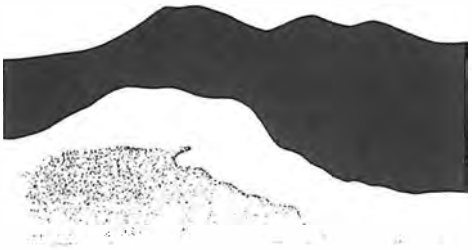

NATIONAL PARKS AND NATURE CONSERVATION AUTHORITY

REPORT ON VISIT TO BARROW AND THEVENARD ISLANDS

28 APRIL 1993 - 3 MAY 1993

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1. GENERAL

1.1 Introduction

This report summarises the results of a visit to Barrow and Thevenard Islands by four members of the National Parks and Nature Conservation Authority (NPNCA), Mrs Marion Blackwell, Mr Angus Horwood, Professor Arthur McComb (Chairman) and Mr Frank Batini of the Department of Conservation and Land Management (CALM), who is a deputy *ex-officio* member.

The visit, which took place from 28 April - 3 May 1993, was one in a biennial series undertaken by members of the NPNCA and before the inception of the NPNCA, by members of the West Australian Wildlife Authority. These visits have been carried out because of the importance of Barrow Island in the conservation estate, which was recognised by its vesting as a Class A Reserve as early as 1910 (Reserve No. 11648 for the protection of flora and fauna). The largest island off the Western Australian coast, its importance to conservation lies in the large populations of species of marsupials which are rare or extinct in other parts of their former range, and in the vegetation which maintains these populations. Other values include the flora, because of its biogeographical position and isolation; protection of the islands from many impacts experienced by mainland nature reserves; the aquatic cave fauna; and a significant landscape.

Management of the reserve is of particular concern because of its use as a very productive petroleum lease, held by West Australian Petroleum Pty Ltd (WAPET). What is taking place in reserve management on the island is significant not only for the NPNCA, CALM and WAPET, but for the oil industry generally. Control by the Company of its impacts on the environment and the success of its work on the rehabilitation of disturbed areas, are relevant to the acceptability of proposals from WAPET and other companies which may impact other nature reserves.

The visits are also important to the NPNCA because they provide the only direct contact between the Authority and the Company at which issues can be directly and informally discussed, sites visited and communication improved.

1.2 NPNCA attitude

The mandate of the NPNCA requires its members to view activities on the island from a conservation perspective because conservation is the purpose for which reserves are vested in the Authority. In general terms, the Authority is opposed to mining and petroleum production on lands vested in it, but where these activities are permitted by Government the aim of the Authority is to ensure that impacts are minimised, and that plans are set in train for the time when the activities have run their course, when decisions have been taken about acceptable rehabilitation and the future of facilities, and when the reserve is managed solely for conservation.

The scale of the Company's operation on Barrow Island is such that environmental impacts are unavoidable and that a continual effort must be made by the Company to seek ways to minimise and repair this damage. The NPNCA is aware that WAPET has made

conspicuous efforts to ensure that it has a good environmental record and applauds these efforts.

1.3 Acknowledgements

The NPNCA is very grateful to members of WAPET staff for their hospitality and the use of facilities. In discussions and site visits we addressed all areas of concern which had been raised by members of the Authority or the Company, and were given the opportunity to visit any sites on the Island in which we expressed an interest. The visit included an assessment of animal numbers by spotlight which has been a traditional component of NPNCA visits.

It is also appropriate to acknowledge here the signal contributions made to management of the Island by WAPET's environmental consultant, Harry Butler, whose role is now diminishing following the employment of environmental staff within the Environmental Health and Safety Section of the Company. Harry joined WAPET staff in hosting the visit by NPNCA members during their first few days on the Island.

1.4 Changing emphasis in management

We note that there has been a change in emphasis with time, in relation to the management of conservation values on Barrow Island. At first attention had been appropriately concentrated directly on the conservation of rare animals, and as detailed in previous NPNCA reports the Authority is pleased to acknowledge the marked success and deservedly high public profile of this work by the Company. More recently emphasis has shifted to include habitat, vegetation and flora, all of which are inter-related and important to animal conservation, and are important components of the Island's conservation value in their own right.

