NATIONAL PARKS AND NATURE CONSERVATION AUTHORITY

NPNCA AND CALM VISIT TO BARROW AND THEVENARD ISLANDS 8-11 SEPTEMBER 1997

1. General

1.1 Introduction and acknowledgments

Barrow Island and Thevenard Island are both nature reserves vested in the National Parks and Nature Conservation Authority (NPNCA) for the purpose of conservation of flora and fauna. Because of its responsibility to the public for the land vested in it, the NPNCA is obliged to take a concerned interest in all happenings that may affect its functions and duties as defined in the *CALM Act*. This report summarises the results of the visit to Barrow and Thevenard Islands by two members of the NPNCA, Marion Blackwell (Deputy Chair) and Graeme Rundle, and two CALM staff, Andrew Burbidge (WATSCU) and Fran Stanley (Pilbara Region).

West Australian Petroleum Pty Ltd (WAPET) have oil and gas production facilities on both islands. They have held a petroleum lease over the majority of Barrow Island since 1967 and lease a portion of Thevenard Island from CALM. The NPNCA considers that the series of visits to these islands are of great importance because they provide the opportunity for direct contact between the Authority, CALM and WAPET.

The NPNCA wishes to thank WAPET staff for their hospitality and the interest in and support of our presence shown by all personnel. In particular, we would like to thank Stephan Fritz, Gordon Innes and Alan Latto for giving us the opportunity to discuss matters openly and frankly and providing the means for site visits. We would also like to thank Stephan, Luke Ulstrup and Lionel Taylor for organising and assisting with the spotlight surveys. Zuwa Omoregie, WAPET's Assets Manager, was visiting Barrow during our visit and met NPNCA members and CALM staff. He also accompanied us on a spotlight survey.

1.2 Cyclone Events

A number of severe tropical cyclones have affected the area since the NPNCA's last visit in October 1995. The most severe of these was Olivia which passed directly over Barrow Island on 10 April 1996. Winds at Barrow exceeded 200 km/h and recorded rainfall was 231.6 mm. However, the Bureau of Meteorology has indicated that actual rainfall may have been around 500 mm. Many of the facilities on the island were damaged or destroyed. Environmental impacts included the destruction of many large termitaria, erosion of beach systems and a large storm surge from the east, which carried debris many metres inland and killed areas of vegetation.

2. Barrow Island Management Issues

2.1 Induction

We were impressed with the thorough and informative induction given to new staff and visitors to the island. We were also impressed by the general staff concern for the environment. It was felt that some minor improvements could be made to the induction to clarify environmental issues:

- generally, we felt that the emphasis of the induction had moved away from the environment and that both the conservation issues and the dangers of the environment could be emphasised more.
- the words "nature reserve" should be included when describing the legal status of the island. Currently, Barrow Island is referred to as an "A class reserve".

- the blue-ringed octopus should be mentioned when talking about marine hazards. This animal is common on the intertidal areas of the island and can kill.

- the resin on the buds and fruit of *Grevillea pyramidalis* can cause an ultrasensitivity to light. This danger should be highlighted either during the induction or by placing warning signs in areas where this plant occurs.

2.2 Data

We appreciated access to a number of environmental, technical, and management reports which were made available for use during our visit.

2.3 Rehabilitation

Good progress has been made with rehabilitation on the island. This has been enhanced by the succession of good seasons the area has experienced. A report on seismic rehabilitation by Dr Libby Mattiske indicated that rehabilitation was progressing well and that "the floristic and structural composition of the seismic lines is approaching the pre-disturbance composition". This work indicates that in *Triodia* hummock grasslands foliage cover rather than species diversity may indicate the climax community. The methods used to prepare seismic lines - ripping, blading or slashing - do not appear to have differential influence upon regrowth. However, the results indicated that environmental considerations both before and after seismic work have improved since 1987. We noted that rehabilitation of borrow pits and 'lease' areas was likely to result in different vegetation associations developing compared to the original vegetation of the area, due to changes in soil properties.

