 seater toilet will be installed, back from the creek if feasible.
- A communal fire ring is to be provided in a central location
- Rubbish bins removed when new central rubbish collection facility is installed
- Provide infrastructure to support self registration and camp fee collection.
- Provide directional signage and other interpretation as necessary

10.5.5 Eighty Mile Beach

Function: This is to remain as a day use site and it will become more important as day visitation to the reserve increases.

Facilities

- In the short term retain as a day use site with controlled beach parking maintained on the western end of the beach and vehicle access through to the rocky headland retained.
- In the medium term investigate the feasibility of developing parking back from the beach which will provide for those wanting to visit Cootenbrand Creek, Eighty Mile Beach and the headland. This will be required when a significant increase in day use is observed with associated congestion.
- Should the geotec report into the stability of Cootenbrand Creek edge advise there are stability issues, alternative parking will need to be investigated.
- The lookout and toilets recommended in the discussions for Cootenbrand Creek will provide for Eighty Mile Beach as well.

- Trails are to connect to this site.
- Provide directional signage and other interpretation as necessary

10.5.6 Sandy Beach Camp

Function: To be the second most important recreation node with a major camping area and ample provision for day visitors as this is the most suitable beach for families. It will be 2WD accessible via a gravel road and the existing character and proximity of sites to the beach is to be preserved. There will be a slight increase in the level of site organisation but this will be offset by visitors being required to be more self sufficient in term of rubbish collection, fish waste disposal, fee paying and a reduction in the presence of the ranger. There will be minor modifications to better provide for a wider range of visitors.

Day Use Facilities

- An area will be designated for day use parking for 10 vehicles with an option for another 5 vehicles in the future.
- Stable access to the beach will be provided from this day use parking area and toilets will be nearby
- Two picnic tables will be provided
- Site information and trail information will be provided
- The area will link into the walk and cycle trail network.

Camping Facilities

- The Sandy Beach camping area is to be accessed off the main access road and will be expanded. It may consist of two sub areas either side of the central day use area and associated parking.
- The camping is to be set back from the fore dunes to ensure the dunes are not impacted by camping
- Increase camping - currently 20 camps, has potential for increase to 30-35 camps with an indicative break down being
 - 2 camp host sites , one at either end of the camp
 - 6-8 front row sites
 - 10 - 15 standard sites
 - 4 campervan sites
 - 4 walk in tent sites
- Provide a campers gathering area, with fire ring, possibly in association with the day use site.
- The old long drop toilets are to be removed and the Rotaloo toilet retained though its use will be managed to ensure its capacity is not exceeded and its visual impact is to be reduced. Two new 2 seater toilets will be installed.
- Communal fire rings are to be provided
- Central rubbish collection facility to be provided with recycling opportunities if feasible
- Provide infrastructure to support self registration and camp fee collection.
- Provide directional signage and other interpretation as necessary

10.5.7 The Mangrove Lagoon

Function: A multiuse trail will be developed around the lagoon with associated trailhead and parking

Facilities

- The trailhead will provide trail information and parking for approximately 5 vehicles with 2WD access off the main road
- The trail and trailhead / parking area will be developed in association with the local Aboriginal community.
- Once the trail is established and the cattle removed all redundant tracks will be reshaped and rehabilitated.
- The lagoon walk trail will connect to Sandy Beach Camp so the toilet facilities there can be used by walkers.
- The trail will be approximately a Class 2 as defined by the Australian Standards as it will be suitable for walkers and cyclists and will have trailside interpretation.

10.5.8 Boat Ramp Camp

Function: To be the main recreation node on the reserve for both camping and day use, with a focus on the bay and the boat ramp. It will be 2WD accessible via a gravel road and the existing character and proximity of sites to the beach is to be preserved. There will be a slight increase in the level of site organization but this will be offset by visitors being required to be more self sufficient in term of rubbish collection, fish waste disposal, fee paying and a reduction in the presence of the ranger. There will be minor modifications to better provide for a wider range of visitors. One beach side site may be made available for a commercial on site caravan / eco lodge. Suggest re-naming the bay to an Aboriginal place name.

General

- The bay needs a specific name
- There will be a focus on reducing the visual impact of this site from views within the reserve.

Day Use Facilities

- Maintain the boat ramp and associated signage
- Provide fish cleaning and fish waste compost facilities nearby (no smell model to be used), Mosquito Creek is suggested.
- Provide boat trailer parking in accord with AS 3962 – 2001 Guidelines for the design of Marinas. Provide for a standard size car towing a 6.5m trailer in accord with Austroads standards and templates (refer Boat Launching Facilities in Western Australia by DoT)
- Identify an area for day use that has attractive views of the bay and provide shade shelter, interpretation, picnic tables and toilets nearby. Provide parking for 5 vehicles with the potential for 5 more in the future. Allow for large 4WDrive vehicles in the size of car bays and turning circles.
- The shelter should also be a trailhead for trails on the reserve.
- Provide a fire ring to facilitate BBQs
- Advise rubbish should be taken home
- Separate pedestrian and cycle facilities from vehicular infrastructure.
- Consider the provision of an associated garden/rehabilitation area that features the local plants. This could be developed by long term campers in association with the Rangelands NRM

Camping Facilities

- The Boat Ramp camping area is to be accessed off the main access road and separated from Mosquito Ridge camping area. It will consist of two sub areas either side of the central boat ramp and associated parking.
- The capacity of the campsite will be maintained (currently 25 -45 camps) and probably increase with an indicative break down being -
 - 2 camp host sites, one either side of the boat ramp
 - 9 approx. front row sites plus 1 foreshore site south of the main area
 - 24 standard sites
 - 5 campervan sites
 - 5 walk in tent sites
 - 2 group sites suitable for 3-5 vehicles each
 - Informal overflow camping area approx 8 sites
- Provide a campers gathering area, with fire ring, probably at the southern end of the shore line.
- The old long drop toilets are to be removed and the Rotaloo toilet retained though its use will be managed to ensure its capacity is not exceeded and its visual impact is to be reduced. Two new 2 seater toilets will be installed.
- The existing sullage point will be retained and as usage increases consideration will be given to the provision of a second sullage collection point.
- Communal fire rings are to be provided
- Central rubbish collection facility to be provided with recycling opportunities if feasible
- Provide infrastructure to support self registration and camp fee collection.
- Provide directional signage and other interpretation as necessary

10.5.9 Mosquito Ridge

Function: This area will be separated from Boat Ramp Camp and become a peak season only camp area with no facilities. This will enable the area to have a natural appearance for much of the year, which will improve the naturalness of the views from the main road.

Camping facilities

- The access track will be off the track to Mosquito Creek and a one way loop will be created which returns to the Mosquito Creek Track. This loop track will enable the area to be closed in the off peak season.
- The existing toilet holes will be removed and campers will be required to have their own toilet facilities.
- The capacity of the campsite will be maintained (currently 9 camps plus 2 on the foreshore one of which will now be accessed from Boat Ramp Camp) and possibly increase with all sites being front row sites.
- Implement management efficiencies including self registration, central rubbish collection facility, communal fire rings and signs.

10.5.10 Mosquito Creek Boat launch

Function: This informal creek access point is to remain an alternative boat launch and retrieval site to Boat Ramp Bay, it is 4WD accessible

Facilities

- The informal layout of the site appears to function well, but it is to be monitored to confirm there is enough parking for trailers and to ensure the area of bare vegetation does not gradually increase.
- Fish cleaning station will be considered for this site.
- Signage is to be reviewed including the need for navigational information and bag limits.
- Downstream fencing is to be retained and monitored. It may need to be replaced due to rusting, or the vegetation may come back so that it is no longer needed
- The access track to the site needs review to determine if it should be one way. This review will need to incorporate the changed access proposed for Mosquito Ridge and consideration of the extra traffic resulting from having the fish cleaning station here.

10.5.11 Col's Beach

Function: This is to remain a 4WD accessible camping area with no toilet facilities and minimal additional infrastructure. Day use will be provided for as below.

Day Use Facilities

- A beach access point and associated informal parking area is to be identified to enable day visitors to access the beach at peak user times without disturbing campers. A capacity of 5 vehicles is proposed.

Camping Facilities

- Apart from the provision of day use facilities, this site will essentially remain as it is until its layout can be reviewed. However access through to Cape Keraudren itself will be closed at Cape Camp, see drive trail section.
- Self registration will be by attaching the 'ticket' to the tent in the short term.
- Rubbish bins will be removed and rubbish will need to be taken to a central collection point near Boat Ramp Camp.
- When the site is reviewed the capacity of the campsite will be maintained (currently 27 camps) and probably increased with an indicative break down being -
 - 1 camp host site
 - 20 approx. front row sites
 - 7 foreshore sites 6 in the main area and 1 south of the main area
 - No campervan or tent sites will be provided as they do not have toilet facilities
- The review of the site layout will examine the location of the access used by through traffic to Rabbit Proof Fence site and Cape Camp to ensure visitor risk is minimized
- The area will link into the walk and cycle trail network.

10.5.12 Rabbit Proof Fence Site

Function: A small day use site will be identified in the vicinity of the Rabbit Proof Fence

Facilities

- Parking for 3 vehicles will be provided near the headland from which a view of the remains of the Rabbit Proof Fence can be seen. The parking will have a natural surface and be subtly defined with rocks, grouped naturally

- A walk trail will be marked to a viewing point and it may continue in a loop around the headland
- Seating will be considered for the viewing point
- Interpretation and signage will be provided

10.5.13 Cape Camp

Function: This is to remain a 4WD accessible camping area with no toilet facilities and minimal additional infrastructure.

Facilities

- The existing loop alignment for the track will be retained and reviewed as necessary to provide for vehicles to turn around.
- The track continuing on to the cape will be closed to prevent through traffic
- Self registration will be by attaching the 'ticket' to the tent in the short term.
- Rubbish bins will be removed and rubbish will need to be taken to a central collection point near Boat Ramp Camp.
- Signage will be provided
- While the campsite remains open to the public its capacity will be maintained (8 camps) and may be increased to 10 camps if there is room. The breakdown of the sites will be
 - 1 camp host site
 - 9 front row sites

10.5.14 Cape Keraudren

Function: Day use site with panoramic views on a proposed 4WD and walk trail loop.

Facilities

- The site is to be defined with subtly placed informal groups of rocks (using the rocks that currently create a fire place)
- The site will essentially consist of a turnaround but there will be capacity for 3-5 vehicles.
- A geotechnical assessment of the site and nearby areas will be required to ensure the proposed use areas are not undercut.
- The need for a marked walk trail around the Cape will be investigated. This may particularly be required to manage visitor risk.
- Interpretation and signage will be provided and some rocks may be grouped to provide informal seating.

10.5.15 Beacon Hill / Trig Hill

Function: Stopping /viewing point on the 4WD and walk trails proposed for the headland area of the reserve.

Facilities

- The significance of the different hill tops will be identified as part of the planning for the trails.
- Liaise with DoP managers of the trig reserve
- Parking / stopping space for around three vehicles will be provided at each point of interest. The limits of vehicle areas will be defined if required with subtly placed informal groups of rocks.

- Interpretation and signage will be provided as appropriate and necessary.

10.5.16 Firewood Creek Boat launch

Function: This creek is to remain an alternative 4WD accessible boat launch and retrieval site, seasonally open (closed after rain or king tides) and the feasibility of developing a small day use area with a lookout over the mangrove flats is to be investigated

Facilities

- The Firewood Creek area as a whole is to be reviewed for functionality, environmental impact and visitor opportunities.
- The most suitable boat launch point is to be identified and its use managed appropriately (signage and fencing if necessary to control how much of the area is impacted).
- The feasibility of providing a small loop car park and approx 3 car bays and a long vehicle bay is to be investigated. The site would need to be above the area of inundation.
- A walk trail could be developed to a suitable lookout point on the rocky ridge to the east that would give panoramic views over the mangrove flats, creeks and salt marsh.
- The lookout may link to a ridgeline walk trail in the long term which could connect to other walk trails on the reserve.
- This site would be used by day visitors 'just having a look around' and would be an opportunity to share more of the values of the reserve.
- The track into Firewood Creek and the other tracks in the flats area need review, so they are rationalized and duplicated tracks closed and located above the flats where feasible to reduce environmental damage. Management by seasonal closure is to continue.
- Toilets may be considered for the site if there appears to be a problem with toilet waste.

10.5.17 Pt. Poolingerina and Western Island

Function: Conservation areas with occasional recreation use from fishermen

Facilities

- No facilities are known to exist.
- Access to Point Poolingerina is possible by 4WD across Pardoo Station and both the point and Western Island are thought to be visited for fishing, either using boat access or walking across the tidal flats at low tide.
- The conservation values of these areas need identifying and management initiatives developed to protect these values. Note: the areas adjacent are to be Sanctuary Zone with shore based activity only when the Eighty Mile Beach Marine Park is gazetted.
- Consider providing information about these areas at the main Boat Ramp.

10.5.18 Roads and Tracks

Function: To provide access to the various recreation sites on the reserve and to also to provide recreation experiences such as scenic drives and 4WD touring.

Facilities

- All roads and tracks should be reviewed as part of the Visitor Risk Assessment Program, particularly intersections to ensure there are adequate sight lines and to remove 'fish tail' situations.

- To improve safety and traffic flow one way vehicular tracks may be beneficial e.g. Mosquito Creek Boat Launch loop.
- At this stage, sealing of the Cape Keraudren Road to the reserve boundary is only considered necessary for ease of maintenance. Should tourism developments occur on the reserve the road will need to be sealed to make management easier.
- The roads within the reserve should remain unsealed to contribute to the natural recreation experience.
- The track to Cootenbrand Creek should be mown (or similar) to make it possible for 2WD vehicle to access the area. In the long term, upgrading to 2WD and providing better parking at the creek may be required (see recommendations for Cootenbrand Creek site)
- The tracks across the salt marshes in the reserve need to be rationalized and duplicated tracks closed.
- Opportunities to improve scenic driving facilities should be investigated such as realigning the main entry road to give a more attractive travel route
- Provision of scenic drive loops such as the proposed 4WD Cape Heritage Trail should be considered.
- The entry road alignment needs review when the ranger's accommodation is to be upgraded and / or tourism development is proposed for the reserve. See Map 10.

10.5.19 Recreation specific Infrastructure: Boat Ramps and Bird Hides

Function: to provide boat access to the marine areas and opportunities to view birds

Facilities

- The current ramp is considered adequate as a larger ramp would just put more pressure on fish stocks
- Information should be provided on site about the hazards in a NW wind and the need to minimize damage to reef flat ecosystem when using the boat ramp at low tide.
- Consider providing a bird hide by the mangrove lagoon, specialists can advise the most appropriate locations.

10.5.20 Trails

Function: to provide a variety of opportunities for appreciating the natural and cultural values of the reserve and to provide opportunities for exercising and socializing.

Facilities

- Plan a network of sustainable trails for a variety of user groups. Include walk trails, cycle trails, dual use walk / cycle, reef walking, scenic and 4WD driving
- Trails will better provide for the day visitor and the camper
- Specific trails to be considered include
 - A walk and cycle trail around the Mangrove Lagoon
 - Walk and cycle trails linking the major recreation sites
 - A ridge walk along the southern ridge of the reserve
 - A trail (walk/cycle/drive?) around the heritage sites on the Cape.

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Appendices

Appendix 1. Department of Lands and Services Plan No. 16173 showing Cape Keraudren Reserve

Appendix 2. Indigenous liaison.

Appendix 3 Correspondence regarding the proposal to use a nuclear explosion to create a harbour at Cape Keraudren.

Appendix 4 Cape Keraudren Recreation Sites – Field Notes July 2012

Appendix 5 Visitor research

Appendix 6 Notes on Coastal Camping and Accommodation Options near Cape Keraudren

Appendix 7 Activities Permitted in Each Zone of the Proposed Eighty Mile Beach Marine Park

Appendix 8 Public Toilets in Outback and Remote Locations of Western Australia

Appendix 9 Visitor Rubbish Management In Natural Areas In Outback And Remote Locations Of Western Australia

Appendix 10 Fish Offal Composters in Western Australia

Appendix 11 Entry Fee and Camping Fee Collection Systems in Natural Areas Like Cape Keraudren

Appendix 12 Communication Plan for Cape Keraudren

Appendix 13 Visitor Survey Form

Maps

Map 1. Cape Keraudren Reserve 2012.

Map 2. Cape Keraudren Context Plan

Map 3 Cape Keraudren and Surrounds prepared by DEC.

Map 4 Bioregions within and adjacent to Cape Keraudren Reserve (Figure 3 from Proposed Eighty Mile Beach Marine Park – indicative management Plan 2011 DEC)

Map 5 Eighty Mile Beach Ramsar Wetland (as provided by DEC)

Map 6 Overview of Existing Situation 2012.

Map 7 Proposed Zoning for the proposed Eighty Mile Beach Marine Park (Figure 4 from Proposed Eighty Mile Beach Marine Park – indicative management Plan 2011 DEC)

Map 8 Proposed Zoning for the proposed Eighty Mile Beach Marine Park – Cape Keraudren to Mulla Mulla Down Creek (Figure 5 from Proposed Eighty Mile Beach Marine Park – indicative management Plan 2011 DEC)

Map 9 Fencing Issues

Map 10 Preliminary Potential Locations for Commercial Development Options

Map 11 Recreation Master Plan

Tables

Table 1 Existing Recreation Sites on Cape Keraudren Reserve 2012

Table 2 Number of People for 2010 to 2012 on Cape Keraudren Reserve

Table 3 Comparison of Fees for Unpowered Coastal Camp Sites

Table 4 Management Options for Cape Keraudren Reserve.