This shift is due to changing public perceptions of what is expected of management agencies, and to the broader significance of aspects of the work, for example on the rehabilitation of seismic lines.

1.5 The role of the Company

The Company acts to maximise oil and gas production while minimising impacts on the environment. It is very pleasing to see the emphasis which WAPET places on conservation in the nature reserve, for example by emphasising this at the outset of the induction process for new staff and visitors, by encouraging the ongoing interest of staff in conservation, and in the publicity which the Company clearly deserves for its achievements.

Recommendation 1

It is important to us that the success of the Company in conservation and rehabilitation is communicated effectively to government, to other industries, to the scientific community, and to an increasingly well-educated public. In this regard it is pleasing to see the rising number of detailed technical reports about environmental matters being made available for scrutiny and the Authority encourages the Company to continue this trend.

WAPET has also given significant support and cooperation to research carried out by other agencies, much of which may not be directly relevant to its fundamental role as producers of oil and gas,

and in the control of impacts brought about by these activities. This matter is addressed in greater detail under Section 3 below.

2. MANAGEMENT ISSUES

2.1 Seismic lines and rehabilitation issues

2.1.1 Flora and vegetation

As a background to understanding the impacts of proposed new seismic lines (and other land disturbances), a vegetation map of the area, together with a flora list, would be appropriate tools. Without them it is almost impossible to assess the likelihood of occurrence of rare species or those which are confined to restricted habitats. In the absence of information about the occurrence and distribution of rare flora it would be necessary to have an experienced botanist at all times walking in advance of the clearing of vegetation along each seismic line.

Recommendation 2

Much of the basic information for vegetation mapping (including the plant communities making up the vegetation) is already available. It would probably be most convenient for this to be incorporated onto a geographic information system (GIS), along with other information such as landform and soil types, in which case it should be compatible with the GIS system used by CALM and other government agencies (see 3.3 below). It may be useful to discuss the detail of vegetation mapping with these agencies, to ensure that it will meet future requirements for purposes such as impact assessment.

Recommendation 3

Similarly, much information is already available for the flora, and we understand this is already being collated. It will hopefully be possible to link the species present in an area (communities) with the vegetation map.

2.1.2 Rehabilitation

There is visual evidence for the conspicuous success of rehabilitation strategies on seismic lines, where adequate time for recovery has been allowed and current procedures in general are commended. The current onshore 2D seismic was viewed. The Committee noted the bladed lines and drilling programmes, and that lines deviated to avoid unusual features and vegetation.

We welcome the recent scientifically-based documentation of the effects on rehabilitation success of the different strategies adopted in the past, and await results of the recently commissioned consultancies of Dr R D Graetz and Dr E M Mattiske. These should provide insights into the most effective procedures under differing conditions, and from them it will be possible to derive optimal methods for future work, and increase confidence that further rehabilitation will be equally successful.

The implementation of new lines will provide opportunities for modest-scale experiments on rehabilitation techniques, and for provision of quantitative data.

Recommendation 4

2.1.3 Landform

In general, two of the most important factors for long term success of rehabilitation work are:

- contours of the reconstructed landform should be fashioned in continuity and sympathy with the surrounding landscape, before any other rehabilitation measures are undertaken. Earth dumps, straight lines and other artificial forms should be 'softened'.

- the surface of the reconstructed landform should not be 'smoothed off' but left in a roughened condition (within its regenerated physiognomy) so as to lift the wind and thus avoid large scale saltation with resultant dust formation and wind erosion of the soil surface, which can completely decimate regeneration.

It is pleasing to note that especially the more recent rehabilitation techniques are following these principles.

2.1.4 Proposals for exploration - Role of the NPNCA

Recommendation 5

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 which may affect this responsibility. It is thus happy to see and comment informally upon proposals at an early stage, regardless of how these proposals may be assessed by the EPA (see 1.2 above).