2.4 New 'Leases'

WAPET is currently constructing 26 new leases and reusing two leases as part of an infill drilling program. The introduction of a new policy to attempt to reduce the amount of earthworks, and hence visual impact and amount of rehabilitation, as well as to reduce interference with drainage, is to be commended. We will be interested in the results of a trial drilling of two deviated wells, one of which is to reduce cut and fill and the other to avoid an H_2S seep.

2.5 Waste Management

WAPET is to be commended on the considerable reduction of metal waste being stored at the old airport site. Simms Metal are now directly responsible for removal of scrap metal and other recyclable and non-recyclable items. This results in a reduction in landfill requirements. Progressive clean up of cyclone debris is also occurring, although some still exists in more remote areas. An "emu bob with a chopper" might be one way to detect remaining debris.

Aluminium cans are not being recycled at present, but are being burnt in the "Tiger Cage", then crushed and buried in the landfill. WAPET is investigating ways of recycling this material through NW Catering Services and Simms Metal. It was recommended that the recycling of steel cans and some plastics also be investigated, and that transport of these materials to Perth be investigated through Energy Trucking.

Lined pits for liquids and sludge disposal and evaporation have replaced unlined pits since the Authority's last visit. The commissioning of the liquids disposal pit resulted in the added advantage of a reduction of the size of the flare pits at all compressor and waterflood stations. These areas are being rehabilitated. The sludge disposal pit replaced two unlined pits and options are being investigated with the DEP for mechanisms of oil degradation and disposal of the sludge. The use of these new facilities has resulted in a decrease in the amount of leakage of oily waste into surface water, reducing possible effects on the stygofauna.

WAPET is to be commended on the management of the R73 landfill. Considerable progress has been made at this site since the Authority's last visit and we were impressed with the site's tidiness.

2.6 Reuse of Gravel

WAPET is continuing to source gravel through reducing lease sizes and recycling gravel from unused leases. However, a requirement remains for new gravel. It was suggested that the many abandoned well sites could provide a source of gravel and that these sites should be rehabilitated progressively to reduce the amount of work to be done when the field is decommissioned. WAPET should investigate whether such sites can be progressively reduced in size or decommissioned.

WAPET have identified 27 flora species which are geographically restricted or poorly known. These species are avoided during earthworks including gravel extraction and this action is to be commended. This list should be updated periodically through consultation with CALM, and WAPET should put their name on the mailing list for updates of CALM's Priority Flora List.

It was felt there was a need to identify areas of *Triodia angusta*, which occurs in conjunction with gravel deposits, and protect some undisturbed areas from any future disturbance. It was suggested that Libby Mattiske could advise on optimal locations.

2.7 Quarantine

WAPET quarantine procedures have been revised and made more user friendly with the incorporation of a table of actions versus responsible party. This has increased understanding of the procedures at the grass roots level. It was suggested that Talon® wax blocks in a bait station be used instead of flour trays in containers shipped from the mainland (and from Thevenard and Varanus Islands). The bait stations could be returned to Perth for reuse, while the baits could be reused or disposed of on the island. Advantages of this method include ease of handling, which saves time, and the fact that any rodents present are killed rather than just detected. Flour trays should be maintained in the warehouses on Barrow Island. WAPET and CALM should consult further on this issue.

It was noted that changes have been made in suppliers and location of mainland warehouses. There are also many more contractors on the islands than in the past. WAPET checks the contractors for compliance with quarantine procedures. Concern was expressed at the lack of a washdown facility at Dampier. It was suggested that staff from CALM's Karratha office could visit the facility at Dampier and discuss quarantine options with the staff.

Changes have also been made to air transport arrangements with Barrow Island becoming the hub for Thevenard, Varanus and Airlie Islands. Concern was expressed at the possibility of movement of mammals (mice in particular, but also native species) and weeds between islands. It was suggested that all visitors to Barrow island be made aware of these possibilities and that care should be taken not to carry weed seeds on socks or in trouser cuffs.