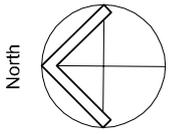
Table 5 Management Efficiencies and Initiatives for Cape Keraudren Reserve.

Table 6 Site Development Proposals for Cape Keraudren Reserve



LEGEND

-  Recreation Reserve Boundary
-  Rabbit Proof Fence No.1 Reserve alignment
-  Geodetic Reserve
-  Gravel Road
-  Track
-  Outline of land mass above high tide line



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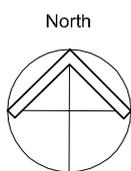
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SHIRE OF EAST PILBARA
CAPE KERAUDREN
 RECREATION MANAGEMENT PLAN
 MAP 1 Cape Keraudren Reserve 2012
 Scale 1:40,000



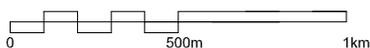
LEGEND

-  Recreation Reserve Boundary
-  Gravel Road
-  Track
-  4WD only track
-  Existing Camping Area
-  Disused Camping Area



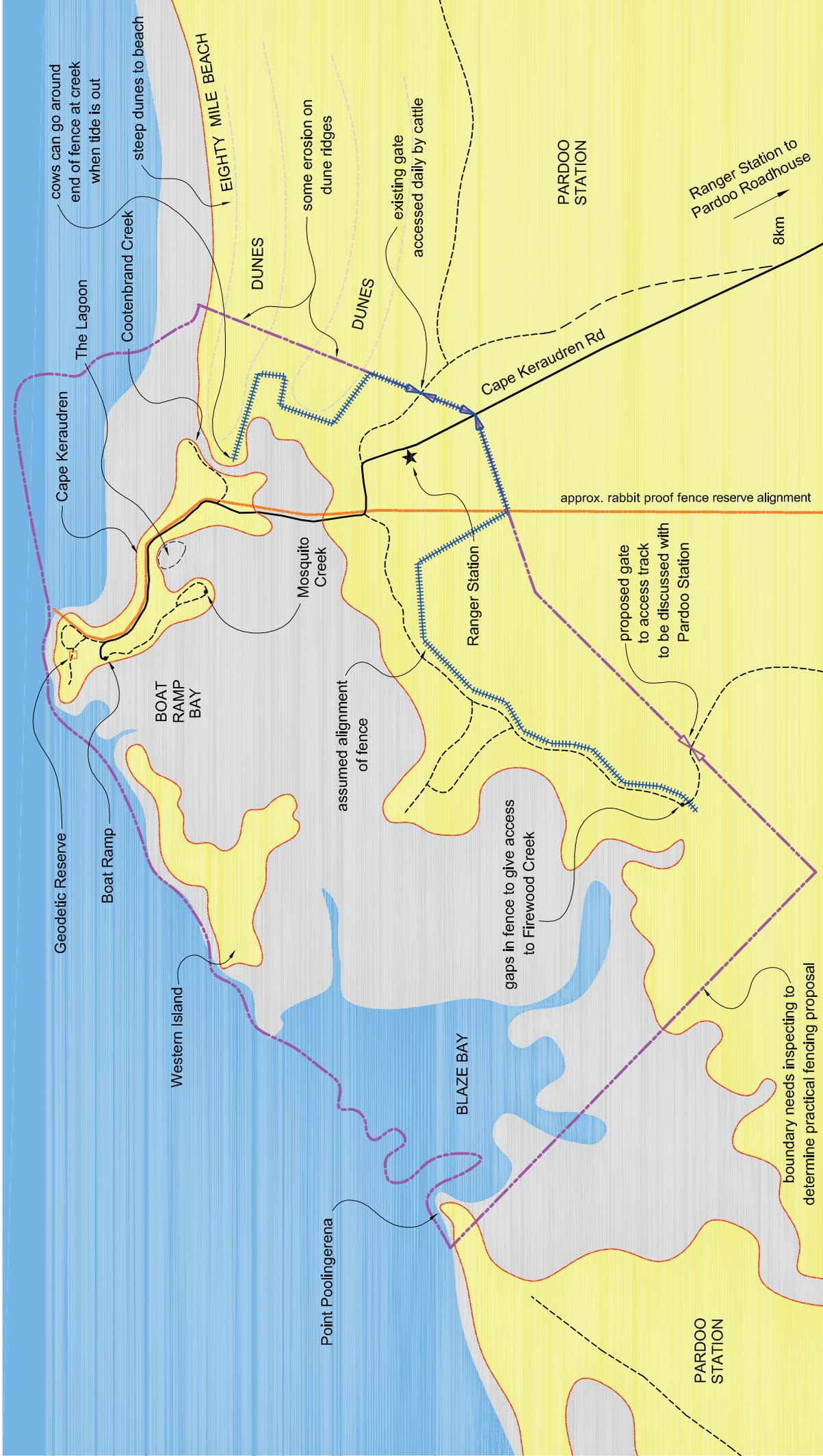
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**SHIRE OF EAST PILBARA
CAPE KERAUDREN**

RECREATION MANAGEMENT PLAN
MAP 6 Overview of Existing Situation 2012
Scale 1:16,000

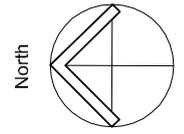


LEGEND

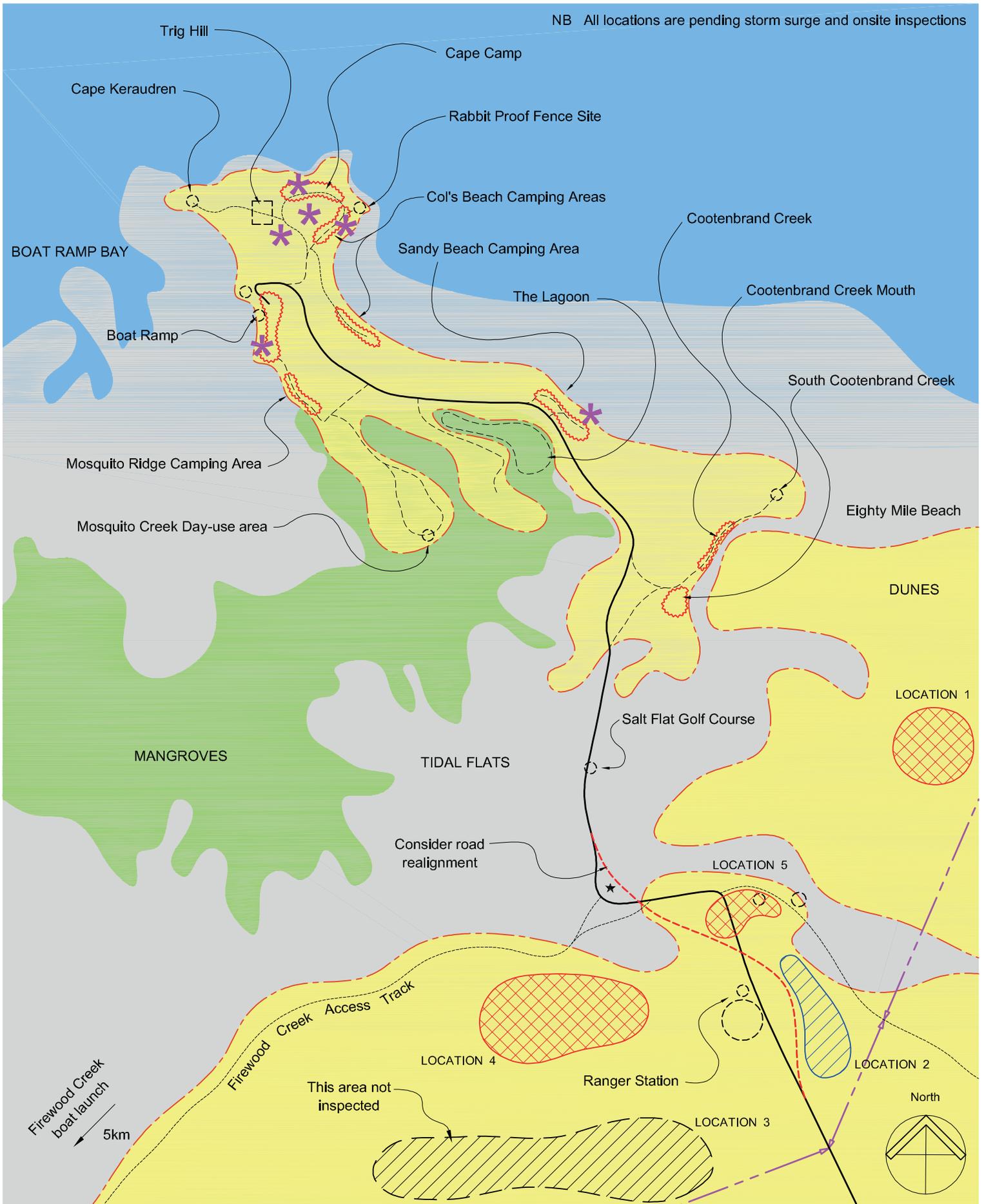
-  Recreation Reserve Boundary
-  Approx. location of existing fence (internal) to be removed once boundary fence installed
-  Boundary fence to be installed
-  Gravel Road
-  Track

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**SHIRE OF EAST PILBARA
 CAPE KERAUDREN**
 RECREATION MANAGEMENT PLAN
 MAP 9 Fencing Issues 2012
 Scale 1:40,000

NB All locations are pending storm surge and onsite inspections



LEGEND

-  Visually Obtrusive Locations
-  Partially Screened Locations
-  Ecovans
(some integrated into existing camping areas)
-  Existing Camping Area

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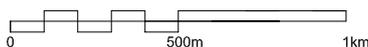
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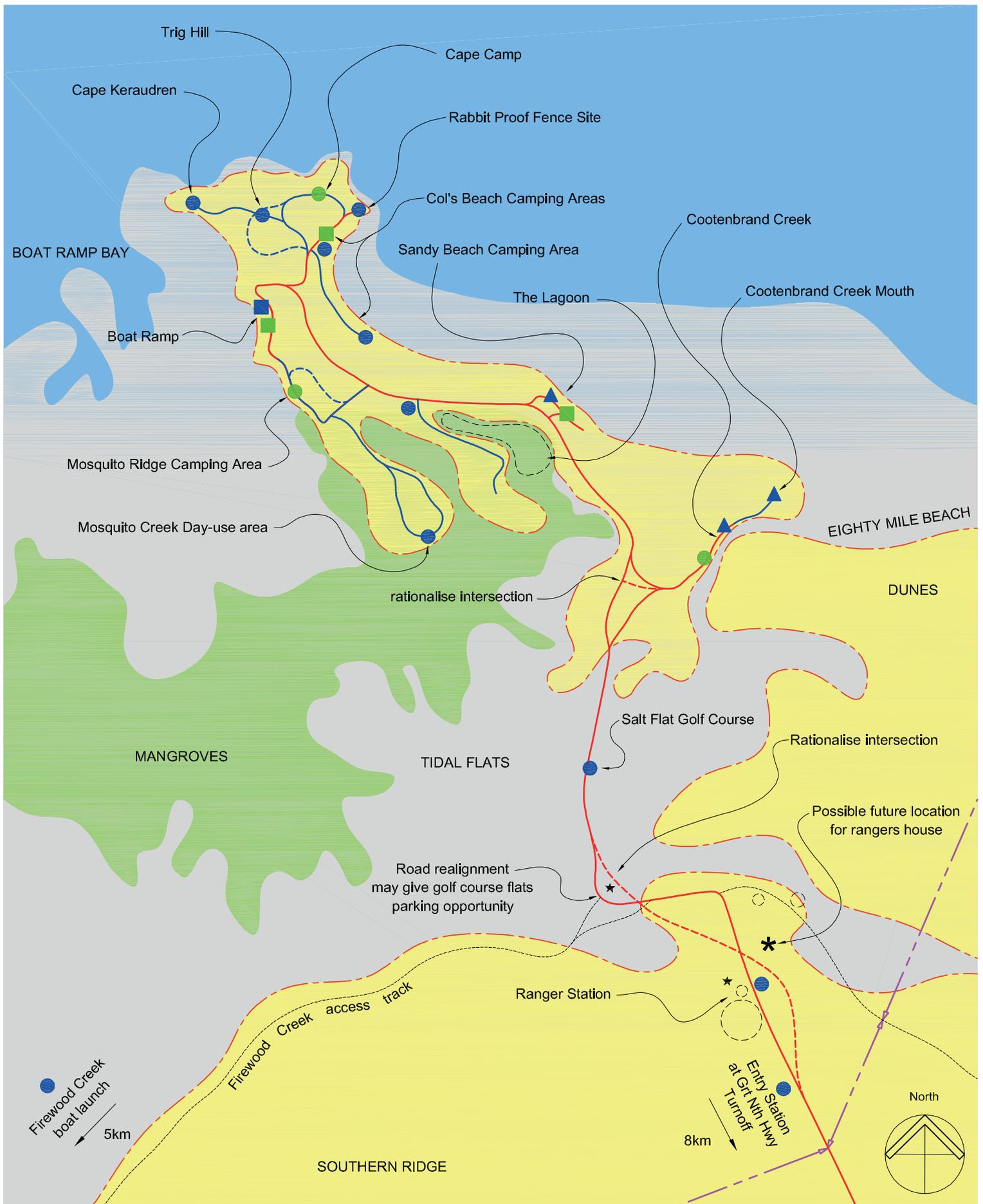
**SHIRE OF EAST PILBARA
CAPE KERAUDREN**

RECREATION MANAGEMENT PLAN

MAP 10 Preliminary Potential Locations for Commercial
Development Options 2012

Scale 1:16,000





LEGEND

- - - 2WD existing / proposed
- - - 4WD existing / proposed
- ▲ ● Major / Medium / Minor Day-use Site
- ▲ ● Major / Medium / Minor Camping Site
- - - Outline of land mass above high tide line

Cliff Winfield & Associates

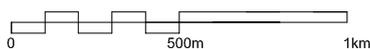
PO Box 814
Manjimup WA 6258.

**SHIRE OF EAST PILBARA
CAPE KERAUDREN**

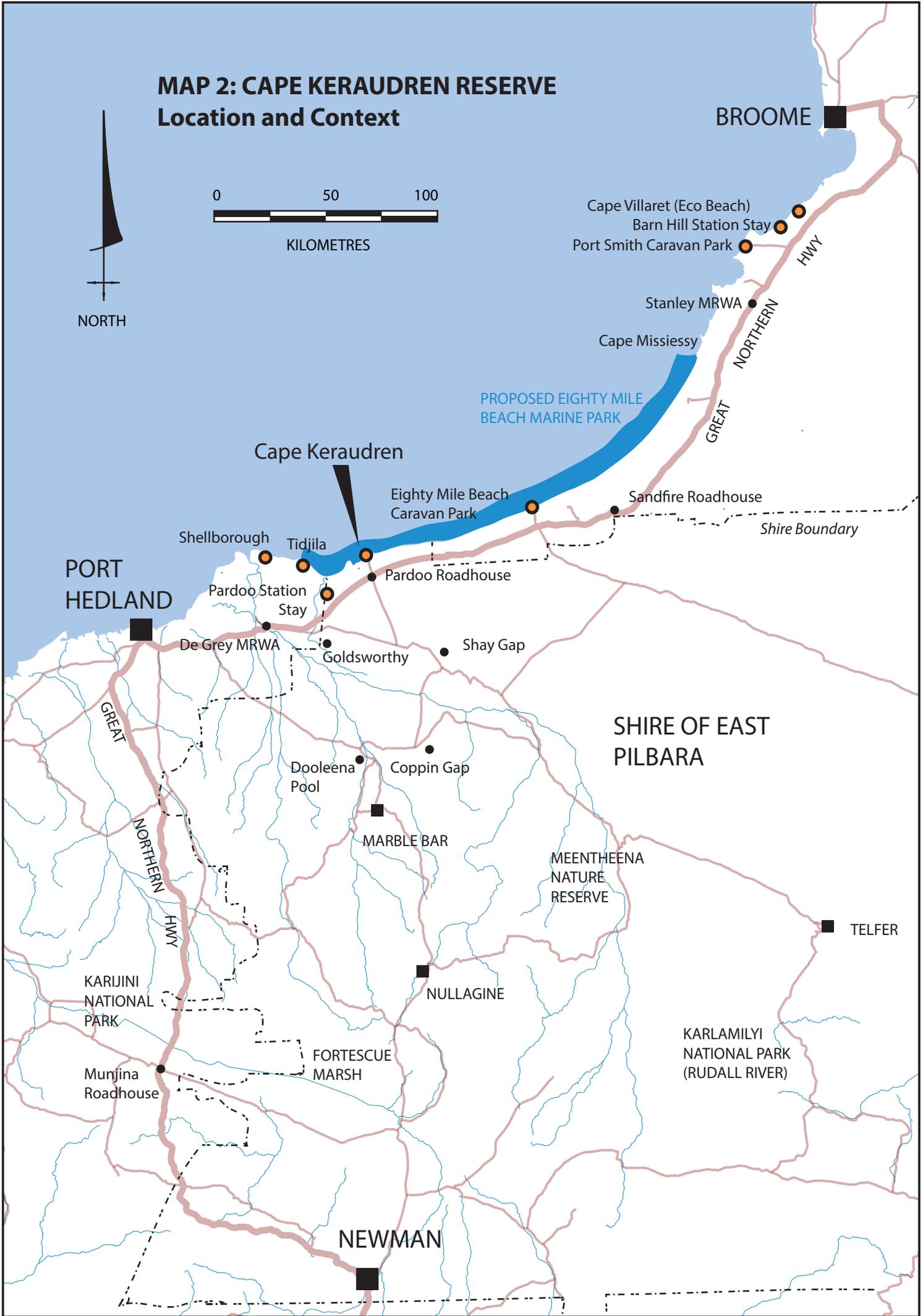
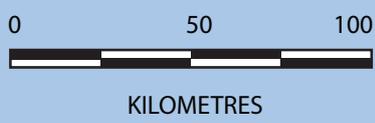
RECREATION MANAGEMENT PLAN