2.2 Roads and leases

The network of roads and leases is one of the major components of habitat disturbance on the Island. Over 700 wells had been drilled by 1988, and at least 650 leases and over 1000kms of roads constructed.[1]

The Authority is pleased to note that the progressive rationalisation and closure of roads is continuing.[2] This involves closing access, contouring, ripping and top soiling where this is available. Some early stages of rehabilitation were noted. The advantage is the narrow width of roads and the large edge effects which should favour reseeding into the prepared surfaces.

During the final years of the life of the oilfield substantial rehabilitation of roads will be needed. The Authority expects that these will rehabilitate successfully, but quantitative data on rehabilitation techniques could be profitably obtained on an opportunistic basis well before that time. The Authority recommends that current rehabilitation techniques and progress be documented on a regular basis (3-5 yearly).

Efforts by WAPET to standardise lease construction and size, and to re-use gravel wherever possible, are encouraging. Revegetation of leases, probably with minimal top soil will present more difficulties than roads. (One area, near to a gas well, had recently been ripped in a way which seemed to leave too many pieces of vertically-oriented rock.) WAPET recognises the need to establish further trials on a variety of sites using different techniques and to monitor

progress in relation to plant dynamics in adjacent areas.[1] The Authority strongly supports this commitment.

An important consideration in the rehabilitation of lease areas (and other areas such as gravel pits) is that the vegetation that will develop will be significantly related to the depth of topsoil over calcareous sheeting. Where possible the depth and composition of topsoil left (or placed) on leases should approximate that of adjoining areas.

2.3 Gravel

Gravel is a scarce resource, and the extraction of this commodity is currently probably the greatest disturbance activity on the Island. Such extractions could have far reaching effects:

- Because of the nature and origin of this material, extractions are usually from equivalent locations in the landscape, i.e. from drainage areas and associated alluvial flats. These niches are likely to all support the same or similar vegetation types and communities. It is important that surveys of some of these areas be undertaken whilst they are undisturbed, and that representative undisturbed samples be set aside for conservation. Also that prospective extraction areas be surveyed for rare and/or restricted species prior to commencement of extraction. We understand that WAPET has already commissioned some of this work.

Recommendation 6

The Authority is aware that WAPET is reusing gravel (as noted above) and believes this is a positive step forward in the reduction of the impact of extraction of this material. The Authority encourages WAPET to maximise the reuse of gravel and to look for other innovative ways to reduce mining of this material on Barrow Island.

As with other rehabilitation work the visual impact of the 'end' land form is a key element for success. As noted above, landform should be shaped in conformity and sympathy with the surrounding landscape.

Added to this is the need for strategies and methods to slow water flow and prevent turbidity with possible consequences of downstream siltation. In the existing natural situation, *Triodia augusta* acts in this stabilising and filtering capacity. However, soil characteristics, including moisture retention capacity and depths of the soil may be radically changed due to extraction, to such effect that re-establishment of the previously existing vegetation may not be readily achieved. This may in turn impact on the terrestrial fauna as these areas could be useful drought refuges.

The data presented by WAPET in their Environmental Review (148-153) suggest that successful rehabilitation has been achieved on some sites but that more than half of the gravel pits examined have not regenerated to match adjacent undisturbed areas. We would encourage the implementation of remedial procedures for these unsuccessful areas as recommended in their report (page 153).

Recommendation 7

The Authority agrees that leaving strips of undisturbed land in areas from which gravel is being removed appears valuable in reducing downstream sediment loss, and seems preferable to past techniques of constructing check dams across drainage lines - these are probably only needed for large disturbed areas with high potential run-off and sediment loads.

2.4 Rubbish disposal

The Authority was impressed with the incineration of food scraps, as part of a strategy to eliminate animal or bird scavenging. The method, although basic, has proved most effective, as seen by the absence of our most prolific scavenger, the silver gull, which is abundant on other parts of the Island.

Recommendation 8

The recycling of both industrial materials and cans from domestic sources was also noted. Some aluminium cans, which are currently being burnt at the incinerator, could be compacted and become part of the scrap removal programme.

The general standard of removal of rubbish and other detritus from lease areas, roads etc, was generally excellent.

