



Varanus Island

**Supporting documentation for a
Clearing Permit (Purpose Permit) –
Fire Risk Reduction and
Maintenance Activities**

Offshore Permit TL/6

Document No. EA-60-RI-180

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1. INTRODUCTION

As part of routine maintenance activities undertaken within its DCLM lease area on Varanus Island located in W.A. state waters (offshore permit TL/6), Apache Northwest Pty Ltd (Apache) may need to disturb or remove native vegetation in order to maintain existing cleared areas around dwellings and infrastructure and for fire hazard reduction. The DCLM lease area on Varanus Island is shown in Figure 1.

In accordance with the Environmental Protection (Clearing of Native Vegetation) Regulations 2004, clearing of native vegetation requires a permit unless exemptions apply. Varanus Island is classified an Environmentally Sensitive Area (ESA) under Regulation 6 of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004; therefore any vegetation clearing on the island requires a permit.

This report supports the application from Apache Northwest Pty Ltd (Apache) for a vegetation clearing (purpose) permit from the Department of Industry and Resources (DoIR) for small-scale routine vegetation clearing on Varanus Island. This application is submitted under the *Environmental Protection Act 1986*, in accordance with the DoIR directives on information required to support a clearing permit application (www.doir.wa.gov.au/environment).

2. PROPOSED WORKS

In the past, native vegetation has been removed or disturbed as necessary within the lease to maintain access to oil and gas infrastructure and reduce the risk of fire. The area within the lease where this activity has taken place includes close proximity to accommodation units, amenities buildings, oil and gas infrastructure, underneath pipe racks and cable trays and around fuel and chemical storage areas.

These activities are managed under various Work Specifications in Apache's Planned Maintenance System. The activities covered under these work specifications include hand removal of vegetation considered a safety risk (trip hazard, fire reduction), spraying of glyphosate (marketed as "Roundup" or "Glyphosate 360") under pipe racks and cable trays and removal of any rubbish.

Areas covered by the work specifications are checked between every 60 days to every 6 months. It is important to note, that although these areas are checked for vegetation regularly, vegetation removal and disturbance only occurs if there is a need.

The following activities within designated areas within the lease on Varanus Island are proposed to be covered by this application:

- Manual removal of vegetation (e.g., hand)
- Mechanical removal of vegetation (e.g., bulldozer)
- Chemical spraying of vegetation (e.g., underneath pipe racks and cable trays)
- Disturbance to vegetation (e.g., by placement of aboveground piping for electrical and water services and associated foot traffic)
- Incineration of cleared vegetation

The designated areas where the above activities would be carried out are described in Table 1 and displayed in Figure 2.



Figure 1. Apache's DCLM lease area on Varanus Island

Table 1. Areas of vegetation that may require disturbance or removal within the DCLM lease on Varanus Island