MAP 11 Recreation Masterplan 2012

Scale 1:16,000



MAP 2: CAPE KERAUDREN RESERVE Location and Context



Cape Keraudren & surrounds

Legend

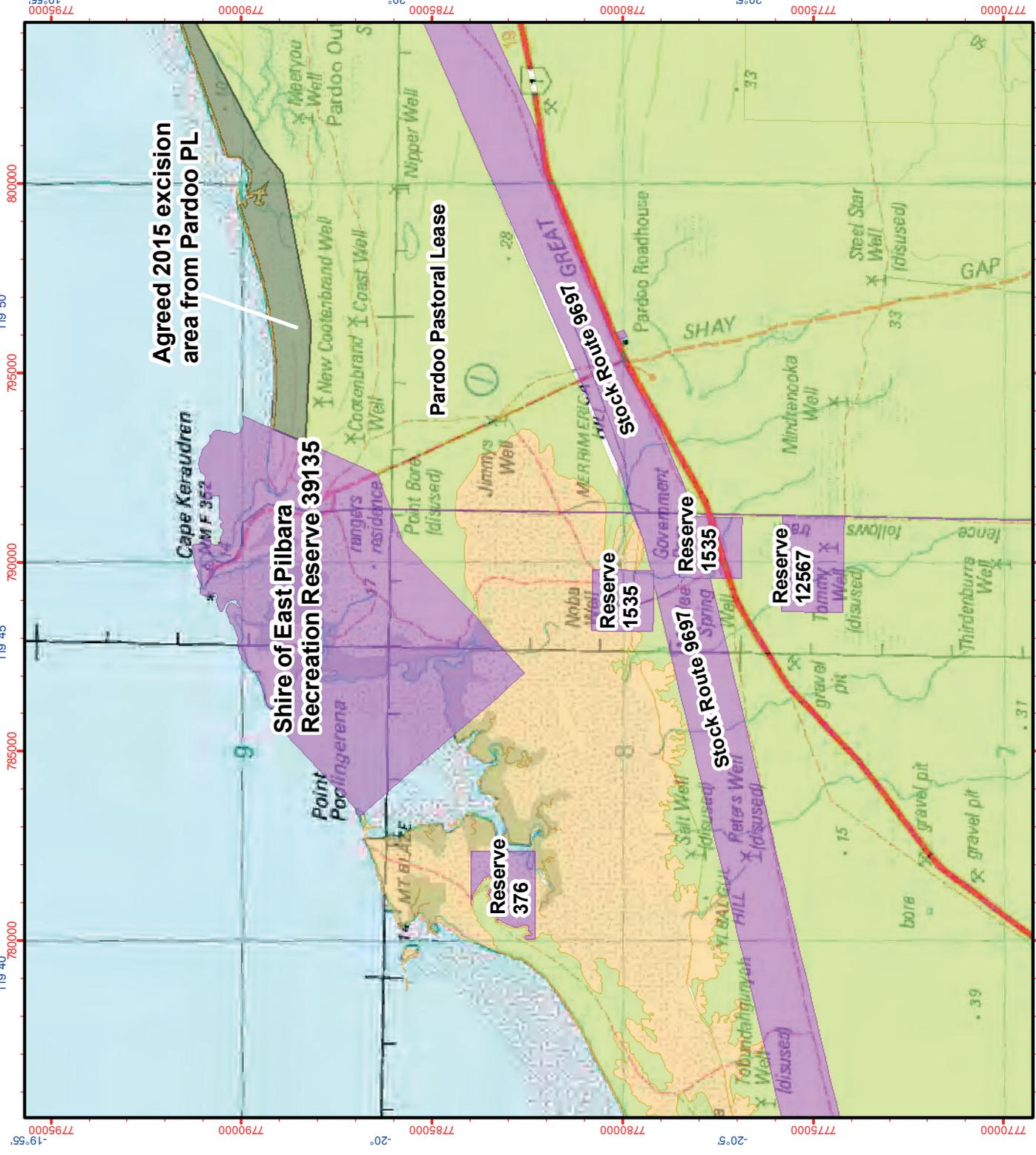
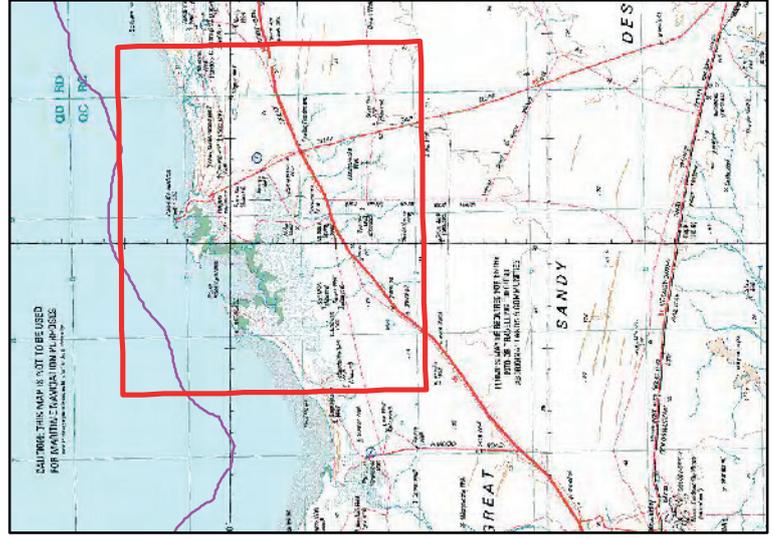
- Agreed 2015 Excision Area
- Crown Reserves
- Pastoral Leases
- Unallocated Crown Land



Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94



Produced by the
Department of
Environment and Conservation



Grid shown at 5 minutes intervals
Grid shown at 5000 metre intervals

119°40' 780000 119°45' 790000 119°50' 800000

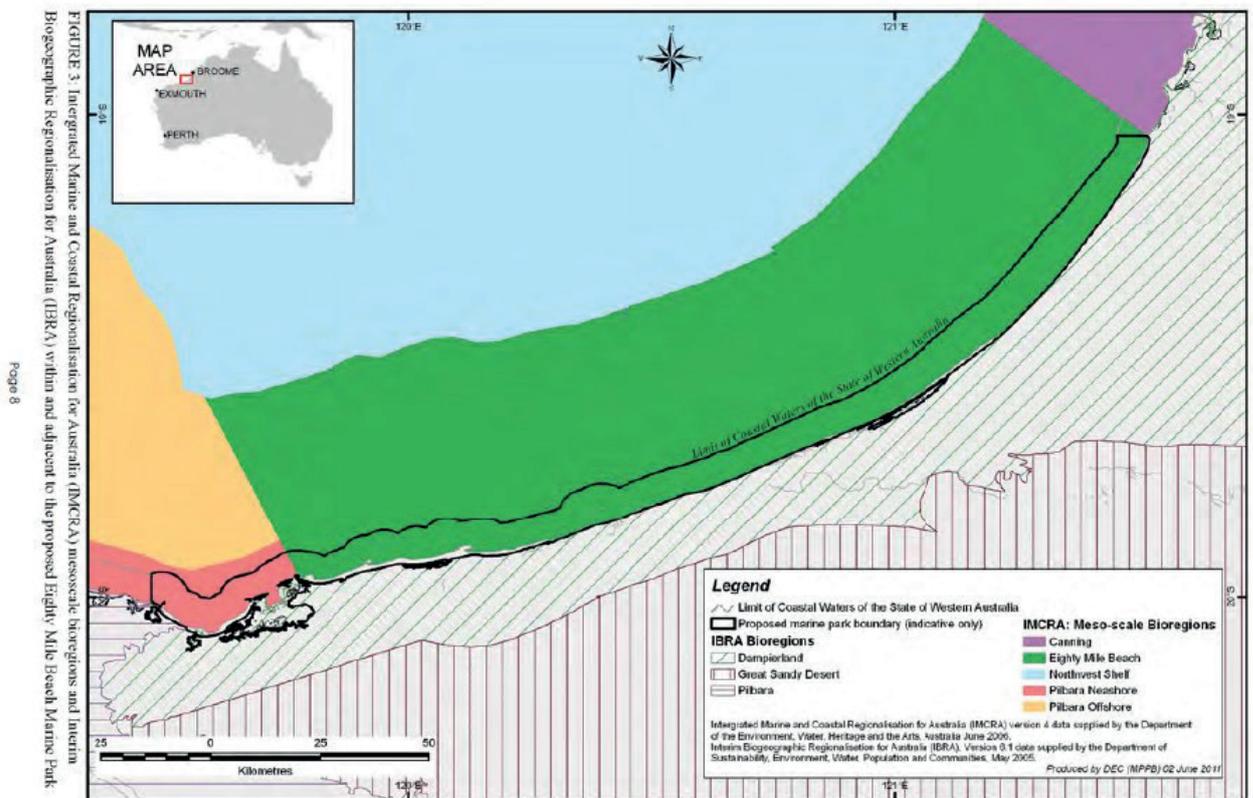
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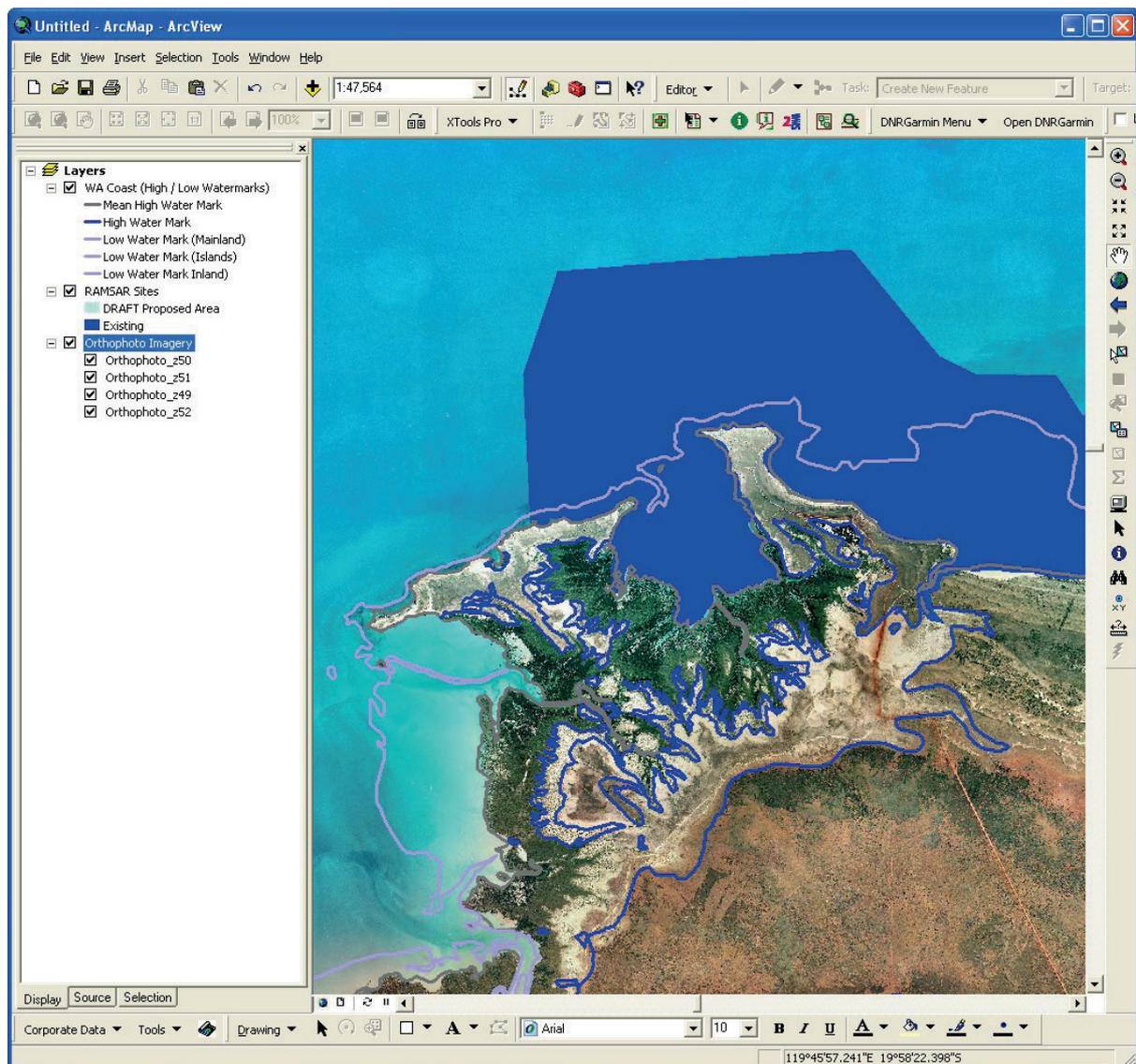
The Dept of Environment and Conservation does not guarantee the accuracy of this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.

Roads and tracks on land managed by DEC may contain unmarked hazards and their surface condition is available. Exercise caution and drive to conditions on all roads.

Map 4. Bioregions within and adjacent to Cape Keraudren Reserve (Figure 3 from Proposed Eighty Mile Beach Marine Park – indicative management Plan 2011 DEC)



Map 5. Eighty Mile Beach Ramsar Wetland (as provided by DEC)



Map 5 . Cape Keraudren Ramsar Wetland Boundary. Supplied courtesy of DEC.

Ramsar Wetland Management Principles from website:

Australian Government Department of Sustainability, Environment, Water, Population and Communities

The Convention on Wetlands of International Importance (the Ramsar Convention) was signed in Ramsar, Iran on 2 February 1971. The Ramsar Convention aims to halt the worldwide loss of wetlands and to conserve, through wise use and management, those that remain.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a framework for managing Ramsar wetlands. The Australian Government Department of

Sustainability, Environment, Water, Population and Communities is the administrative authority within Australia for the Ramsar Convention on Wetlands of International Importance.

EPBC Schedule 6

(regulation 10.02)

1 General principles

1.01 The primary purpose of management of a declared Ramsar wetland must be, in accordance with the Ramsar Convention:

(a) to describe and maintain the ecological character of the wetland; and

(b) to formulate and implement planning that promotes:

(i) conservation of the wetland; and

(ii) wise and sustainable use of the wetland for the benefit of humanity in a way that is compatible with maintenance of the natural properties of the ecosystem.

1.02 Wetland management should provide for public consultation on decisions and actions that may have a significant impact on the wetland.

1.03 Wetland management should make special provision, if appropriate, for the involvement of people who:

(a) have a particular interest in the wetland; and

(b) may be affected by the management of the wetland.

1.04 Wetland management should provide for continuing community and technical input.

2 Management planning

2.01 At least 1 management plan should be prepared for each declared Ramsar wetland.

Note: DEC is currently preparing a Ramsar management plan for Eighty Mile Beach.

2.02 A management plan for a declared Ramsar wetland should:

(a) describe its ecological character; and

(b) state the characteristics that make it a wetland of international importance under the Ramsar Convention; and

(c) state what must be done to maintain its ecological character; and

(d) promote its conservation and sustainable use for the benefit of humanity in a way that is compatible with maintenance of the natural properties of the ecosystem; and

(e) state mechanisms to deal with the impacts of actions that individually or cumulatively endanger its ecological character, including risks arising from:

- (i) physical loss, modification or encroachment on the wetland; or
- (ii) loss of biodiversity; or
- (iii) pollution and nutrient input; or
- (iv) changes to water regimes; or
- (v) utilisation of resources; or
- (vi) introduction of invasive species; and
- (f) state whether the wetland needs restoration or rehabilitation; and
- (g) if restoration or rehabilitation is needed — explain how the plan provides for restoration or rehabilitation; and
- (h) provide for continuing monitoring and reporting on the state of its ecological character; and
- (i) be based on an integrated catchment management approach; and
- (j) include adequate processes for public consultation on the elements of the plan; and
- (k) be reviewed at intervals of not more than 7 years.

3 Environmental impact assessment and approval

3.01 This principle applies to the assessment of an action that is likely to have a significant impact on the ecological character of a Ramsar wetland (whether the action is to occur inside the wetland or not).

3.02 Before the action is taken, the likely environmental impact of the action on the wetland's ecological character should be assessed under a statutory environmental impact assessment and approval process.

3.03 The assessment process should:

- (a) identify any part of the ecological character of the wetland that is likely to be affected by the action; and
- (b) examine how the ecological character of the wetland might be affected; and
- (c) provide adequate opportunity for public consultation.

3.04 An action should not be approved if it would be inconsistent with:

- (a) maintaining the ecological character of the wetland; or
- (b) providing for the conservation and sustainable use of the wetland.

3.05 Approval of the action should be subject to conditions, if necessary, to ensure that the ecological character of the wetland is maintained.

3.06 The action should be monitored by the authority responsible for giving the approval (or another appropriate authority) and, if necessary, enforcement action should be taken to ensure compliance with the conditions.