The "R" block rubbish dump should be managed so that it is kept to a minimum in area and burnt regularly. The current method of pushing the burnt material to the bottom of the gully, compacting then covering with soil ready for the re-establishment of vegetation appears to be working well for this continual problem. The Authority feels that this area is being well kept.

Recommendation 9

It would be beneficial if the size of the old airport scrap collection area were reduced, in an attempt to minimise the run-off into the adjacent rehabilitating gravel pits during periods of rainfall. As this reduction in size is accomplished, an attempt might be made to slow the rate of run-off by strategically placed barriers on what appears to be a generally flat surface.

2.5 Oil spills and water disposal

The effects of past minor oil spills and small recent spills were observed during the visit. Some vegetation in these impacted areas had been killed by salt water leaks rather than oil. Decomposition of minor spills by aerobic microbial activity at the surface is an acceptable treatment.

Recommendation 10

Oil in water is discharged in the unlined flare pots at the various separator stations and is also disposed into water disposal wells and a shallow limestone cave. Disposal averages about 5500kL per day. The Committee noted that disposal into the cave has now ceased (but could be resumed in an emergency) and that there has been no detectable hydrocarbon contamination of the surrounding groundwater. The Company is examining various, mostly alternative options (your letter dated 11.3.93 refers). We wish to be consulted once an appropriate course of action has been selected.

2.6 Quarantine

Although we did not see first-hand the quarantine procedures, these were explained to us in detail, and it is evident from the vermin free status of the island that they are working.

We suggest that any personnel coming to Barrow Island to do scientific work (marsupial/bird/ vegetation counts and surveys) should be informed of the disease-free status of the fauna and flora prior to their arrival, and informed that only clean clothing and equipment should be used to help maintain this status.

The Authority has some concern about the source of fracturing sand, particularly that which we understand is from Jandakot. This could be contaminated with *Phytophthora* species and tests should be conducted to confirm the disease status of this material. The current handling procedures seem appropriate in that they minimise the spread of this sand from sealed hoppers, and allow direction of the sand - direct into bore holes. Minimising the spillage or inappropriate use of this sand should be encouraged among the staff.

Recommendation 11

Recommendation 12

2.7 Nearshore areas

The Committee inspected one of the sites where geoflex cord had been tested over a limestone platform. It is pleasing to note that local data on the effects of this technique are being collected prior to the use of geoflex in the main survey. We understand that, during the survey, any obvious or unusual effects will also be noted and recorded.

Of particular concern is the possibility of major spillages during the loading of oil onto tankers, and the Committee was briefed on these matters. Potential problems with transport to the tankers are reduced by the attention being given to moorings, to the transport pipe, to back-pressure pumps and to relevant cyclone procedures. The potential of a tanker disaster is substantially reduced by WAPET's actions in employment of its own pilots and by inspection of tanker vessels.

3. COOPERATIVE RESEARCH/INTERACTIONS

3.1 Fire management

The Authority recognises WAPET's concern at the risks associated with the use of fire as a management tool. There is no strong indication at present that this type of management intervention is necessary to protect fauna or flora values. Nevertheless, the opportunity presented by past (and future) 'natural' fires should be used to obtain appropriate data. This may involve the use of monitoring plots to record seral stages and the use of exclusion plots to monitor grazing effects from natural populations (including termites where present). Comparison of seral progression with areas mechanically disturbed (e.g. by seismic lines) will be of interest. The work concerned with the ecological effects of fire should be carried out in association with CALM.

Recommendation 13

3.2 Herbaria

Recommendation 14

The State Herbarium should examine its collection to list species collected at Barrow Island. Similarly, the Herbarium at Karratha should provide a list of Barrow Island specimens. These data should be incorporated into the revised flora list for the Island. Specimens of all species on the list should be lodged with the State Herbarium, that held at Karratha and that held on Barrow Island. CALM should provide this information from its data bases to WAPET.

3.3 Geographic Information Systems (GIS)

The Authority supports WAPET's consideration of data base systems including GIS for the storage and manipulation of data related to flora, fauna and landscape. CALM is the State custodian for certain databases and the programme is coordinated by WALIS (West Australian Land Information System).

CALM has extensive experience in these areas (hardware, software, management systems) and a collaborative approach is recommended.