The suspected introduction of a cat to Barrow Island earlier this year demonstrated the need to continually educate people on the island regarding the importance of notifying someone of a possible sighting of a feral animal. It was suggested that general awareness of this issue be raised, particularly in areas where feral animals are most likely to be seen, for example the landing and warehouses. However, it is very pleasing to note that once notification had occurred, WAPET procedures handled the situation quickly and efficiently.

2.8 Terminal Tanks

As noted above, the old unlined sludge pit has been replaced with a lined pit. Although a fence has been placed around the pit to prevent animals falling into it, the gap under the gates is large enough to enable small mammals to enter. Fences also need to be erected around the sumps on each tank to

exclude animals. These items were brought to the attention of WAPET on site and action to rectify the problem was initiated immediately.

Tank 302 is to be decommissioned and removed in the near future, after an inspection of the floor revealed extensive corrosion. WAPET is proposing to construct a berm in its place to deflect any spill from tank 301 or 305 into a naturally low area. A new firewater tank has also been installed in the terminal tanks area.

2.9 Ballast Water

Ballast water is no longer accepted on Barrow Island and WAPET is continuing to request that ships comply with the international voluntary guidelines regarding exchange of ballast water at sea. This issue is being handled at both the Commonwealth and International levels and WAPET should keep abreast of the latest developments in this field.

2.10 Fuel tanks

The above-ground bunded diesel fuel tanks have been completed and to the company's credit there was no evidence of contamination from the old below ground tanks. A new diesel supply system has been initiated whereby diesel is transferred to a tank at the landing and then piped to the Base. This system will reduce the chance of accidental spills.

2.11 GIS and Mapping

It is pleasing to note the production of a GIS map of Barrow Island, which includes vegetation types, environmentally sensitive areas, such as Boodie warrens, turtle and seabird nesting areas, and infrastructure. A copy of this map has been supplied to CALM in both digital form and hard copy. The incorporation of this information into the Oil Spill Contingency Plan is to be commended and has improved this database immensely.

2.12 Report of the Marine Parks and Reserves Selection Working Group

The production of a draft document supporting the reservation of the marine area surrounding the Montebellos, Lowendals and Barrow Island under the *CALM Act* by the Australian Petroleum Producers and Exploration Association (APPEA) was noted.

The Authority also noted that with the proclamation of the *Acts Amendment (Marine Reserves) Act* and the formation of the Marine Parks and Reserves Authority and the Scientific Advisory Committee, it was no longer responsible for marine reserves in WA.

2.13 Produced Water Disposal

The new deep injection disposal system is due to come on-line in early 1998. Glass reinforced epoxy (GRE) flowlines have been installed to carry water to a central facility for injection. While it was noted that the option for disposal of produced water into the shallow Cardabia formation has been retained, this is only for emergencies and is estimated to reduce the amount of water disposed in this way to a very low percentage of the total. Injection of produced water into the deep strata will be of considerable benefit to conservation of the stygofauna and WAPET are to be commended for putting this system into place. It was also noted that the groundwater monitoring programme is being expanded and redesigned in conjunction with DEP.

2.14 Stygofauna

A report produced by Dr Humphreys indicates that the stygofauna of Barrow island and Cape Range, while similar to each other, are dissimilar to the fauna found in other parts of the world. It was noted that some species of stygofauna are now listed on CALM's Priority Fauna Lists, including a Blind Snake discovered on Barrow Island, while other species have been removed from the lists. WAPET have offered support to Dr Bill Humphreys to continue to explore the caves on Barrow Island, including a proposal to dive in Ledge Cave. Concerns were raised over disruptions caused to fauna through diving in such caves and it was decided to allow diving for scientific purposes only. This recommendation will be included in the Barrow Island Interim Management Guidelines document.