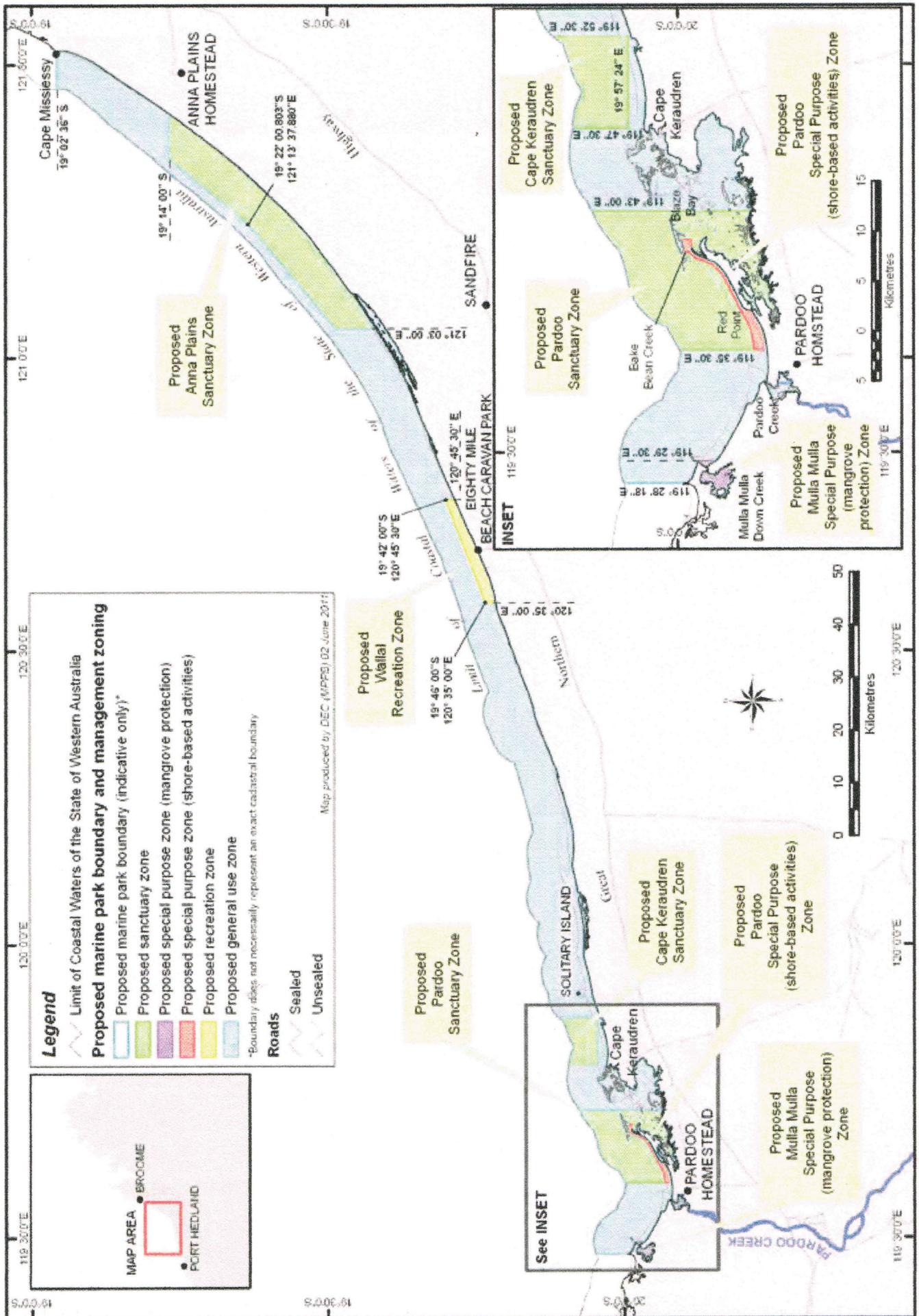


FIGURE 4: Proposed zoning scheme for the proposed Eighty Mile Beach Marine Park

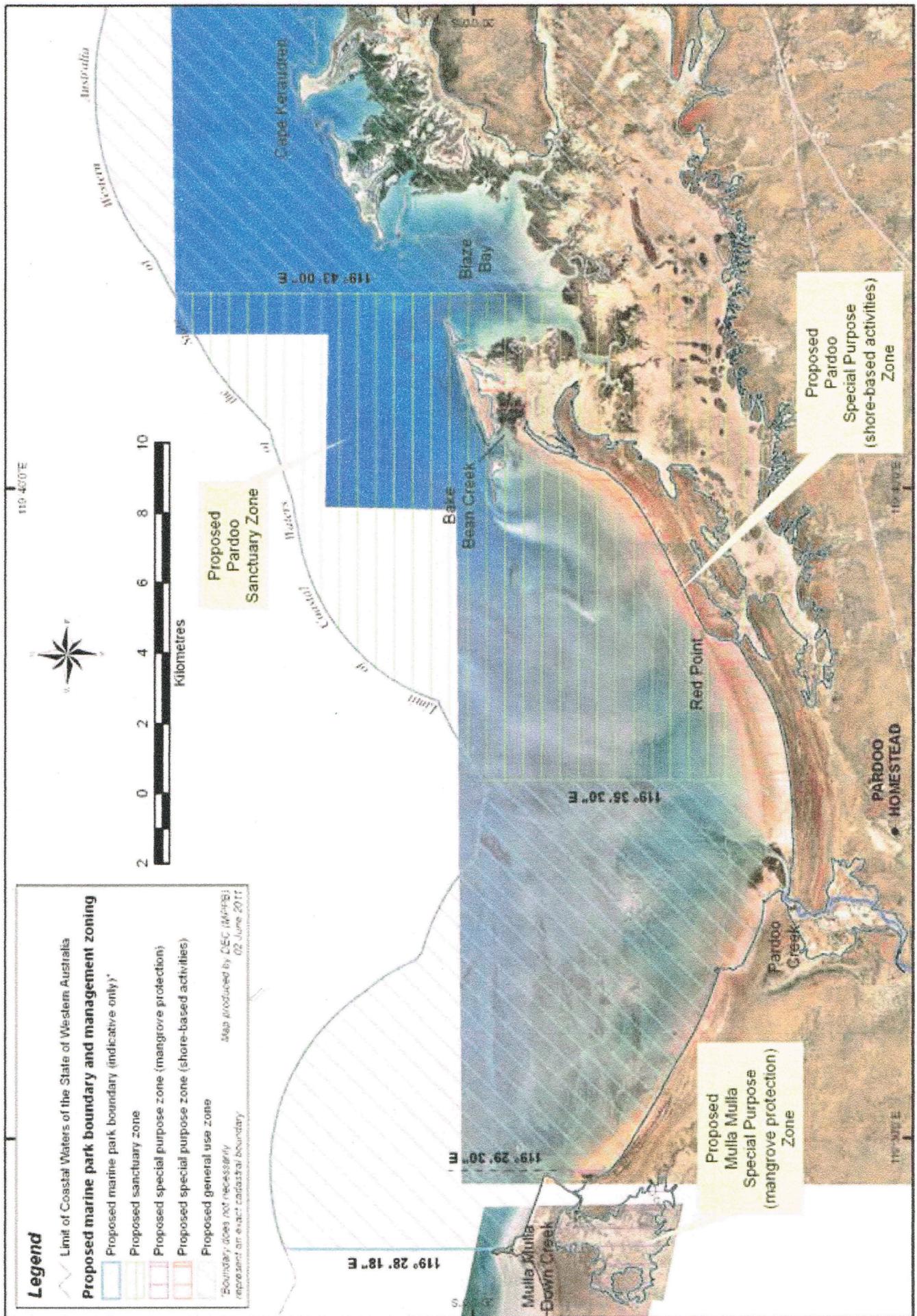


FIGURE 5: Proposed zoning scheme for the proposed Eighty Mile Beach Marine Park - Cape Keraudren to Mulla Mulla Down Creek



RESERVE # 39135

Address:	Degrey Location 64 & Pardu Location 19
Assessment:	139135
Known as:	Cape Keraudren
Purpose:	Recreation Reserve
Effective:	12 July, 1985
Annual DOLA fee:	



DEPARTMENT OF LANDS AND SURVEYS

Cathedral Avenue,
Perth,
Western Australia 6000

Your Ref. 14.1.5

Our Ref. 3219/979 CN:JG R11.17

Telephone Enquiries 3231278

[]

Shire Clerk
Shire of East Pilbara
Francis Street
[MARBLE BAR 6760]

Dear Sir,

CAPE KERAUDREN - PROPOSED RESERVE FOR RECREATION

Further to my letter of May 13, 1985 I advise for your information that Executive Council has approved of De Grey Location 64 and Pardu Location 19 being set apart as Reserve No. 39135 for the purpose of "Recreation" and issued an Order in Council directing that Reserve No. 39135 shall vest in and be held by the Shire of East Pilbara in trust for the purpose of "Recreation".

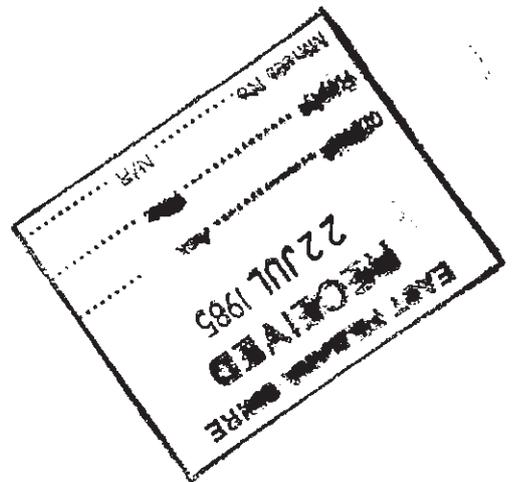
Notice to this effect was published in the Government Gazette of July 12, 1985 and I enclose a print showing the said reserve and the relevant Vesting Order.

Yours faithfully,


UNDER SECRETARY FOR LANDS

July 17, 1985

enc



L.196
L196/2
LI

LAND ACT, 1933
(Section 33)

VESTING ORDER

File No. 3219/79

I, The Honourable Sir Francis Theodore Page Burt, Knight Commander of the Most Distinguished Order of Saint Michael and Saint George, Lieutenant Governor and Deputy of the Governor of the State of Western Australia and its Dependencies in the Commonwealth of Australia, do hereby, in pursuance of the powers enabling me in that behalf, and under and by virtue of the provisions of Section 33 of the Land Act, 1933, direct that Reserve No. 39135 (De Grey Location 64 and Pardu Location 19)

shall vest in and be held by the Shire of East Pilbara

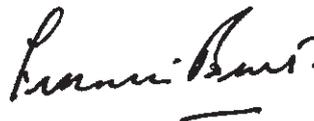
in trust for the following objects and purposes (that is to say)

"Recreation"

subject nevertheless to the powers reserved to me by Section 37 of the said Act.

Given under my hand, at Perth

this 2nd day
of July 1965



Lieutenant Governor and Deputy of the Governor

Aboriginal Liaison Report

For Pilbara Regional Council

Summary of visit to Cape Keraudren Monday 9 July 2012-07-09

Attendees

W Carr
Cliff Winfield
Vicki Winfield

Jeffrey Brown
Larissa Brown
Dean Kelly
Frank Brown
Two Brown children

Steve Bunce Ranger East Pilbara Shire

Background

Bill Carr is sub- contracted to CWA to provide guidance on Aboriginal Heritage obligations.

Desktop investigation at Department of Indigenous Affairs (DIA) revealed Native Title determination in favour of Ngarla people. The Cape Keraudren Reserve was excluded from the claim; however, there are xx registered heritage sites in the reserve. The Native Title determination Connections Report recognises the Brown family ties to the land.

Bill Carr had attempted to meet with Yamatji Marlpa Legal service to discuss the project. This meeting was cancelled at very short notice, and after discussions with others, Cliff Winfield and Bill Carr visited the Brown family in Port Hedland on June 18, the result was this field visit.

Hence the purpose of the liaison was primarily to confirm with traditional owners that proposed works at Sandy Beach and Boat launch did not require formal heritage or ethnographic surveys. Secondary purposes were to reassure the Brown family that we were respondent to their suggestions on facilities, and finally to offer the traditional owners an opportunity to tell us stories which might be used in interpretation. As an aside, Shire of East Pilbara asked us to discuss the issue of fencing the reserve with the Browns.

The Field Trip

Departed with the Ngarla group from Port Hedland 8.15am, refuelled Jeffrey Brown's and Larissa Brown's vehicles. I was advised to expect this by Phil Drayson of Abbot Solutions.

It was disappointing that Steven Stewart and Charlie Coppin were not available to attend although they had been advised of the visit in plenty of time.

On the journey Jeffrey Brown told me that Ngarla does not want to deal with Yamatji any further and now has Gavin Mclean of McLean Legal as their lawyer. He advised that they were having trouble in getting the Connection Report from Yamatji.

We arrived at Pardoo Service Station at 9.45am and met Cliff and Vicki Winfield. We drove to the Ranger Station and met Steve, the Shire of East Pilbara Ranger.

We observed the interpretation shelter at the Ranger Station. It was noted that there should be recognition of the Pananykurra clan's connection to the Cape Keraudren area.

Kurtumburrana (Cootenbran or Cootenbrand) Orrlya.

This is a registered site, nearby proposed works at Sandy Bay. Larissa Brown, Vicki Winfield and the young people and children did not come on the walk as Jeffrey was concerned they may see items they should not.

We examined the swale between dunes in the Kurtumburrana area. It was decided that the most likely place for the soak was some 280m east of the road (19 58' 07.4"S 119 47' 06.7"E). 15cm below the surface the sand was moist. This area was in a distinct hollow. This location is significant as the O'Connor and Veth report (1985) indicated that this soak gave its name to the Cape Keraudren peninsula.

Dunes to the South of the soak were visited and had extensive shell middens of with some baler and conch shell and two grinding stones were observed.

While inspecting the area, Jeffrey Brown recounted the story of how the Ngarla gained fire. An octopus (Munmulgurra) tried to drag a burning pile of sticks from Solitary Island but just before they were hauled beneath the waves a chicken hawk grabbed a burning stick. He advised we check with Steven Stewart (Number 2).

Warramurrunga Nyuka

This is currently a rundown walk trail, and a candidate for upgrade should a PRC grant application to Lotteries West be successful. The area is recognised by the Ngarla as a flying fox increase site. However there was no concern about any of the members visiting the site. Jeffrey Brown knew of no current ceremonial activity at this location.

We first visited a gap in the mangrove shore of this flying fox and little bat habitat (19 57' 58.1"S 119 46' 40.6"E). The lagoon was very attractive with *Rhizophora stylosa* and *Avicennia marina*.

Steve advised that little bats and flying foxes come in their hundreds when the fig fruits are ripe. UWA has conducted mist netting here. Jeffrey indicated that not only are the flying foxes good eating they are also medically beneficial as they only eat fruit.

We drove around to the western side of the lagoon noting the extensive middens of *Terebralia*. Ribs, possibly of a dugong, and coral fragments are cemented into the calcarenite on the south western shore. It was noted that some of the ribs had been prised from the rock (19 58' 07.9"S 119 46' 49.1"E).

On driving back to the main track we stopped and discussed the potential for an interpretive board and car park and start of a walking track (19 57' 56.1"S 119 46' 32.1"E) rather than continuing to have a vehicle track to the western shore of the lagoon. This was seen to be desirable. It was suggested to the Browns that old people could still be driven around to the western side if necessary but this did not seem to be important.

Boat Ramp

This location (19 57' 41.6"S 119 46' 07.9"E) was visited on the NW coast and there were no concerns about upgrading the location for day use.

Fenceline

We travelled south past the rubbish tip to the boundary fence line where it diverged from the reserve boundary (19 59' 24.6"S 119 47' 47.2"E). It was explained that in order to control cattle grazing on the reserve, the fence needed to be upgraded and an option was to continue the fence to the east along the reserve boundary.

Jeffrey Brown advised that there were no concerns for extending the fence unless it was off the reserve into the station. He did not want any decisions taken that would affect the operations on the station. He impressed on us that there was a good relationship with the station owners and he did not want that affected by any encroachment onto the station.

Conclusions re current proposals

- Interpretive sign at Ranger Station should be upgraded to include reference to the Pananykurra Clan
- The Ngarla connection report needs to be provided by Yamatji to the Ngarla people to assist in developing interpretation
- Kurtumburrana soak was indentified and it would be a useful point for interpretation
- Warramurrunga Nyuka although recognised as an important increase site was not regarded as an area of concern for general visitors and a walking track and interpretation with car park were supported
- The boat ramp upgrade was not a concern and there were not any locations of significance to the Ngarla people.
- Extension of the fence line on the southern boundary of the reserve was not a concern to the Ngarla as long as there was no incursion into the station.

Next stage of consultation

If additional funds are secured through the trails grant, further consultation will be made with the Ngarla regarding interpretation information. Mr Steven Stewart and Mr Charlie Coppin will be organised to participate. The incentive to have them to come would be visiting sites north of Pardoo that may still hold ceremonial boards.

W Carr
9 July 2012

R O'Connor and PM Veth 1983 Report of the ethnographic and archaeological survey of Cape Keraudren and adjacent areas of Pardoo Station West Australia.

DECLASSIFIED
PA/HO Department of State
E.O. 12958, as amended
August 6, 2007

MEMORANDUM

THE WHITE HOUSE
WASHINGTON

~~CONFIDENTIAL~~

~~MEMORANDUM FOR THE PRESIDENT~~

FROM: Henry A. Kissinger

SUBJECT: Cape Keraudren

In the attached letter (Tab A), Glenn Seaborg reports that the U. S. and Australian Atomic Energy Commissions believe that continuation of the joint study on a nuclear harbor at Cape Keraudren in Western Australia is no longer warranted. The reason for this decision is that the industrial participant, the Sentinel Mining Company, has decided, after re-evaluation of the economics of the iron ore located there, not to participate.

The Australian government requested clearance this afternoon to release the attached press statement (Tab B) at 9:00 am tomorrow, Saturday, Washington time, announcing the termination of the project. State would like to advise the Australian Embassy by 5:00 pm today of our decision. The press release has been cleared by State and the AEC.

There is clearly no basis for continuing the project in the absence of interest by both the Australian government and the Sentinel Mining Company. The prompt release of the decision and the reasons for it at the request of the Australian government should prevent it from becoming an issue in connection with Prime Minister Gorton's possible visit next week.