Fig. 1 Ref	Description	Area (ha)*	Vegetation potentially impacted	Type of disturbance or clearing	Reason for clearing or disturbance
Red	Pipe work, cable trays and diesel fuel lines outside of gas plant. (e.g. photo 1)	0.33	Annuals: <i>Flaveria australasica</i> , <i>Cleome viscosa</i> <i>Tribulus occidentalis</i> Annual grasses: <i>Triraphis mollis</i> , <i>Setaria dielsii</i> , some * <i>Cenchrus ciliaris</i> Short Lived Perennials: <i>Sclerolaena uniflora</i> , <i>Atriplex semilunaris</i> , <i>Indigofera trita</i> Perennial <i>Capparis spinosa</i> , <i>Rhagodia preissii</i> - rare	Hand removal or spraying of glyphosate of vegetation 1 m either side of pipe work, cable trays and diesel fuel lines.	Fire risk reduction.
Pink	Bottom and top camp and associated pathways (e.g. photo 2)	0.70	Perennials: Vines <i>Canavalia rosea</i> , <i>Ipomoea pes-caprae</i> and less frequently shrubs <i>Capparis spinosa</i> , <i>Rhagodia preissii</i> , <i>Myoporum montanum</i> and introduced <i>Acacia ampliceps</i> Annuals: <i>Salsola tragus</i> , <i>Flaveria australasica</i> , <i>Nicotiana occidentalis</i> , <i>Cleome viscosa</i> <i>Tribulus occidentalis</i> , Annual grasses: <i>Triraphis mollis</i> , <i>Setaria dielsii</i> , Weeds; * <i>Cenchrus ciliaris</i> , <i>Sonchus oleraceus</i> <i>Tridax procumbens</i>	Hand removal of vegetation overgrowing pathways, between accommodation units and over air conditioning units.	Remove trip hazard from vegetation along pathways Fire risk reduction around living quarters
Green	Gas plants, flares and associated pipe work	4.28	Annuals: <i>Nicotiana occidentalis</i> , <i>Amaranthus pallidiflorus</i> , <i>Salsola tragus</i> <i>Flaveria australasica</i> , <i>Cleome viscosa</i> , Weeds: <i>Sonchus oleraceus</i> , <i>Aerva javanica</i> (being controlled)	Hand removal of vegetation overgrowing pathways and underneath pipe work.	Remove trip hazard from vegetation along pathways Fire risk reduction around oil and gas infrastructure
Blue 1	Sewage treatment plant (photo 3)	0.02	Annuals: <i>Salsola tragus</i> , , <i>Flaveria australasica</i> , <i>Cleome viscosa</i> , <i>Tribulus occidentalis</i> Perennial vine: <i>Canavalia rosea</i>	Hand removal of vegetation interfering with access to sewage tanks	Remove trip hazard from vegetation surrounding and in between sewage tanks Fire risk reduction around oil and gas infrastructure
Blue 2	Jet Fuel Tanks (photo 4)	0.01	Annuals: <i>Triraphis mollis</i> , <i>Cleome viscosa</i> , <i>Nicotiana occidentalis</i>	Bulldoze or hand removal of vegetation	Fire risk reduction around fuel tanks
Blue 3	Water Tanks	0.06	Perennials : <i>Myoporum montanum</i> , <i>Capparis spinosa</i> Annuals: <i>Setaria dielsii</i> , <i>Flaveria australasica</i> , <i>Cleome viscosa</i> , <i>Amaranthus pallidiflorus</i> , <i>Sida fibulifera</i> , <i>Salsola tragus</i>	Hand removal of vegetation interfering with access to water tanks	Remove trip hazard from vegetation surrounding and in between water tanks Fire risk reduction
Blue 4	Roustabout Area	0.03	Perennials: <i>Capparis spinosa</i> , <i>Abutilon cunninghamii</i> , <i>Myoporum montanum</i> , <i>Canavalia rosea</i> Annuals: <i>Nicotiana occidentalis</i> , <i>Flaveria australasica</i> , <i>Setaria dielsii</i> , <i>Triraphis mollis</i> Weeds: <i>Cenchrus ciliaris</i> (being controlled)	Hand removal of vegetation within 2 m of southern side of buildings.	Fire risk reduction around working areas
Blue 5	Pig Receiver Skid	0.02	Annuals: <i>Pilotus exaltatus</i> <i>Salsola tragus</i> , <i>Setaria dielsii</i> Perennials: rarely <i>Frankenia pauciflora</i> , <i>Myoporum montanum</i> , <i>Capparis spinosa</i>	Hand removal of vegetation	Fire risk reduction around oil and gas infrastructure
Blue 6	Control Building	<0.01	Annuals: <i>Nicotiana occidentalis</i> , <i>Amaranthus pallidiflorus</i> , <i>Flaveria australasica</i> , <i>Cleome viscosa</i> , <i>Boerhavia schomburgkiana</i>	Hand removal of vegetation within 2m of northern and north-western side of building	Fire risk reduction around control building and working area
Blue 7	Project Offices	0.02	Annuals only <i>Nicotiana occidentalis</i> , <i>Amaranthus</i>	Hand removal of vegetation within 2	Fire risk reduction around

			<i>pallidiflorus</i> , <i>Flaveria australasica</i> , <i>Cleome viscosa</i> , <i>Boerhavia schomburgkiana</i> Weeds – under control	m of southern side of buildings	working area
Blue 8	Crude Storage Bund	4.30	Very sparse vegetation: <i>Sesuvium portulacastrum</i> , <i>Euphorbia</i> species	Hand removal of vegetation within 2 m of infrastructure within the crude storage bund	Fire risk reduction
Blue 9	CPI	0.01	Annuals: <i>Flaveria australasica</i> , <i>Amaranthus pallidiflorus</i> , <i>Setaria dielsii</i> Perennial: <i>Abutilon cunninghamii</i>	Hand removal of vegetation overgrowing bund walls of CPI and pathway between CPI units	Remove trip hazard from vegetation overgrowing bund and pathways Fire risk reduction
Blue 10	Gas Power Station	0.01	Annuals only <i>Nicotiana occidentalis</i> , <i>Amaranthus pallidiflorus</i> , <i>Flaveria australasica</i> , <i>Cleome viscosa</i> , <i>Boerhavia schomburgkiana</i> Weeds (buffel Kapok)— under control	Hand removal of vegetation within 2 m of southern and eastern sides of building	Fire risk reduction
Blue 11	Chemical Storage Shed	<0.01	Perennials: <i>Capparis spinosa</i> , <i>Abutilon cunninghamii</i> , <i>Myoporum montanum</i> , <i>Canavalia rosea</i> Annuals: <i>Nicotiana occidentalis</i> , <i>Flaveria australasica</i> , <i>Setaria dielsii</i> , <i>Triraphis mollis</i> Weeds: <i>Cenchrus ciliaris</i> (being controlled)	Hand removal of vegetation within 2 m	Fire risk reduction
Blue 12	Contractor Officers	0.01	Annuals: <i>Ptilotus exaltatus</i> , <i>Setaria dielsii</i> , <i>Dactyloctenium radulans</i> , <i>Euphorbia</i> spp Short lived Perennial: <i>Sclerolaena uniflora</i>	Hand removal of vegetation within 2 m of building	Fire risk reduction
Blue 13	Painters Shed	0.02	Very sparse: Annuals <i>Cleome viscosa</i> , <i>Euphorbia</i> spp, <i>Nicotiana occidentalis</i>	Hand removal of vegetation within 2 m of building or work areas.	Fire risk reduction
Yellow	Proposed Water main to bottom camp	<0.01	Predominantly limestone outcrops	Disturbance to vegetation from 4" or 6" metal pipe placed on top of ground and foot traffic during installation of pipe	Fire risk reduction to accommodation area