3.4 Quarantine

Recommendation 15

A potential problem with serious consequences is the possible introduction of animal pathogens, for example from mainland or captive populations. Strict quarantine for all personnel entering Barrow is required, but is especially important for research staff who frequently work with live animals. Animals taken from the Island must not be returned to Barrow. These recommendations will be provided to CALM.

3.5 Collaborative Research

Recommendation 16

The Authority notes that WAPET has supported a number of research projects involving other agencies. WAPET should encourage the publication of these results whenever possible, so that they are available to the scientific community.

4. GENERAL ISSUES

A discussion was held about some more general issues concerning the management of the area, and a summary of the main points is given here.

There was discussion of management plans, since this issue had been raised after earlier NPNCA visits. It was concluded that this approach would be more appropriate at the end of the life of the oilfield when rehabilitation would be being finalised, decisions would be needed about which facilities should be retained and their potential use, and the long-term management for conservation would need to be implemented. At that stage a public advisory committee would be established and views of the wider community canvassed: this seems not very appropriate at this stage, when the public do not have access and at the moment seem unlikely to have access for many years.

On the other hand, value was seen in the development of interim guidelines in collaboration with the NPNCA and WAPET, to assist CALM

officers define the areas of their responsibility. These guidelines should also address matters of communication between WAPET and CALM. A need for improved communication had been mentioned on occasion during the visit and some of the matters referred to in the previous section could be addressed through the proposed set of interim guidelines.

Recommendation 17

The question of zoning was also raised. It may be simplest in relation to developing guidelines about referrals to have one section of the Island in which developments could take place without specific reference to the NPNCA (e.g. new wells using already-approved techniques). On the other hand, developments proposed for areas in which there has been relatively little previous impact should be routinely referred to the NPNCA. WAPET has a document relating to what needs to be referred to CALM and what does not; it was suggested this be studied and if appropriate be formally accepted by the Authority.

Recommendation 18

While it was felt that while a management plan for Barrow Island would not be well timed, a more general 'regional' plan for the entire suite of islands, including Barrow and the Monte Bellos, was a different matter because of increasing pressure for public access or for the development of petroleum facilities. Planning for the rational use of the islands would seem to be timely and have considerable value, and could include the possible placement of support facilities for more than one company on the same island, while excluding such facilities from others. It was felt that this issue should be taken up in discussion at the NPNCA.

5. REFERENCES

1. Barrow Island Environmental Review (1963-1988).

2. Barrow Island Oilfield Environmental Review Update (1989-1991).

APPENDIX 1

VISIT TO THEVENARD ISLAND

A.1. General

The Authority visited Thevenard Island on 1 May 1993, including a visit to the adjoining DOLA lease held by Mackerel Islands.

It was interesting to note several engineering design problems with environmental implications. One of these concerned the construction of a solid-fill jetty which interrupted sand transport along the coast, and which has now been replaced by a pile jetty. Another concerned the design and performance of the flare, commented on below. It also seems a pity that newly-rehabilitated dune areas must be re-excavated for additional pipelines.

A.2 Flare

An ongoing problem has been the design and performance of a flare tower, which had been designed to not emit sufficient light to impact on turtle behaviour in nearby beaches. Members noted the significant and ongoing investment of resources by the Company in this area. The main structure was not in operation at the time of the visit, the adjoining flare pit being used.

At present a very considerable amount of gas is burned off, and it is pleasing to note that this will not be necessary once the gas pipeline to the mainland is operating in about two years: after that time only a small
Recommendation 19 flare will be routinely in operation. The large pit could continue to be operated until then, subject to there being no significant effect demonstrated on turtle hatchlings: if there is an effect the flare tower should be used at the appropriate times. Once the volume of gas to be flared off has been reduced, the flare tower could presumably be used more effectively.

A.3 Weed Control

It was pleasing to see the attention given to weed control, and the success of the measures used. The Authority will also write the Chairman of Mackerel Islands lease seeking ongoing vigilance for the suppression of weeds.