The press release makes the general future comment that: "However, the United States and the Australian Atomic Energy Commissions continue to be interested in the possible use of nuclear explosions for harbour construction and will therefore continue their review of the practicability of applying this technology to other possible harbour sites in the area."

I recommend that you approve the press release.

Approve press release _____
Disapprove press release _____
Other _____

~~CONFIDENTIAL~~

1226

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

March 26, 1969

OFFICE OF THE CHAIRMAN

The President
The White House

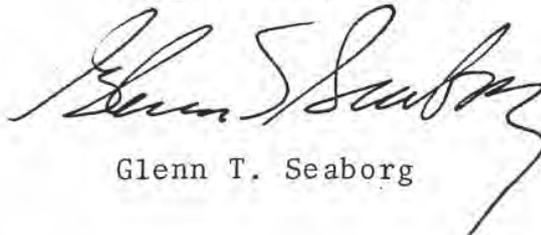
Dear Mr. President:

In light of your interest in the USAEC's Plowshare program, in particular the proposed harbor project at Cape Keraudren in Western Australia, and the forthcoming visit of Prime Minister Gorton, I would like to advise you that the industrial participant, the Sentinel Mining Company, has decided not to participate in the Feasibility Study as originally contemplated. The reason cited by the Sentinel Mining Company for their new position is a re-evaluation of the opportunities in the mining and marketing of iron ore (the principal product to be shipped through the harbor) which indicates they are markedly reduced as compared with those a few months ago. The USAEC and the Australian AEC believe that continuation of the study under these conditions is unwarranted.

In the course of your discussions with Prime Minister Gorton, during his visit next week, the USAEC believes you should express regret at Sentinel Mining's unwillingness to participate as expected and reiterate the United States willingness to participate in a similar alternate Feasibility Study.

A more encouraging note in the Plowshare program is the signing today of a contract between the U. S. Government represented by the USAEC and the Department of the Interior and the Austral Oil Company of Houston, Texas for Project Rulison. Rulison will be the second deep underground nuclear explosion to investigate the use of nuclear explosions in "stimulating" unproductive natural gas fields.

Respectfully yours,



Glenn T. Seaborg

Appendix 4

Cape Keraudren Recreation Sites – Field Notes July 2012

Cootenbrand Creek – camping area with capacity 12-15 camps if the southern creek area is used, preferred capacity 8-9 camps and there are 1 or 2 long term campers. Campers camp on the edge of the creek and there are 1 or 2 long term campers. Shore fishing and net fishing are popular in the creek. 1 bin is provided with an extra bin in peak season, these are emptied at least once a day, sometimes twice. Toilets - 1 long drop and 1 Rotaloo. Cyclone Lua washed the sand off the limestone so much of the site is no good for tents and is difficult for the elderly to walk on. The rock edge to the creek should be checked for undercutting to ensure it is stable. Day visitors access the creek for fishing, particularly bait fishing (swimming is not common) and they need somewhere to turn as there is only one road in. Fencing is in place to prevent dune access. The southern section of the creek is signed 'no camping' but people still camp there. The camp is relatively sheltered and it is only the southern area that is readily visible from other parts of the reserve. The cow fence, east of the creek does not extend across the creek and animal tracks indicate animals are coming round the end of the fence on the east side of the creek.

Eighty Mile Beach - Camping used to occur on the sand spit stretching onto Eighty Mile Beach, now access is restricted by a fence and the area is for day use parking. Approximately 5 – 10 4WD vehicles would fit in the fenced area depending how good they were at manoeuvring in the sand. Some day use visitors park on the northern rocky section of creek bank, if it is not being used by campers. A narrow sand 4WDrive track is retained to the small sandy beach, enclosed by rocky headlands, which are popular for fishing. This facilitates access by the elderly and retains a short beach 4WDiving experience. Visitors come here hoping to swim and need to be advised of the limitations and risks. Beach combing, fishing, shell collecting and mud flat walking are also popular.

Sandy Beach Camp – has capacity for 20-21 camps, with 7 or 8 long term campers. The camps overlook Sandy Bay with the front row on top of the single fore dune, other camps are set behind this, lower down the grassy slope which slopes down from the dune. Good for families with the sandy beach and rock pools etc. There is some shelter from the easterly wind, but the camps set up along the top of the dune are still very exposed. Day visitors access the beach by a central track, other camps have their own tracks (only 15 – 20m in places and they seem relatively stable. Toilets - 1 long drop and 1 Rotaloo with a sullage disposal unit and 1-2 bins. A gravel road guides visitors through the area but many are still unsure where to camp. There are 2 entry roads which facilitate driving through the camp. Cows wander through the area at night causing damage.

The Mangrove Lagoon – The attractive mangrove edged lagoon is the focus for a walk trail on vehicular tracks. There are a couple of old signs but no other infrastructure, though nearby Sandy Beach camp could be used for parking.

Boat Ramp Camp – this overlooks Boat Ramp Bay/estuary with the boat ramp set in the centre of a steep rocky bay near the mouth of the estuary on the east side. The camps are set above the steep shore, and in places, on the top of low cliffs. The ground slopes away from the cliff top/shore edge so the camps set back from the cliff top do not get such good views of the bay. It is very exposed to

the east wind with the sand being blown out from under the tyres of the parked vans at times. Those at the northern end may get some shelter from nearby dune ridges. There is capacity for 25 to 30 camps, with up to 45 vans if there are groups, with vans closer together. The areas near the boat ramp that are used year round are generally bare of vegetation, elsewhere the buffel grass comes back in the wetter summer months. There are 2 Rotaloo Toilets and 1 long drop. Bins are provided and regularly emptied, including a bin specifically for fish offal which is set by the fish cleaning table and boating regulation signs. Fishing and boating are the main activities. The boat ramp extends down the shore to the water line, but when it is mid tide vehicles drive on to the reef to launch and retrieve their boats from a nearby channel. The ramp can be hazardous in a NW wind. The area is also popular with day visitors who often park at the site of the Ince's old hut at the northern end of the camp, if they are not launching a boat. The gravel road ends at Ince's hut site, and then a sand track continues to the next headland where it branches and drops back to the main road through a gullied out section (it lines up with the east wind). Caravans prefer to park on the east side of the track to reduce the dust blowing into their vans, despite the track, with all its traffic then being between them and the view. The southern, elevated section of the camp is known as Nob's Hill.

Mosquito Ridge - 1-200m further south of Boat Ramp Camp, has about 9 camps (no long term camps) with another 2 down on the foreshore. It has no toilets (though there are concrete bases for them which need to be kept covered) and 1 bin. The site is really an extension of the Boat Ramp Camp with an extension of the foreshore camp sand track looping back to the gravel road. As it only gets seasonal use on the ridge, the buffel grass recovers in summer and needs mowing each year to create the camp. This camp is particularly evident in many views, particularly those from the entry road. It is also exposed to the east wind. Fishing and boating are popular activities.

Col's Beach – Named after a long term camper in the area this site is separated from the Boat Ramp Camp and the Cape Camp by low ridges. It slopes gently east towards a tidal flat bay with sandy beaches mixed with rocky shores. The panoramic views take in the sweep of Eighty Mile Beach in the distance. Nob Hill vans are fairly prominent but only the tops of the vans in the adjacent camps can be seen. There are only bins here, no toilets so campers must bring their own, but this is not mentioned on signs. Access is via a single lane track (that has a rocky section?). Up to 15 vans can camp either side of the main track, up to another 6 on a second track closer to the beach and a third track just above the beach to the south will take 6 more, giving a capacity of approximately 27. This southern area has a long term camper and the beach is good for children. A couple more long term campers are in the main area. Day visitors may use the main track on their way to the cape and the rabbit proof fence site, a destination for day visitors, is at the northern end of Col's Beach on a small headland.

Rabbit Proof Fence Lookout – the remains of the northern end of Rabbit Proof Fence No.1 can be seen extending northwards across the tidal flats at low tide, from a small rocky headland between Col's Beach and Cape Camp. There is a large sign that was bent over in the recent cyclone, which commemorates the fence. The potential parking area by the sign is often used by campers, which can intrude into the panoramic view from the site.

Cape Camp – North of Col's Beach, over a small rocky ridge the track divides and up to 8 camps can be on the level grassy area between the ridge and the ocean. There is a bin but campers must bring their own toilet. Many vehicles driving to the cape pass through this camp.

Cape Keraudren – two rough, rocky 4WD tracks terminate at a small turnaround on the northern end of the cape. Camping is not permitted but a rocky fireplace persists in the centre of the turnaround. There are panoramic views back over the headland, across Boat Ramp Bay and out to sea. There are no facilities.

Beacon Hill? - There are two high points on the cape, one behind Col's Beach and the Cape Camp, the other closer to Boat Ramp Bay. There are rocky 4WD tracks to both of them and panoramic views. The Col's Beach hill is thought to be the geodetic reserve, but this needs confirming. The WW2 lookout is also likely to be close by.

Mosquito Creek Boat Launch – there is no camping at this site (confirmed by a sign) and its main function is as a boat launch, for small boats into the tidal creek. The informal turning, backing area has a firm limestone base covered with white sand. Boat trailers were not observed parked there but there would be room for one or two. Vehicle access along the creek is restricted by a fence and apart from the boat launch site the creek is screened by mangroves. Access is via a single lane, firm, sandy track loop; this could be made one way by appropriate signage at the site.

Firewood Creek Boat Launch – this site is to the south west of the main recreation across tidal flats, and so is only open seasonally. Access on the site is constricted by a number of fences and the launch access appears to be inundated daily, making the area muddy and slippery. There is a rocky outcrop east of the creek from which there are panoramic views of the area. There is evidence of the need for a toilet in the area. There may be an opportunity to expand this into a day use site, providing a destination for those wanting to explore the reserve and learn more about the area.

Salt Flat Golf Course – this seasonal facility is created by placing temporary flags, holes etc. on the salt flat. A small gravelled area on the southern end of the causeway which crosses the flat is suitable for two vehicles to park and is marked with bollards.

Ranger's House and Entry Station - all visitors pass through this site going in and out of the reserve. The road through the site is sealed and divides to give an entry bay with information shelter and other signs. Visitors are required to stop and pay entry fees, and there are speed humps and traffic signs to regulate traffic. A works yard is on the west side of the approach to the entry station and this has a sullage point and tap for use by visitors and a water trailer, tank and other stored materials. The ranger's house which has associated services such as mast and storage container, overlooks the entry station, yard, approach road and the reserve as a whole.

Point Poolingerina – the western edge of this point is in the Cape Keraudren reserve. It is thought to be a destination for fishermen who want to fish in Blaze Bay. Visitors may travel by boat from Boat Ramp Bay to the point or vehicle access may be available via Pardoo station. This area has not been assessed as part of this plan. It will be in part of the proposed Pardoo Sanctuary Zone of the proposed marine park and therefore extractive activities such as fishing will not be permitted.

Bossut Islandor Western Island

Middle et al refer to the headland between Boat Ramp Bay and Blaze Bay as Bossut Island, and note that it is the highest conservation area of the reserve and is a recognized turtle nesting area. Access is by foot at low tide across the tidal flats or by boat at high tide. Fishermen are known to occasionally access the area.

North West Highway / Cape Keraudren Road Intersection Information Bay – The parking area located on Cape Keraudren Road just before a cattle grid, has information about Cape Keraudren Reserve. There is a sense of arriving at the reserve even though the visitor is still 8km away from the reserve.

APPENDIX 5 VISITOR RESEARCH

There is a considerable amount of information available about caravanning and camping, including information specific to coastal camping in the northwest of Australia. The importance of caravanning and camping and associated scenic driving is acknowledged in the recent draft Tourism 2020 Strategy where this is a key component of increasing tourism in regional West Australia.

The wealth of research available means it is beyond the scope of this plan to comprehensively review all the information and research available but the following information was considered to have some relevance to Cape Keraudren.

Ningaloo Visitor Experiences

The Ningaloo Destination Modelling (NDM) project is a collaborative project between researchers from seven universities and the Sustainable Tourism Cooperative research Centre (STCRC) focused on assisting tourism planning in the region. It is part of the Ningaloo Collaboration Cluster of projects and sits within the CSIRO Wealth from Oceans Flagship and is funded by STCRC and CSIRO. Ningaloo Collaboration Cluster Final Report No. 3 is dated 8 June 2011 and is referenced below

Jones, T. et al, (2011) *Ningaloo Collaboration Cluster: Socio-economics of Tourism*, CSIRO and Curtin University,

Socioeconomic research at Ningaloo indicated three major visitor experiences were being sought

- The Comfortable Visit – required a higher level of infrastructure and facilities, sightseeing were important, they were older visitors, were unlikely to fish and were often from interstate.
- The Nature Lover – younger visitors staying for short periods, unlikely to fish but interested in most other nature based activities and were happy to pay for them and were often from overseas.
- The Fishing Escape – older visitors, staying for a longer period of time, interested in fishing and lower spending than other visitor groups. This was popular with West Australians and some interstate visitors.

Appendix A2 of the above report *Ningaloo Coast Remote Campers: A Comparison of Preferred Campsite Attributes and Activities* which presents an element of Anna Lewis' doctoral research indicates there are some attributes that are very important to most campers along that coast and other preferences that are location specific. Lewis notes "the top four most important campsite characteristics ...were 'campsite close to the beach', 'minimal litter', 'price' and 'distance to neighbour campsite'". Other important attributes were 'toilets provided', 'generators allowed' and 'dump point for sewerage'.

The attribute that was least important to most campers was 'fresh water showers provided'. The other most common, location specific, least important attributes were 'dogs allowed', 'boat launch facilities/access' and 'campsite not exposed to wind or sun'. The other common least important attributes were 'toilets provided', 'well defined paths/campsite areas', 'generators' and 'dump point

for sewerage'. So what is most important for some groups of campers is least important for other groups of campers.

Rangelands NRM Coastal Camping Report

Refer <http://www.rangelandswa.com.au> accessed on 17 August 2011

This study extended from Carnarvon to the Dampier Peninsular and focused on the management of coastal camping and achieving environmental outcomes. There was a focus on the Ningaloo area, probably based on the above research. There was limited specific information on coastal camping for the East Pilbara as even the limited information that was available applied to the whole of the shire. However there was considerable analysis of user groups across the entire study area, some of which appeared relevant to Cape Keraudren.

The following are extracts from the report.

'Camping was found to be a highly valued social activity for both residents of and visitors to the region.

Campers' 'strong ethic of environmental stewardship was closely linked to their sense of community and belonging to camping areas. Importantly, those campers who tended to stay at low cost campsites that had few regulations governing their activities often demonstrated a stronger ethic of environmental stewardship and also sense of community and belonging. These campers were most likely to be involved in environmental protection and rehabilitation efforts. Increasing the regulation of these camp sites, which would result in increased costs for campers, would cause these environmental stewards to be displaced. This could potentially have significant negative consequences for environmental management in the Rangelands coastal area.

Tightening the regulation of coastal camping sites and developing well serviced camping nodes was found to have resulted in an increase in short term visitors being attracted to those sites. Visitors to such sites usually had a low level of connection to place and rarely participated in volunteer environmental conservation efforts.'

The report identified four user groups

- '• Grey Nomads
- Recreational Fishers – local residents and visitors
- Surfers and Windsurfers
- Four Wheel Drive Tourists

The term 'grey nomads' generally refers to people aged over 55 years who travel for extended periods of time, have mixed budgets but are generally price conscious as the majority have low incomes (Tourism Western Australia, 2009). Statistical trends indicate that over the next decade, as the 'baby boomer' population retires, this segment of the tourism market is likely to grow. Indeed, over the last decade in the Rangelands there has been a steady increase in grey nomads visiting, and moreover, an increase in the number visiting coastal camping locations.

Grey nomads who visit the Rangelands coastal area can be, simplistically, divided into three groups. These are:

1. Long term, repeat visitors based in a single location for some months. This group can be separated into two subcategories. The sub-categories are:

- a) those who stay at caravan parks
- b) those who stay in bush camps

2. Short term repeat visitors based at a single location for up to a month a year. Again, this category can be separated into two subcategories. The sub-categories are:

- a) those who stay at caravan parks
- b) those who stay at bush camps

3. Mobile, once-off visitors travelling from place to place along the coast. These visitors mainly use caravan parks and formal campgrounds.'

Recreational fishers can be from a variety of user groups, shore or boat fishing and it appears that the practice of catching a freezer full of fish is less common these days.' Evidence also suggests that fishers who participate in this type of fishing tend to locate at caravan parks or well serviced camping grounds, and do not locate at remote bush camping sites. Limited power supplies and active monitoring by fellow campers deter fishers from over-fishing'

Surfers and windsurfers do not occur at Cape Keraudren.

Four wheel drive tourist were classified in accord with the CRC Desert Knowledge which 'identified four wheel drive tourism as a significant emerging industry in remote Australia. Three main types of four wheel drive tourism have been identified. These are:

i) The 'activity seeker' who use four wheel drives to get access to places where they then participate in other activities such as fishing, bushwalking and surfing.

ii)The 'group explorer' who likes the cultural aspects of being in the bush and in places where other people would not normally go.

iii) The 'thrillseeker' who seeks to test the capabilities of their vehicle and driving skill.

All of these types are active on the Rangelands coast, and are linked in one way or another with coastal camping.'

Caravan and Camping Research

Understanding the Caravan Industry in WA a research report by Tourism WA undertaken in 2007 identified the following visitor groups to caravan parks

Travellers

- Grey Nomads – older age group (55+) on an extended trip often including travel to other states in Australia

- International travellers – overseas visitors typically staying in caravan park accommodation to afford a longer holiday
- Freedom seekers – typically younger interstate travellers or older travellers staying for a shorter period of time

Holidaymakers

- Families – family holidays with children
- Winter drifters – older age group (55+) intrastate visitors taking an extended holiday within WA
- Intrastate holiday makers – intrastate visitors who are typically younger, travelling intrastate on their trip or having a short getaway.