2.15 Fire Fighting

It was agreed that it would be of limited value to allocate resources to fire management on Barrow Island, other than to continue to suppress fires that occur. It was noted that large fires of many hundreds to thousands of hectares would be preferable in managing vegetation seral stages than small fires of tens of hectares.

2.16 Barrow Island Interim Management Guidelines

This document is in late draft stage and has been produced through consultation between CALM and WAPET. NPNCA/CALM would like to see WAPET sign the document and endorse both its production and the recommendation held within it. WAPET suggested that an endorsement could be written into the preface. It was decided that CALM would approach WAPET formally on this issue.

2.17 Environmental Management System (EMS)

WAPET have produced an Environmental, Health and Safety System that integrates environmental management into the safety management system. The majority of WAPET documentation and procedures have been reviewed, including safety training courses, such as Job Safety Analysis, Incident Investigation, etc, to include environmental examples and considerations. WAPET have also developed an Environmental Hazard Register for Thevenard and plan to develop one for Barrow Island. The company also plans to develop an Environmental Awareness short course for 1998. All work groups have been briefed on the EMS.

3. Thevenard Island Management Issues

3.1 Induction

As on Barrow Island, the induction is thorough and informative. We feel it would be useful to mention that WAPET leases the area on Thevenard Island from CALM.

3.2 Navigation Beacon

An unauthorised track was cleared to the navigation beacon when the power supply was installed. Rehabilitation of this track is progressing well and it is pleasing to note that *Acacia coriacea* is suckering.

3.3 Crest Wells

Rehabilitation of this site has been postponed until 1999 pending possible drilling in 1998. It was suggested that this area could be used for seeding trials for difficult species such as *A. coriacea* and *Sarcostemma australe*. Buffel grass control will also have to be initiated to prevent its invasion of this site.

3.4 Ward Reef

Rehabilitation at this site is continuing to progress slowly. However, research carried out by Murdoch University scientists indicated that the original cement stabilisation was not affecting the physical and chemical properties of the soil and there was no reason why rehabilitation should not be successful. Seed collection of problem species has been undertaken and trials using a layering technique to promote regeneration of *S. australe* has been carried out.

3.5 Spectral Quality of Light Sources

Research undertaken by Peter Hick and Kelly Pendoley looking at the spectral qualities of light sources on Thevenard Island indicated that the flares may influence hatchlings at close range on nights when there was no moon. However, the influence of the moon appears to override that of artificial light sources.

3.6 Gas Flaring

It is pleasing to note that the Authority's concerns over the large amount of gas being flared are being addressed. A new compressor has been constructed and will enable excess gas to be used for gas injection. This will reduce flaring by 30-80%.

The pit flare has been upgraded to allow increased flaring and a new tulip flare has been installed for emergency use only. The original tower flare is being decommissioned and the majority of the structure should be removed in the near future.

3.7 Weed Control

WAPET are to be commended on the continued removal of kapok plants from the lease area. A patch of kapok recently discovered on the nature reserve was also removed the area will be monitored for regrowth.

Buffel grass is continuing to spread over the island. However, WAPET have initiated some control spraying around the camp. An excellent kit has been compiled for WAPET by Astron Environmental to aid in the identification of buffel and native non-target grasses on Thevenard Island. The company is also investigating what assistance it can provide to the team from Kings Park and Botanic Garden who are currently researching buffel grass control techniques on Airlie Island. CALM is hoping that a scientist will be appointed in the near future to conduct research on buffel grass.

A number of sow thistles (*Sonchus oleraceus*) are still present in the camp area. However, spraying of this weed is occurring in conjunction with the buffel grass control.

A large *Acacia pyrifolia* plant was also noticed in the camp area. This plant had flowers and seed pods on it. There appears to be some confusion as to whether this species should be removed from the island. It was recommended that WAPET remove the pods from this plant and any others and that CALM investigate further whether removal is necessary.

Doubt exists whether *Triodia* sp. is native to Thevenard Island. WAPET and CALM are to investigate whether this species was found during the original survey of the island and whether or not it should be removed.