A.4 Rehabilitation

This has generally been successful. Even areas of dunes which have been
Recommendation 20 rehabilitated once and then disturbed for laying of new pipelines give little cause for concern. It would be useful to conduct further work into the germination and establishment of *Acacia coriacea.*

A.5 *Mus/Leggardia*

A briefing and discussion was held about the heavy mice infestation on the Island and how difficult it is to trap *Mus* without the small native species
Recommendation 21 *Leggardia.* Options include establishing *Leggardia* on neighbouring islands (which is probably to be encouraged in any event), then intensively killing the remaining mice and so inevitably impacting *Leggardia* which, if

necessary, could be reintroduced. Other possibilities might include selective poisoning (is *Leggardia* resistant to 1080?). However it was noted that the option would be soon discussed with CALM staff with direct experience in the possible techniques.

A.6 Reporting

It is pleasing to see the documentation of rehabilitation or environmental problems set out in the Annual Report of Environmental Management of Oilfield Operations on Thevenard Island, January 1993.

APPENDIX 2

SUMMARY OF MAIN RECOMMENDATIONS

The text contains a number of comments and recommendations relevant to management, but it was felt that it would be useful to summarise the main recommendations here. They are numbered in the text (Recommendation 1, etc), and are presented below with minor rewording.

Recommendation 1 The Authority encourages the production of detailed technical reports about environmental matters.

Recommendation 2 In the absence of information about the occurrence and distribution of rare flora it would be necessary to have an experienced botanist at all times walking in advance of the clearing of vegetation along each seismic line.

Recommendation 3 It would be convenient for information on vegetation, plant communities, flora, landform and soil types to be incorporated onto a geographic information system. Detail of vegetation mapping should be discussed with the relevant agencies.

Recommendation 4 Implementation of new lines will provide opportunities, which should be taken up, for modest-scale experiments on rehabilitation techniques, and for provision of quantitative data.

Recommendation 5 The Authority would be happy to see and comment informally on proposals for exploration at an early stage.

Recommendation 6 Surveys should be carried out of areas for potential gravel extraction, with a view to ensuring that representative habitats are conserved, and that any rare and/or restricted flora be identified and protected. To facilitate retention of vegetation types, the Authority urges WAPET to maximise recycling of gravel and seek other ways to reduce extraction of this material.

Recommendation 7 The Authority encourages the implementation of remedial procedures for correcting unsuccessful rehabilitation of gravel pits.

Recommendation 8 Some aluminium cans, currently being burnt at the incinerator, could be compacted and become part of the scrap removal programme.

Recommendation 9 It would be beneficial if the size of the old airport scrap collection area were reduced.

Recommendation 10 The Authority wishes to be consulted once an appropriate alternative course of action has been selected for the emergency disposal of oil in water to the limestone cave.

Recommendation 11 Tests should be conducted to confirm the disease status of the sand brought in from Jandakot.

Recommendation 12 Minimising the spillage or inappropriate use of imported sand should be encouraged among the staff.

Recommendation 13 The opportunity presented by past (and future) 'natural' fires should be used (in collaboration with CALM) to obtain data on the possible use of fire as a management tool for protecting flora and fauna.

Recommendation 14 Data from the herbaria should be incorporated into the revised flora list for the Island, and specimens lodged at the State Herbarium.

Recommendation 15 In relation to avoiding the introduction of animal pathogens, research staff who work with live animals should take particular care, and animals taken from the island must not be returned.

Recommendation 16 WAPET should encourage the publication of results from research carried out by other agencies which it has supported.

Recommendation 17 Interim management guidelines should be developed in collaboration between WAPET and CALM.

Recommendation 18 Developments proposed for areas in which there has been relatively little previous impact should be routinely referred to the NPNCA. A document setting out what needs to be referred to CALM and what does not should be studied and if appropriate be formally accepted by the Authority.

Recommendation 19 If there is an effect of the flare pit on Thevenard Island on turtle hatchlings, the flare tower should be used at the appropriate times.

Recommendation 20 It would be useful to conduct further work on Thevenard into the germination and establishment of *Acacia coriacea*.

Recommendation 21 It will be important to continue discussions with CALM staff into the most effective method of removing mice from Thevenard.