The research indicated there had been an increase in visitor nights and occupancy of caravan parks between 1994 and 2006, and suggested that this trend would continue. Other trends noted were

- The number of caravan parks closing
- The trend for the remaining caravan parks to get bigger
- The trend for more cabin accommodation
- The trend for self contained rigs which require fewer facilities
- The possible trend for fewer families to have expensive caravans, due to lack of space to park them and the significance of the financial outlay.

The top factors important to visitors when selecting a caravan park were

- Cleanliness of amenities
- Friendliness of operator
- General appearance of the caravan park including cleanliness and landscaping
- Visitors apparently expect to 'get what they pay for'

Since this research was completed the Global Financial Crisis has occurred which may have reduced the number of overseas visitors and increased the likelihood of an overseas holidays for some Australian user groups. Or it may mean that more families are selecting cheaper camping holidays. Another consideration is that the last of the baby boomers (those born 1945 to early 60's) are approaching retirement and once they have completed their Grey Nomad trip there is likely to be a decline in this user group.

A 2011 consumer report was commissioned by the Caravan, RV & Accommodation Industry of Australia (CRVA) and was independently conducted by Alliance Strategic Research (refer <http://www.roadahead.com.au/caravanning/caravanning-by-numbers/>).

<http://www.crva.com.au/wp-content/uploads/2013/05/Industry-Research-Report-2011-For-Email.pdf>

Key findings include:

- 85% of Australians have visited a caravan holiday park at least once in their lifetime.
- 7% of Australians intend to buy a caravan or other RV product in the next two years.

- 73% agree that caravanning and camping holidays are easy to organise and plan.
- 57% believe that these holidays are very good value compared with other types of accommodation.
- The internet is the starting point for consumers when researching holidays, with 69% of respondents expecting online booking facilities.
- Location, security and cost are the most important caravan holiday park features to visitors.
- each accommodation type appealed to different age groups, with cabins favoured by those aged over 35 years, tents by younger age groups, and caravan usage being most common in the 50+ market.
- increased visitation to caravan holiday parks by married couples and family groups since 2008

Appendix 5

Notes on Coastal Camping and Accommodation Options near Cape Keraudren

The camping and accommodation options in the vicinity of Cape Keraudren were briefly assessed in terms of

- site type;
- site manager;
- proximity to beach, inland water body or other natural attraction;
- degree of naturalness;
- access and distance from Cape Keraudren;
- fees for powered and unpowered sites;
- general layout (geometry and zoning into use areas);
- approximate number of sites;
- approximate size of individual sites;
- facilities and activities available (showers, toilets, washing machines, BBQs, restaurants, shop, recreation facilities, etc.); and
- dogs, campfires and ATVs.

The assessments made were to give a general understanding of the context of the Cape Keraudren area and were not intended to be assessments of quality, appropriateness or any other value judgement. The assessments are generally based on a very brief site visit with supplementary information taken from websites. Reference was also made to the main Roads of Western Australia publication 'A Guide to Roadside Amenities and rest areas on major routes in Western Australia'.

De Grey Bridge

NB. No camping or accommodation at De Grey Station Homestead

Site Type – Road Side Stop on the east side of the De Grey River at a major bridge.

Site Manager – Assumed Main Roads Western Australia (MRWA)

Access—directly off the Great Northern Highway, onto an unsealed open area, with tracks going down to the river. 80 km from Port Hedland and 85km to Cape Keraudren.

Proximity to beach – Adjacent to the river, but the closest beach would be Tijila (approx. 10 km east of Shellborough) approx. 50 km away via very rough 4WD tracks.

Degree of naturalness – it is a natural site with significant shadey stands of mature eucalypts along the river bank. The highway traffic would be a constant source of noise and disturbance and the open areas and recreation facilities would also detract from the naturalness.

Fees - Free, it is not supposed to be a camping area but campers have stayed there for many years, some becoming long term campers.

General layout – informal, with tracks and sites made by campers

Approximate number of sites – approx. 30

Approximate size of individual sites – sites are not defined

Facilities available –sealed vault toilets, shade, picnic tables, wood BBQs, rubbish bins, sullage point,

Dogs allowed, cooking campfires provided for, no restrictions on ATVs etc.

Shellborough and Tidjila

Site Type – Informal coastal recreation area, camping and day use (fishing)

Site Manager – pastoral station to 40m above High Water Mark (HWM), and Unallocated Crown Land (UCL) below that which means there is no manager. Tidjila is proposed marine park below HWM.

Access– rough and often boggy, unmanaged 4WD tracks, link approx 50km back to the Great Northern Highway. The site is approx 120km from Cape Keraudren and approx 150km from Port Hedland by vehicle.

Proximity to beach –Campers camp on the sandy beach at Tidjila, behind the primary dune. They also camp in the shade of introduced trees at Shellborough, just back from the beach in the grasslands.

Degree of naturalness – they are natural sites with a remnant jetty at Shellborough with remnant introduced trees, and access tracks being the only introduced elements.

Fees – Free

General layout – informal, with tracks and sites made by campers and fishermen access fishing spots

Approximate number of sites – approx. 30

Approximate size of individual sites – sites are not defined

Facilities available –none

As it is unmanaged land there are no restrictions on dogs, off road vehicles and campfires (except for the Bushfires Act conditions).

Pardoo Station

Site Type and Location - Working station with caravan, camping and holiday accommodation. Approx 130km north of Port Hedland.

Site Manager – Pardoo Station

Access – approx 15km from Great Northern Highway along a formed, unsealed road. Approx. 60km from Cape Keraudren by road and 25km ‘as the crow flies’. Visitors can access the cape by 4WD and boat along the coast.

Proximity to beach – approx 4 km by station tracks

Degree of naturalness – Homestead atmosphere with mostly eucalypts for shade trees and irrigated grass. Areas grazed by cattle adjacent to the caravan park.

Fees -Powered site \$35 per night (2 adults) \$15 per extra adult, \$ 5 per child between 5&12 years, weekly rate \$210.

Range of built accommodation

General layout (geometry and zoning into use areas) – Organised site with clear signage identifying ‘streets’. A degree of regularity to the layout, but not overly geometric. Grouped into different accommodation types.

Approximate number of sites - approx. 80 camp sites with capacity for approx 60 more, approx. 80 units plus 4 self contained houses.

Approximate size of individual sites – unknown, assumed similar to other parks approx 10m x 15m, some separated by trees, in newer areas separated by log railings.

Facilities available – Cold beer, general store, great fishing (as per entry sign), 24 hour power, showers, toilets, sullage dump, washing machines, BBQs, restaurant, shop, camp kitchen, pool, volleyball court, gym. No generators, no fish cleaning (clean in creek or on beach).

Dogs – welcome on a lead. No campfires observed. No restrictions on ATVs

Pardoo Roadhouse

Site Type and Location – Roadhouse, tavern and caravan park accommodation. Sealed Great Northern Highway accesses the site and it is, 150 km from Port Hedland and 460km from Broome.

Site Manager - Private

Distance –14km from Cape Keraudren

Proximity to beach – 14km to Cape Keraudren

Degree of naturalness – surrounding environment is natural pindan woodland /pastoral station. Site is grassed with mature eucalypts on the perimeter, mixed with Australian hibiscus, figs, oleanders, palms and other exotic looking trees in the camping and accommodation area, which also has irrigated lawn areas. Unfortunately many trees were lost in the recent cyclone.

Fees for powered and unpowered sites – powered sites \$15 per person, so usually \$30 per site, unpowered sites \$12 per person, units \$100 - \$140 per night.

General layout (geometry and zoning into use areas) – Built accommodation close to roadhouse, set around pool with ablutions close by. Caravan generally rectangular layout, unpowered an open irrigated grass area, overflow areas informal non irrigated mown area.

Approximate number of sites – 20 powered sites, approx 10 unpowered sites, 15 Budget donga style accommodation (not self contained), basic kitchen facilities, shared ablutions. Sullage dump???

Approximate size of individual sites – not measured, caravan sites approx 10m x 20m from photos

Facilities available – 24 hour power, showers, toilets, washing machines, BBQs, picnic tables, bins, restaurant, shop, fuel, pool.

Dogs - allowed on leads. Campfires – not provided for but those in the overflow area had one.

Eighty Mile Beach Caravan Park

Site Type – caravan park located by the beach, with a level of amenity similar to what is found in coastal towns.

Site Manager - Family Owned Business

Access– Approx 125km from Cape Keraudren by road. A formed gravel unsealed road of about 10km links to the sealed great Northern Highway.

Proximity to beach – caravan park is behind the fore dune so is adjacent to the Eighty Mile Beach, though the beach cannot be viewed from the park.

Degree of naturalness – irrigated lawn with lush green trees and palm trees, natural Spinifex country beyond the park. Natural beach with turtle nesting in season and bird watching.

Fees for powered and unpowered sites – Powered site \$37, Unpowered \$32 cabins \$180 prices for 2 people extra persons \$7 / \$5 and \$24 in the cabins. Per Week -Powered \$245, Unpowered \$210, cabins \$1260.

General layout - generally a grid layout with different accommodation types in different area. Lawned area for groups. Separate day use car park.

Approximate number of sites – 160 powered sites, 50 unpowered sites and 10 self contained cabins with ensuite and linen provided. Disabled accessible units available.

Approximate size of individual sites – 10m x 15m marked with tyres, rocks and trees, taps and power boards.

Facilities available – 24 hour power, showers, septic toilets, laundry, BBQs, picnic tables, weekend takeaway, shop, no fuel, gas refill, war memorial, coast watch, lit fish cleaning (table, hose and bins for offal), internet and TV, telephone, rubbish bins with recycling, beach showers, chemical dump point, camper's kitchen with fridge / freezers, fresh water.

Dogs – no dogs allowed. No campfires and restricted use of ATVs etc.

24 Hour Rest Area (Stanley?)

Site Type – 24 Hour MRWA rest area set adjacent to the Great Northern Highway.

Site Manager - MRWA

Access – directly off sealed great Northern Highway on sealed internal roads, and approx 240km from Cape Keraudren via the Great Northern Highway (assuming the rest area we stopped at was the Stanley rest Area, there are no others in the MRWA brochure.

Proximity to beach – no direct beach access, beach approx 20km to west.

Degree of naturalness – Site set in natural woodland.

Fees for powered and unpowered sites – no fees

General layout - curvilinear sealed roads guide access through the site, visitors park informal off these roads

Approximate number of sites – 10 – 20 (?)

Approximate size of individual sites – sites not defined

Facilities available – composting toilets, shade shelters, picnic tables, wood BBQs, rubbish bins, sullage point,

Dogs allowed, cooking campfires provided for, no restrictions on ATVs etc.

Port Smith Caravan Park

Site Type – Caravan Park

Site Manager - unknown

Access– 23km off great Northern Highway on an unsealed, graded road, 315km from Cape Keraudren, 160km from Broome

Proximity to beach – Approx. 2-3 km to port smith creek and then further to the beach, day visitors are not allowed to visit the beach.

Degree of naturalness – palms, bougainvilleas, and large spreading shady trees, and some green lawn areas give a tropical feel to the park, which is surrounded by natural station country. Upon arrival regulatory signs indicated a strong management presence.

Fees for powered and unpowered sites - Powered site \$35, unpowered \$35 cabins \$175, budget cabins \$95, prices for 2 people extra persons \$12/ \$5 and \$25 in the cabins. Per Week -Powered \$210, unpowered \$81pp, cabins \$1260, cabins with linen, ensuite, TV and air conditioning.

General layout - grid layout with wide gravelled roads, bays marked with painted steel bollards and trees.

Approximate numbers of sites – 100 powered sites, overflow non powered area.

Approximate size of individual sites - 9m x 12m and 12-14m x 15m

Facilities) 24 hour power, showers, toilets, laundry, gas BBQs, picnic tables, park dinner Thursday nights with band, shop, fuel, gas refill, lit fish cleaning (table, hose and bins for offal), , telephone, rubbish bins, Chemical dump point (?), campers kitchen, golf course, boat tours, fish and chips.

Dogs on a lead. No campfires. No mention of ATVs etc.

Barn Hill

Site Type –Beach Side Station Stay, beachside accommodation with a country atmosphere.

Site Manager – family run, assumed to be the pastoralists.

Access– 9km off Great Northern Highway on graded unsealed road, 128 km from Broome and approx. 350km to Cape Keraudren.

Proximity to beach – 50m

Degree of naturalness – main area of powered sites has a dense canopy of large trees with lush green foliage, it is assumed they have been planted and are watered. The unpowered and overflow areas are set in the natural vegetation, a low woodland. The infrastructure reflects the informality of a station.

Fees - powered sites from \$25 - \$30 per night per couple depending of level of power used, unpowered sites \$20 per night per couple, and rammed earth huts \$100 or less depending on length of stay, dongas \$120 or less depending on length of stay.

General layout –generally curvilinear though central powered area may be more regular.

Approximate number of sites – 200 or more (guesstimate)

Approximate size of individual sites – unpowered sites 11m -15m apart about the same deep, separated by tyres or vegetation. Powered sites closer and separated by trees.

Facilities - limited 24 hour power, showers, toilets, laundry, BBQ nights, craft corner, bingo, lawn bowls, shop, no fuel, emergency gas refill, compressor, fish cleaning table, with hose and bins for offal, mail service, mobile phone reception, central rubbish bins with recycling,. Chemical dump point (?).

Dogs – controlled. No campfires and only vehicles launching boats on the beach.

Eco Beach

Site Type –luxury resort with eco friendly focus. Packages include well-being, romantic getaway, ultimate fishing, stay active and whale watching.

Site Manager – Assumed to be a private company

Access – Approx. 10km graded unsealed road off sealed great Northern Highway. Approx. 125km from Broome and 350km from Cape Keraudren. Transfers and shuttle busses are available as well as helicopter and boat access options.

Proximity to beach - less than 50m from community facilities, some villas closer others set back further.

Degree of naturalness – high degree of naturalness as the local vegetation and landform has been retained where feasible and the infrastructure sited to minimise impact. However there is still a significant footprint on the site.

Fees – dependant on proximity to beach and season. Rack rates per night, main season, are Eco Villa - ocean front \$750, ocean view \$550, garden view \$450, Eco Tents - ocean view \$250, garden view \$230.

General layout - organic layout, reflecting the landform.

Approximate number of sites – 27 Villas approx 65 sq m each and 30 Tents (permanent) approx 25 sq m both have decks and/or terraces as well.

Facilities available - ensembles, bar and restaurant, shop, activities centre - massage, meditation, fishing, cruises, kayaking, walking, sustainability tour, nature observation (whales, turtles, birds), food appreciation, kite surfing, paddle boarding and volleyball court, central BBQ with cooking facilities, marked bush walks, limited power, weddings and conferences.

Assumed no dogs or campfires, though there is a community campfire outside Jack's Bar. No mention of ATVs etc.

Appendix 7. from Indicative management plan. Table 1: Activities permitted in each zone of the proposed Eighty Mile Beach Marine Park

Activity	Sanctuary Zone	Recreation Zone	Special Purpose (Mangrove Protection) Zone	Special Purpose (Shore-based Activities) Zone	General Use Zone
COMMERCIAL					
Pearling ^a	No	No	No	No	Yes
Commercial fishing ^a	No	No	No	No	Yes
Commercial specimen shell, marine aquarium and land hermit crab collecting ^a	No	No	No	Yes ⁱ	Yes
Aquaculture ^a	No	No	No	No	Yes
Mineral & petroleum exploration ^{bc}	Assess ^j	Assess ^j	Assess ^j	Assess ^j	Assess
Mineral & petroleum development ^{bc}	No	No	No	No	Assess
Proposals for marine infrastructure ^{bed}	Assess	Assess	Assess	Assess	Assess
Pipelines (including dredging for pipelines) ^{bc}	No	No	No	No	Assess
Dredging and dredge spoil dumping ^{bc}	No	No	No	No	Assess
Charter operators - fishing ^{ac}	No	Yes	Yes	Yes	Yes
Charter operators - non-extractive (e.g. wildlife viewing) ^{cef}	Yes	Yes	Yes	Yes	Yes
CUSTOMARY ACTIVITIES					
Customary activities (e.g. hunting, fishing, camping) ^{ag}	Yes	Yes	Yes	Yes	Yes
RECREATIONAL					
Boating (motor & non-motorised) ^{ad}	Yes	Yes	Yes	Yes	Yes
Surface water sports ^{ad}	Yes	Yes	Yes	Yes	Yes
Shore-based recreational fishing ^a	No	Yes	No	Yes	Yes
Boat-based recreational fishing ^{ad}	No	Yes	Yes	No	Yes

Activity	Sanctuary Zone	Recreation Zone	Special Purpose (Mangrove Protection) Zone	Special Purpose (Shore-based Activities) Zone	General Use Zone
Recreational specimen shell collecting (dead or alive) ^a	No	Yes	No	Yes ⁱ	Yes
Recreational coral and 'live' rock collecting ^a	No	No	No	No	No
Snorkelling and diving	Yes	Yes	Yes	Yes	Yes
Wildlife viewing ^{ef}	Yes	Yes	Yes	Yes	Yes
Vehicle access (car or motorbike) ^f	No (except designated areas)	Yes	No (except designated areas)	Yes	Yes
Boat launching	No (except designated areas)	Yes	No (except designated areas)	Yes	Yes
Access to mangrove areas by foot	No (except designated areas)	Yes	No (except designated areas)	Yes	Yes
OTHER					
Navigation aids	Yes	Yes	Yes	Yes	Yes
Research ^{ac}	Yes	Yes	Yes	Yes	Yes
Anchoring (other than emergency anchoring) ^{dh}	Yes	Yes	Yes	Yes	Yes

KEY:

- a. Subject to the *Fish Resources Management Act 1994 and Pearling Act 1990*.
 - b. Subject to the *Environmental Protection Act 1986*.
 - c. Licence required from Department of Environment and Conservation and/or Department of Mines and Petroleum and/or Environmental Protection Authority.
 - d. Subject to the *Western Australian Marine Act 1982*.
 - e. Subject to the *Conservation and Land Management Act 1984 and Wildlife Conservation Act 1950*.
 - f. Seasonal access restrictions may apply in some areas during key turtle nesting and waterbird migration and feeding times.
 - g. Subject to the rights and provisions of native title holders provided by *Native Title Act 1993*.
 - h. Specific sites where anchoring is either permitted or restricted may be developed through a mooring and anchoring plan.
 - i. Only shore-based collection is permitted in this zone.
 - j. Exploratory drilling for petroleum is not permitted in this zone.
- Assess Proposal will be assessed by relevant agencies in accordance with standard procedures.