3.8 *Mus/Leggadina*

WAPET are to be commended on the provision of support for PhD student Dorian Moro who has been researching the ecology of *Leggadina* and possible control techniques for *Mus* on Thevenard Island.

The company also supported a translocation of *Leggadina* to Serrurier Island. The presence of *Mus* continues to be a problem for Barrow Island's quarantine programme.

3.9 Drilling Programmes

Saladin C is due to be drilled in the near future. This well is very close to reefs on the southern side of Thevenard Island. WAPET are negotiating the method of cuttings disposal in order to reduce the impacts of smothering on this sensitive ecosystem.

The Saladin 5, 6 and 11 lease is located on the eastern end of the island and consists of a concrete stabilised area with infrastructure associated with the three wells. Due to the mobility of the sand in this area, the edge of the lease is constantly being eroded and rubble is falling into the ocean. WAPET have used sand collected from the south side of the island in the past to build up this portion of the lease and it is likely that this practice will continue. Permission will be needed form CALM on each occasion.

3.10 New Construction

A new chemical storage area has been constructed at the landing area since the Authority's last visit.

The old sewage system has been replaced by a more efficient system with larger capacity. The ocean outfall is no longer used for sewage disposal. This material is now piped to leach drains which have been constructed on the island, reducing possible contamination of the marine environment.

3.11 Tank Floor Replacements

Tank floors inspections in 1995 revealed the floor of T121 needed replacing. WAPET took the decision to replace floors in all three tanks over three years. However, following a suspected leak in April 1997, the tank floor replacements were brought forward and all three tanks now have new floors. Cathodic protection and leak detection were also installed during this process.

3.12 Mackerel Islands Lease Conditions

After their last visit to Thevenard Island in October 1995, the NPNCA requested that an Environmental Management Plan be prepared for the Mackerel Islands Holiday Resort addressing concerns such as lighting, weeds and quarantine. An EMP was prepared in 1988. Since then, regional CALM staff have visited the facility and produced a report on the history and current status of this part of the island.

The EMP document is now out of date and needs to be reviewed. It is suggested that regional CALM staff liaise with Mackerel Islands to review and update this document. Quarantine is of particular concern. In the past, WAPET have transported equipment and supplies from Onslow to Thevenard for the resort resulting in strict quarantine procedures being applied to everything coming onto the island. However, WAPET have recently transferred their onshore operation to Dampier and Mackerel Islands are now transporting their own supplies weekly from Onslow.

Liaison is also needed between CALM and Mackerel Islands regarding access to the nature reserve beaches. It was noted that a new track was present across the dunes from the Crest 4/5 lease to the beach on the northern side of the island. It is assumed that resort staff are using this track to unload the vessel when the winds are unfavourable for unloading on the southern side. Use of this track is degrading the dunes in this area.

WAPET have been using a portion of the Mackerel Islands lease for a construction camp. Use of this camp is soon to be discontinued and WAPET have offered the buildings to Mackerel Islands for their use. If they do not take up this offer, WAPET will decommission the camp. This option would be

preferred by the NPNCA as continued use of the buildings will increase the pressure on the surrounding nature reserve and on Mackerel Islands' resources.

4. Major Recommendations

Barrow Island

4.1 Once finalised, the Interim Management Guidelines should be used as a management tool for Barrow Island. Amongst other actions arising from this document, the fauna monitoring program will be revised and expanded and the management of recreation sites will be reviewed.

4.2 Areas of *Triodia angusta* need to be identified for long term protection from gravel mining.

4.3 WAPET should investigate the use of Talon® wax blocks in containers shipped from the mainland and from Thevenard and Varanus Islands.

Thevenard Island

4.4 CALM's Pilbara Region should upgrade Mackerel Islands' Environmental Management Plan in conjunction with the resort manager. Issues to be addressed include quarantine, lighting, access to the nature reserve, weed control and other matters of importance to nature conservation.