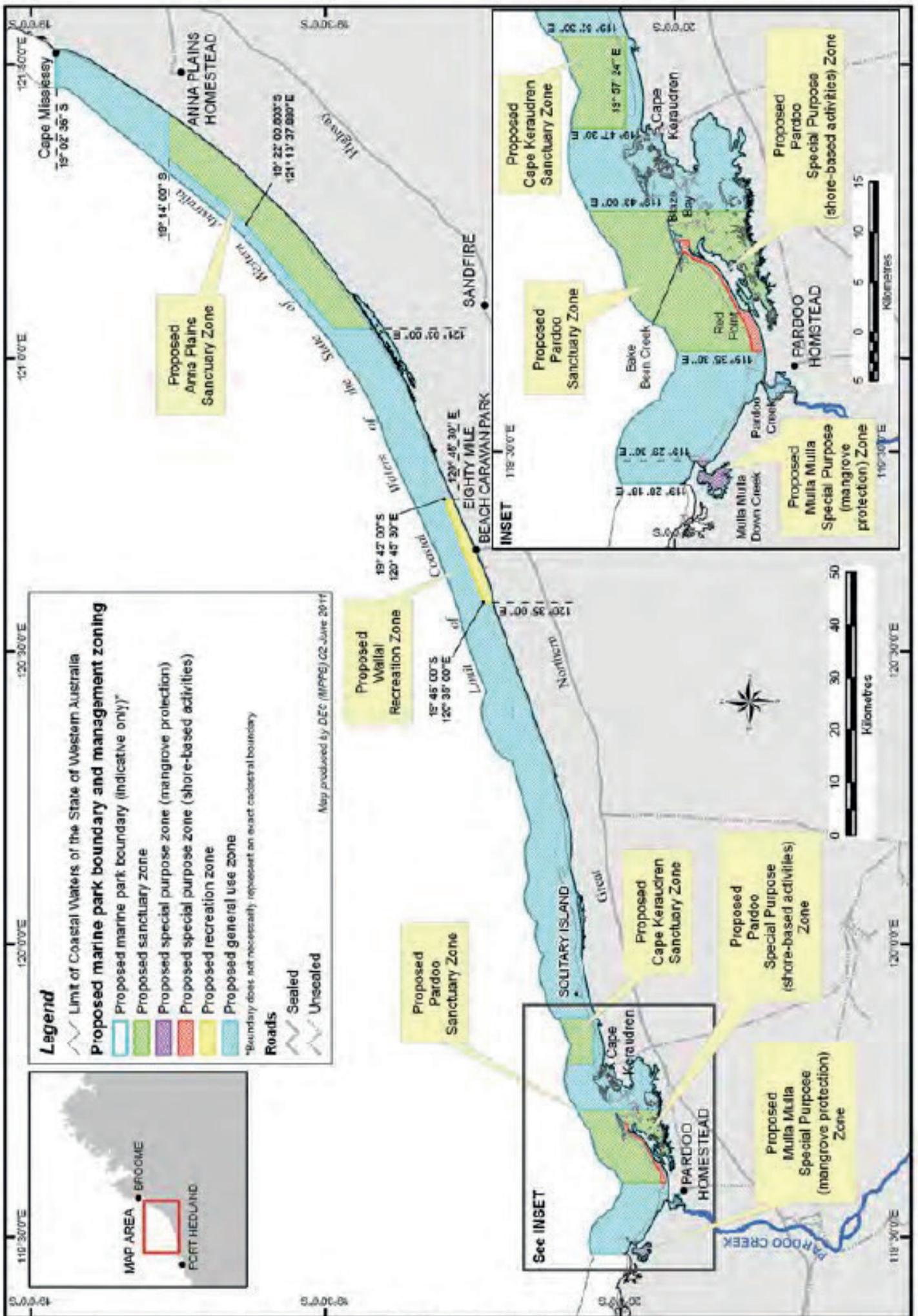


FIGURE 4: Proposed zoning scheme for the proposed Eighty Mile Beach Marine Park

Appendix 8

Public toilets in outback and remote locations of Western Australia.

Position paper prepared by Cliff Winfield & Associates, for Shire of East Pilbara, September 2012.

May be reproduced with acknowledgement.

Note: this should not be construed as product review or recommendation, rather a position statement.

For many years the standard toilet in remote areas like national parks and were “long-drops” - a pit toilet - a hole in the ground and a building on top of it. Often one or two 44 gallon drums with slots cut into them were set underground, with a pedestal surrounded by a corrugated iron or weatherboard “dunny” above. The solids accumulated and the liquids leached out. When the solids came too close to the surface, eventually the “dunny” was removed and the remnant drums covered over with earth and left to rust, and a new site started.

There are health hazards and environmental hazards associated with untreated sewage leaching into ground water, and by and large, long drops like these have been outlawed in the past 20 years. This coincided with a range of composting toilets becoming available.

The Health Department description:

Composting toilets receive and treat human waste using natural decomposition processes, usually without the use of a water flush system. Some composting toilets have electric or wind driven heating/drying units to assist with the process. A well maintained composting toilet should not smell or create a nuisance.

Wastes are retained for a sufficient period of time so that they are broken down to a safer, more stable and less offensive product. This material is not sterile and should still be handled with care.

Material from composting toilets must be buried and is not permitted to be used for the growing of fruit or vegetable plants.

As composting toilets do not remove nutrients (such as Phosphorus), they cannot be used in areas where nutrient attenuating on site wastewater disposal systems are required.

System installations are only permitted with local government or Department of Health approval

The agencies in Western Australia which manage the largest number of remote toilets are the Department of Environment and Conservation (manager of national parks and State forests etc) and Main Roads WA on their roadside rest and 24 hour stops.

Over the years these agencies have installed most brands and types of composting systems in various locations around the state, with varying degrees of durability, performance and operational success. A performance measure of a remote location toilet must be that they can function effectively, and provide a positive experience for the user, with minimal maintenance.

Manufacturers argue that most problems encountered with their products stem from overloading (wrong choice of product or size), poor installation, poor maintenance, or poor location in terms of sun/wind/drainage etc. Misuse – particularly with chemical toilets being emptied into composting systems which kills the bacterial action is an emerging major issue, but not exclusive to composting systems.

However, regardless of the reason, there have been some significant design and operation faults in many products, and they frequently fail in remote locations where they are untended and their use unsupervised. Note the Health Department stated: *A well maintained composting toilet should not smell or create a nuisance.* Attending to any duty related to fixing problematic toilets is never going to be a popular job, and this has led many on-ground managers to form, perhaps sometimes unfounded, biases against certain products. Conversely, we encounter a “purchaser scotoma” where the person who recommended installing an expensive system which doesn’t function as expected, turns a blind eye to its faults.

A variant of composting systems is the traditional sealed vault with one or more extra tanks. The original sealed vault is simply a sealed tank beneath the pedestal, pumped out when full. These have been in wide use in US Forest Service for decades or longer. The variant provides extra capacity, by placing extra tanks in series, and in some cases only liquid needs to be pumped regularly from tertiary tank/s, and solids accumulated in the primary tank far less often. Where environmentally acceptable, a leach drain can be added to make the system essentially a non-flush septic system. This system is referred to below as a MRWA Special.

Below are recent statements from agency staff:

DEC comments

“Most of the districts are opting to use sealed vaults. The ranger network has poo poo’d the hybrid systems for various reasons - and they make the management choice. If you have a sullage/dump point there is no difference. Pump a sealed vault or the pit; the same cost”.

MRWA comments

Main Roads has tried almost all types of remote toilets and have also completed exhaustive studies on what works best for Main Roads. As we operate mainly in remote parts of the State, we looked for a system that required little or no maintenance. After looking at most (named in original) commercially available systems we decided to standardise on the (named) hybrid system, or a Main Roads developed system similar. Almost all our other systems have been removed from service.

MRWA now have about a dozen hybrids and about 5 or 6 Main Roads specials. We first installed a ‘special’ on the Great Eastern Highway east of Merredin and it was quite successful so more followed. The advantage of the ‘special’ is lower cost but the hybrid is technically superior in terms of processing the waste and size of system. We still purchase the hybrids for areas of heavy traffic and high profile.

We almost always install a black water dump point at each new toilet location as we find that if we do not, the black water is either dumped in our toilet or in the bush –of course both are undesirable.

A few tips:

- Size matters – if in doubt install a larger unit as overloading means sending a pump-out truck
- Install a black water facility if you have vans parked nearby. The formaldehyde used in portable loos will destroy the bacteria in the toilet
- If at all possible, install a leach drain rather than a holding tank as this reduces servicing
- Use straight sided pedestals rather than V shaped for reduced cleaning

So, in choosing a system for use in outback situations, some key factors need to be considered:

- Visitor frequency and numbers of uses – including seasonality. The volume of liquid is the issue: the more “dry time” the more chance of a system recovering from peak use times. Most suppliers have formulae for calculating size of equipment required, but these are very arbitrary figures. Compounding this, many managers lack accurate visitation data to their sites.
- Maintenance and management capacity - on-site presence dramatically lessens many misuse, maintenance and vandalism issues with more complex systems. Conversely, the simple sealed vaults require relatively less maintenance and are somewhat vandal resistant, but may need to be pumped out more frequently.
- Site attributes, slope, soil, type, temperature and wind, and whether leach drains can be used.
- Siting in the landscape may also be an issue with some systems which have removable tanks beneath the enclosure. These structures may be highly visible in flat landscapes, with their roof lines up to 6 metres above the ground.
- Distance to cart pumped out materials, size of tanks and tankers, and availability of pump out contractors - a cost and convenience factor. No system functions if it is full.
- As mentioned above, with the popularity of on-board toilet systems in modern campervans and caravans, placing a sullage point nearby for chemical toilet waste is now critical. The corollary of that is that the more travellers have these, the less on-site toilets will be needed.
- Price – some systems can be up to twice the price of others. Also, some require more specialist installation than others – which can add significant costs in the outback.



MRWA sites with a sophisticated hybrid system (left) and MRWA Special, under construction with extra tank for sullage (centre & right).

Appendix 9.

Visitor rubbish management in natural areas in outback and remote locations of Western Australia.

Position paper prepared by Cliff Winfield & Associates, for Shire of East Pilbara, September 2012.

May be reproduced with acknowledgement.

Waste management in remote camping areas is a major issue for land managers. Visitors to national parks in the Pilbara are asked to take their rubbish out of the park themselves. Campers on the Ningaloo coastal stations are required to take their rubbish to central pits. In the commercial “station stay” camping grounds central collection points operate and visitors are required to place their bagged rubbish in covered skip bins or similar. Some camp grounds reduce volume by providing composting bins for green waste and food scraps.

Recycling is not viable in most outback campgrounds – the cost (and carbon) required to transport the recycled materials to town collection points defeats the purpose. Crushed aluminium cans may be an exception.

The nearest traveller’s bins to Karijini National Park are at Tom Price – some 120 km from the main camping areas, so park managers provide a caged, tipping rubbish trailer for visitors staying more than a day or so to leave their campground rubbish in sealed bags. The trailer is towed to the Tom Price tip when full. It is caged to prevent dingoes and birds getting at the refuse.



More modern products are available off the shelf, with hydraulic ram tipping, larger capacity, with minor modification required to make them vermin proof. As at June 2012 the cost of the unit pictured below, with modifications was around \$12 000.



Landfill

Legislative framework

The Department of Environment and Conservation (DEC) is responsible for regulating waste management in Western Australia.

The DEC administers the *Environmental Protection (Rural Landfill) Regulations 2002*.

The regulations apply to landfill sites that receive more than 20 tonnes of putrescible waste per year.

Landfill sites in this category and not exceeding 5000 tonnes per year of putrescible waste are required to be registered with DEC, be managed appropriately, be fenced effectively and subject to other requirements of the regulations.

It is estimated by the DEC that each person in a remote setting generates around 900kg of solid waste per year. The proportion of putrescible waste varies (25-45%), although it should be noted that in many remote settings most household waste would be disposed rather than recycled.

The DEC entry point of 20 tonnes of putrescible waste would seem to imply that communities with a population of or in excess of 50 people would generate enough putrescible waste per annum to require a prescribed landfill site registered with DEC. The Cape Keraudren population would not average 50 people over a year, and so should be exempt from registration.

Appendix 10

Fish offal composters in Western Australia

Position paper prepared by Cliff Winfield & Associates, for Shire of East Pilbara, September 2012.

May be reproduced with acknowledgement.

Recreational Fishing Guide (Dept of Fisheries) states 'In general boat anglers returning from a day trip are asked to land their fish whole so that they are in a form that can be measured and counted.'

Thus there is a need for onshore facilities for fish cleaning - and the removal of the resultant fish waste which very quickly starts to rot and smell, and if waste collection is say weekly, the offal becomes putrid.

Where fishermen clean their catch in locations away from regular garbage collection, the disposal of the frames and offal can be an issue. Some local governments and community groups have installed fish offal composters. There does not seem to be a proprietary product available, rather people have used commercially available components adapted to designs reputedly for disposing of game offal in South Africa. Whilst there may be more, we are aware of a fish offal composter operating at Windy Harbour for six years, and others in Onslow, and Parry Beach near Denmark.

The fish offal composters are basically giant fly traps. Vented vaults are set into the ground, with the only access through a normal closed hatch, or a very thin slot. The offal is deposited through the hatch. Flies are attracted but can only access through the slot, and cannot get out. The maggots eat the soft tissue and the residual fish bones require removal from time to time. There is potential for these systems to smell but the addition of a bacteria activator and /or installation of a biofilter attenuates this problem.

Below is a description from the Windy Harbour community

The fish offal unit was emptied on the 18th December. The tank was full of remnants of fish offal that had been reduced by the maggots over the last year. There were some initial concerns about odours from the unit when it was first installed, primarily because the unit was filled with offal within two weeks and a maggot population had not been established to be able process the large amount deposited. The following steps have been implemented since then:

- The breather pipe from the unit has been fitted to a 600ltr bio filter tank (filled with layers of woodchips and charcoal).
- The original plastic lid has been replaced with a metal lid fitted with seals.
- Bars have been fitted inside the hatch to prevent children from climbing inside.
- The inside of the unit is sprayed inside and outside weekly with a Bacterial activator to speed up the breakdown of the offal - this bacterium also prevents any odours. The bacteria are completely harmless and safe to humans or animals.



Windy Harbour Composter photo: Klaus Mueller.

Excerpt from Onslow Community newsletter:

ONSLOW BOAT RAMP — FISH OFFAL COMPOSTING UNIT

Jenko Welding has worked tirelessly to manufacture the lid for our new fish offal composting unit and it has now been installed with help of Munro Contracting. Both companies working together I believe have come up a fantastic result and a project which I am proud to be part of.



The unit is the first of its kind to be trialled in the Northwest. Other Shires and Governments Agencies have shown interest in this project and are keen to monitor its success for future inclusion in their own areas.

Entry Fee and Camping Fee Collection systems in natural areas like Cape Keraudren.

Entrance fees – overview

Four of the State national park agencies (WA, SA, NSW, TAS), charge daily entrance fees for public access to some or all of their national parks. Entry fees may be charged per vehicle, per person, or both. Some agencies charge fees for all parks, others only for more heavily visited parks. For parks where fees are charged, fees range from \$3.00 to \$15.00 per vehicle per day, and \$3.00 to \$6.00 per person per day. In Western Australia national park entry fee is \$11 per vehicle for up to eight legally seated people. Cape Keraudren entry fees are mid-range in the spectrum of fees charged across Australia.

Fee collection

For those agencies that collect entrance fees, park passes can be purchased and entrance fees paid in advance at information centres, and some shire offices. In most cases, payment can also be made at entry stations or by self-registration, or to rangers.

Camping Fees

At national parks across Australia camping fees are typically paid on site, either by self-registration systems or ranger collection. At some busy campgrounds, advance-booking facilities are available. Where advance booking applies, all fees must be paid in full prior to the date of arrival. Non-compliance is most common at isolated camping sites in parks, which do not levy entrance fees. Those attempting to avoid payment are asked either to leave the park or to provide payment.

For most parks, the estimated level of compliance to user pays fees is very high: up to 95% in some areas where self registration systems apply.

Northern Territory National Parks

Camping fees can be paid by self-registration systems, to a commercial contractor responsible for the collection of camping fees, or to the ranger in charge (RIC). In Kakadu National Park, fees may be collected by a contractor, and in these cases compliance is considered to be high (~100%). Compliance is lower (<50%) at sites where self-registration is the only means of payment. (ANZECC, 2001)

Western Australian National Parks

Entry points at some parks are not staffed. In these circumstances, visitors are asked to complete a self-registration slip with their details, enclose the appropriate fee in the envelope provided, and retain the 'tear off' receipt.

Camping fees are also paid by a combination of self-registration and ranger patrol. The estimated level of compliance by the general public to parks where a self-registration or 'honesty box' fee collection system applies is around 50 - 70%. This varies from park to park, however, depending on factors such as ranger presence, level of facilities provided and remoteness.

DEC encourages the purchase of park passes as they have become a successful means of reducing non-compliance to self-registration systems. Rangers have the authority to issue an infringement notice and a \$100 fine for non-payment of fees. However, they do not issue these, preferring instead to use a warning/education system for non-complying visitors. Under this system, a warning notice is placed on the windscreen of the car, asking the visitor to pay before they leave the park, and briefly explaining why visitor fees are collected.

The image shows two forms from the Department of Environment and Conservation. The left form is a 'Camping permit' and the right is a 'Day entry pass'. Both forms have a top section for registration details and a bottom section with instructions and the department's logo.

Camping permit

Is this your first visit to the park? Yes No Postcode: _____

Fee total: _____

Concession card type (if applicable): _____

Motorcycle \$5 Bus passenger (9 seats or more) \$5

Vehicle \$11 Vehicle with concession driver \$5

Park name: _____

Date of entry: _____ Vehicle registration: _____

Name: _____

Concession card type (if applicable): _____

Total camping fees = \$ _____

No. of nights: _____

Children: _____

Adults: _____

Camping fees: _____

No. people: _____

Fee: _____

Total: _____

Camp site number: _____

Camp ground: _____

Date of entry: _____

Vehicle registration: _____

Name: _____

Campers - please read this first

- 1 Select your camp site and take note of your camp site number (where applicable).
- 2 Complete the details overleaf (see signs for camping rates).
- 3 Detach permit, insert correct fee in envelope and deposit envelope in fee container.
● Please place the peel-n-seal strip inside the envelope!
- 4 Display permit on camp site post or attach to your tent.

Enjoy your camping experience!

Department of Environment and Conservation Our environment, our future

Day entry pass

Is this your first visit to the park? Yes No Postcode: _____

Fee total: _____

Concession card type (if applicable): _____

Motorcycle \$5 Bus passenger (9 seats or more) \$5

Vehicle \$11 Vehicle with concession driver \$5

Park name: _____

Date of entry: _____ Vehicle registration: _____

Name: _____

Concession card type (if applicable): _____

Total camping fees = \$ _____

No. of nights: _____

Children: _____

Adults: _____

Camping fees: _____

No. people: _____

Fee: _____

Total: _____

Camp site number: _____

Camp ground: _____

Date of entry: _____

Vehicle registration: _____

Name: _____

Visitors - please read this first

- 1 Complete the details overleaf (see signs for entry and camping rates).
- 2 Detach permit, insert correct fee in envelope and deposit envelope in fee container.
● Please place the peel-n-seal strip inside the envelope!
- 3 Display ticket on vehicle dashboard or visor.

Enjoy your visit

Department of Environment and Conservation Our environment, our future

Day Registration Process

- Envelopes available from a dispenser
- Envelopes would have completion instructions on them and require vehicle registration number, vehicle type, date of entry, number of passengers and concession card type. Additional information such as first visit or not and home post code could also be requested (refer DEC Day entry pass envelope).
- The day pass is detached from the envelope and placed on the dashboard.
- Fees are then placed in the envelope which is then sealed and placed in a fee pillar which is regularly emptied.
- A brochure about the reserve is also available from a dispenser.

Camp registration process

There are a number of variables associated with a camper self registration process depending on whether electronic registration is to be considered, whether the individual campsites are to be numbered or not and where the onsite registration station is located. It is proposed that the following system is trialled

- Campers staying one week or more are encouraged to pay online with BPOINT through the main shire website. They should be able to do this from their own computers or phones and should be eligible for a discount for paying this way. A campsite ID or user name (e.g. "Cape K 23", or "Cape K Cameron" is the BPOINT reference, and a digital receipt number is issued.
- The onsite self registration system should be located at the entry point to the reserve (where there is a surveillance system) to reduce the likelihood of theft.
- Using an envelope similar to that used for day passes campers can pay on the way in or enter, select a site and return to the registration station to pay.
- There will be an overflow camping area made available so that there is always somewhere for people to camp (this can be reviewed in due course)
- Those extending their stay will be required to return to the entry station to pay for their extra days (this should discourage campers from paying for an extra day at a time).
- Campers leaving should be required to leave by a set time, such as 10.00am so that it is clear that those still on site are intending to stay another night and are expected to have their fees paid.
- Campers will be required to display the receipt component of their ticket in a prominent location at their site. If sites are to be delineated and numbered a special ticket holder can be incorporated into the delineation structures (pegs or similar markers). If sites are not numbered the tickets can be made large, brightly coloured and weather resistant and be required to be attached to the camp in a location where the ranger can inspect the ticket without disturbing the campers.
- The ranger will be required to regularly empty the collection box to check all is in order and to check tickets on site at regular intervals, so campers know their tickets are likely to be checked.
- Volunteers could assist with checking tickets.

Note: since visitors don't always have correct fee denominations, a note explaining any surplus will be donated to the Flying Doctor Appeal may reduce non-compliance.



Millstream National Park Self Registration Entry Station

The pillar boxes are around \$500 each, the envelopes cost about \$0.25 each in orders of 10 000, suppliers are:

Envelope Specialists Pty Ltd, Balcatta, Western Australia, 6021

ES Wigg and Son Pty Ltd Thebarton SA 5031

Direct Envelopes Pty.Ltd Sunshine Vic 3020

Proposed communication plan for the reserve.

An option for increasing revenue on the reserve is to increase visitation by extending the range of months of camper visitation, and increase day use entries – particularly out of Port Hedland and from passing travellers. As mentioned in Section xx the approach is to optimise current levels of service and spread the visitation over more months so that extra infrastructure and management service is not required.

Suggested marketing media are;

Brochure – existing one updated and more widely distributed to visitor centres especially throughout the Pilbara.

Pictorial poster panels placed in visitor centres such as Newman, Marble Bar, Port Hedland, Broome, and roadhouses and 80 Mile Beach Caravan Park, outlining both natural values of the reserve and its unique experiences.

Web presence – both within the Shire website, discoverpilbara.com.au, and on other tourist and promotional sites and resource industry staff information sites.

However, the relatively steep day entry fee is likely to cause dissatisfaction in some visitors unless some other day-use elements of the reserve are upgraded – in particular quality of toilets, provision of shade shelter and picnic areas, and directional and interpretive signage.

Signage

Apart from directional signs, there are some essential, basic and important messages to convey to all visitors to the reserve.

A livery palette of sea/sky blue and Spinifex grey/green with ironstone brown lettering should be developed and used in all non traffic regulatory signs.

Essential messages at the highway intersection:

Sealed road for 4km, then 4 km of gravel to the fee registration post, then 3 km to coast.

Entry fees and camping fees apply

Type of camping and other facilities

Dogs are not permitted on the reserve

Only registered vehicles are permitted on the reserve; no off road motor bikes, quad bikes etc.

No off-road driving or beach driving is permitted on the reserve

Bring your own firewood. Wood cannot be collected on the reserve

Penalties apply for non compliance.

Cape Keraudren – suggested interpretation topics

Lay of the land - Other non regulatory essential information

Welcome to country

Shire message: “Your entry and camping fees contribute directly to provision of services on the reserve”

“Cape Carers” volunteers and Cape community group

Camping area map

Access map

Drive with caution on single lane tracks

Drinking water

Composting toilets (toilet paper, hand washing)

12m Rule unless by mutual consent

Emergency management procedures

Neighbourhood watch logo

Natural values

Marine Park – reason for, values, boundaries, sanctuary zones*

Fish ID *

Ramsar Wetlands - worldwide significance of 80 Mile Beach*

Migratory waders - Australasian Flyway

Birds Australia ID list

Overlapping ecosystems - where desert meets sea – where Pilbara meets Kimberley

Common terrestrial plants and animals

Mangrove ecology – rare arid area mangroves

Crocodiles & turtles*

Cyclones and meteorology

Tides currents and oceanography

Geology

Tsunami evidence in desert

*DEC and DoF have both indicated they will provide appropriate sign content.

Aboriginal themes

Dreamtime stories

How Ngarla use the area (then and now)

Octopus story (Solitary Island)

Bat season story – Mangrove Lagoon

Sand dune water point, tools, middens, diet species

European history

Explorers – Dutch, French, English, Australian (Forrests)

Pearling on 80 Mile Beach

Shipwrecks – especially Koolama and luggers in cyclones
Pastoralists
Shipping out of Condon – wool, mining etc
Rabbit Proof Fence
World War II, lookout post, Japanese bombing raids, Corunna Base
Iron ore in WA (Woodward 1893, Koolan Is 1938, Lang Hancock et al)
Mining Goldsworthy & Shay Gap
Early recreation times at the Cape – shacks, characters, legends, stories
Nuclear harbour proposal
Sealing Great Northern Highway

Behavioural messages

Condition of the reserve compared to rest of the coast, help preserve that experience. No driving off road or on beach and mudflat, firewood, reef flats, reef walking code
Camping etiquette, 12 m rule unless by mutual consent, generators, cleaning fish.
Fish for the future of the reserve – local fishers code
Launching and retrieving your boat

Hazards and dangers and what to do

Wildfire
Marine dangers - crocodiles, irikandji stingers, stonefish, cone shells
Heat stroke
Straying stock and wildlife – Cattle
Snakes, sandflies, mosquitoes, Dengue, Ross R
Tidal range – don't get caught offshore
Cyclones

Links to the other places and greater Pilbara.

Touring drives through Shire of East Pilbara – e.g.

Marble Bar via Shay Gap and Coppin Gap

Marble Bar – Carawine - Nullagine

Marble Bar – Corunna - Newman

Gorges and pools around Newman

The Western Desert trails

Karlamilyi National Park

Canning Stock Route

Directional/regulatory sign plan (suggested)

Many of these signs are in place already in non-standard, rustic or worn state. We recommend a staged replacement program, with all future signs within a set palette and design theme.

Implementation should subject to resources available, prioritised need, and in conjunction with other redevelopment. However,

* marks higher priority.

Suggest traffic signs go on lower than standard posts, to reduce windage in cyclones and because of their prominence in the flat landscape.

Plan commences at the highway and sequences to the cape

. Location	message	style	size
*Highway intersection layby	Essential Information panel as above	Interpretive billboard with shire logo	3m x 2m
*100 m from highway	No dogs, no ORVs BYO firewood	Black on yellow	2m x 1m
*At cattle grid on boundary	Welcome, registration station 500m Reverse side: Thank you, visit again	Interpretive billboard with shire logo	2m x 1m
At ranger depot	Management access only	Park livery	Type one:1.2m x 0-3m on two posts 0.5m above ground
At road divide	Keep left Speed bump	Regulatory	Standard
Shelter	Registration and essential information	Park Livery	Standard panels
*Opposite existing shelter	All visitors register here please.	Park livery	Type one
At road convergence	Keep left Speed bump	Regulatory	Standard
*At intersection approach	40km All traffic left turn symbol <Cape Keraudren	Regulatory Park Livery	Standard Type one
At T intersection	chevron///\	Regulatory	Standard
At tip road entry	Management access only	Park livery	Type one
*At Firewood Creek track LHS	<Firewood Creek 5km Cape Keraudren >	Park Livery	Type two: 2 bars, 1.2m x 0-3m on two posts

	Track closed during wet weather and high tide. No Camping		0.5m above ground Two sided.
*Cootenbrand Creek t/o RHS	Cootenbrand Creek 1km > 10 camps 80 Mile Beach day use: tent, toilet, picnic, symbols	Park Livery	Type two two sided
Cootenbrand Creek t/o LHS //	<Highway ///\\ Cape>	Park livery	Type one
Cootenbrand Ck Approach to:	Reduce speed shared zone	Park livery	Type one
Cootenbrand Ck Limit of camps	No Camping beyond this point	Park livery	Type one
At beach gate	Ramsar and Marine park interpretation	Park livery	Inclined interp panel
At Beach	Nesting area -Vehicles prohibited on beach	Shire Regulation	Standard
*Fish tail intersection (until modified)	<Highway Cape> : boat launch, tent symbol	Park Livery	Type one
*Sandy Beach t/o RHS	Sandy Beach>: tent, toilet, dump point, symbols	Park Livery	Type one two sided
Beach access point	Marine park interpretation	Park Livery	Inclined interp panels
Sandy beach Second t/o	<Highway ///\\ Cape >: boat launch, tent symbol	Park livery	Type one
Mangrove Walk parking bay	Mangrove Walk Trail: Walk, wildlife observe symbols	Park livery	Type one two sided
Mangrove trail	Interpretive stories – Aboriginal importance	Park Livery	Trailside inclined interp panels (6 -10)
Mosquito Creek t/o	< Mosquito Creek 2km: Fishing, symbol	Park livery	Type one
Mosquito Creek road split	<Mosquito Creek 2km: Fishing, symbol Mosquito ridge	Park livery	Type two

	overflow camping > (no toilets)		
*Col's beach t/o RHS	Cols Beach and Cape: tent, lookout, byo toilets	Park livery	Type one
Col's beach t/o //	///\\ Boat Launch: tent, boat ramp, picnic, toilet symbols	Park livery	Type two
Cape track t/o	<Cape Keraudren: 4WD, fishing, camera, no camping symbols	Park Livery	Type one
Col's beach beach sites t/o	Beach front x camps	Park Livery	Type one
Cape Camps track	Cape camps, 4WD, byo toilets	Park Livery	Type one
Rabbit Proof fence day use area	Rabbit proof fence, WW2, whales, staircase to moon interp	Park livery	Inclined interp panels x2
Day use shelter on Inces corner Boat launch area	No camping Interpretive stories Walk trail to Cape>	Park livery	Interp panels x6 Type one
Boat ramp	DoT, DoF, advisory Warning on tides and walking the mud flats	Agency Regulatory	Standard Inclined interp panels
Cape Keraudren end of track	Cliff risk area	Park Livery	Standard ! hazard

Cape Keraudren Reserve - Visitor Survey 2012

Cape Keraudren Reserve is managed by the Shire of East Pilbara with guidance from a management plan. The Shire has engaged Cliff Winfield & Associates to prepare a revised Recreation Management Plan with a focus on

"maintaining and protecting the unique natural and cultural features of the reserve for future generations, whilst providing a range of sustainable recreation experiences for visitors".

To better understand your needs as a visitor now and in the future we ask you to spend a few minutes filling out this visitor survey.

PRIZE FOR YOUR TIME

You may choose to remain anonymous, but if you leave contact details you will be eligible to receive one of two \$100 vouchers awarded to the most informative responses, redeemable at Pardoo Roadhouse or Retravisation anywhere in Australia.

Your details will remain confidential and no third party will have access to your contact details and you will not receive any junk mail as a result of participating.

Date you arrived.....

How many in your vehicle? adults children

What are the ages of people in your group? - age number

under 15

15-20

21- 35

35-55

Over 55

Day visit or overnight stay? (tick)

If overnight, how many nights do you intend to stay?.....

What is the home postcode or town of most people in your group?.....

If you are not from the Pilbara:

Where did you stay the night before you arrived?.....

What will be your next stop?.....

How did you find out about visiting Cape Keraudren? (You can tick more than 1 box)

Previous visit Word of mouth Road signs Internet/app

Tourist publication Visitor Centre advice Information bay Traditional knowledge

Other.....

If you are camping or caravanning what type of rig do you have? (tick)

4WD & caravan 2wd & caravan Campervan with toilet (eg Winnebago)
Campervan 4wd (eg Brits) Van (eg Wicked) 4WD & Camper trailer
2WD & Camper trailer 4WD & Tent 2WD & Tent
Converted bus, Semi-trailervan
Other.....

Approximate length of van/campervan/tent?.....

Do you use a chemical toilet?Do you have an on-board shower?..... or do you have an outside shower tent?.....

Do you use a generator?.....Do you require ground space for solar panels?.....

Do you have any additional vehicles with you? 4WD, Motor bike, Bicycles(tick)

Does your rig include a boat?Less than 5mOver 5m

Car topper..... or with licensed trailer.....?

If you are group camping, how many vehicles in your group (include caravans and boat trailers).vehicles.....trailers.

What are the main activities your group will pursue whilst you stay at Cape K?

(tick more than one)

shore fishing, rock fishing, boat fishing, walking,
cycling, bird watching, nature study, sightseeing,
boating, reef walking, socialising with friends, beaching
swimming, other.....

What would you say the three main reasons for your visit are?

1.....
.....
2.....
.....
3.....
.....

If you are a return visitor, what is the main reason for your return and roughly how many times have visited?

.....
.....

Do you have likes or dislikes of current visitor service arrangements such as toilets, campsites, rubbish management, fish cleaning, fish stocks, ranger services, fees, fishing regulations etc?

.....
.....
.....
.....
.....
.....

If this is your first time, what do you like about the place and will you recommend Cape K to others.....

While you are here do you use mobile phone.....or internet.....

Do you have a campfire at Cape K....., if yes, where do you get your wood from?.....

Any other comments?

.....
.....
.....
.....
.....

Thank you.

A PRIZE FOR YOUR TIME

You may choose to remain anonymous, but if you leave contact details you will be eligible to receive one of two \$100 vouchers, redeemable at Pardoo or Retravision anywhere in Australia awarded to the most informative responses received by September 20, 2012.

Contact: Mobile number, e-mail or postal address.....

.....
.....

Hand your completed form back to the ranger, or ask for a stamped addressed envelope.