*Total area of polygon minus the area of any obvious infrastructure to give an estimate of the potential area of vegetation disturbance or clearing. Digital spatial information (ESRI shape file, polygon shape, GDA 1994, Zone 50) has been supplied to DoIR with this application on CD-ROM.

Figure 2. Location of proposed clearing areas with Apache's lease area on Varanus Island



Photo 1. Vegetation under pipelines and cable trays.



Photo 2. Vegetation around base of accommodation units.



Photo 3. Vegetation surrounding sewage farm tanks.



Photo 4. Vegetation around the helicopter Jet Fuel tanks.



It is estimated that the total area covered by this permit application as outlined in Table 1 and Figure 2 is 9.86 ha, which represents 34% of the DCLM lease on Varanus Island. Note that the actual area of vegetation removal or disturbance within these designated areas per calendar year will be far less because

- the majority of the 4.28 ha covered by the gas plant and the 4.30 ha covered by the crude storage bund is unvegetated.
- estimates of the gas plant and crude storage tank areas also include all roads, pathways and the majority of infrastructure except storage tanks and control buildings,
- natural variation in climatic conditions will influence the growth of the vegetation, and
- vegetation will only be disturbed or removed if necessary.

All of these designated areas cover previously disturbed vegetation and none overlap with undisturbed vegetation within or outside of the DCLM lease.

After consultation with Sally Black, DoIR Team Leader (Northern Region), Native Assessment Branch, Apache seeks the permit to cover a period of five (5) years from acceptance so as to avoid lodging annual permit applications for works that are considered to be very minor and similar to each other.

3. SITE OVERVIEW

Varanus Island is located in state waters, 110 km north-northeast of Onslow and 120 km west of Dampier, on the North West Shelf (NWS) of Western Australia. It is part of the Lowendal Islands.

Varanus Island is listed as a 'C' class reserve (Reserve 33,902) for the protection of all plants and animals. Apache leases part of the island from the Department of Conservation and Land Management (DCLM) for its oil and gas receiving, processing and export facilities (DoE Operating licence 6284/9).

3.1 Climate

The climate of Varanus Island is arid, subtropical with two distinct seasons: a hot, wet summer and a dry, warm winter. The average annual rainfall is about 250 mm, which is dependent on the summer cyclone season.

3.2 Geology and Landform

The Lowendal group of islands are low lying limestone rock, some covered in vegetation, others being rock with few plants to be found. The formation is comprised of lime-cemented dune sand that was deposited during the Pleistocene. Outcropping occurs over much of the lease area (Parsons Brinckerhoff, 2005).

Varanus Island, named after the goanna that inhabits the island, is the largest of the 34 islands, islets and rocks that make up the Lowendal group. Varanus Island is 2.5 km long, 600 m wide at its widest point and reaches a height of 30 m above sea level (see Figure 1). Topography ranges from flat to undulating low dunes.

3.3 Hydrogeology

The uppermost aquifer is located within the Pleistocene aged sands and is unconfined. The watertable level and groundwater flow patterns are subject to tidal influence, and groundwater quality is saline. Investigations conducted in the mid-1990s found that the watertable over most of the lease area lies at a mean elevation of 1.8 m at low tide and 2.6 m above sea level at high tide, corresponding to a daily height variation of 0.8 m (Parsons Brinckerhoff, 2005).

3.4 Vegetation

The vegetation assemblages that occur on Varanus Island have been described as coastal. Six broad vegetation assemblages have been described for Varanus Island by Semeniuk (1990) (Figure 3). The assemblages have been distinguished on the basis of the relative abundance of species and/or vegetation structure. They consist of:

- Low (to 20 cm) open herbland of *Frankenia pauciflora* on exposed limestone, which is exposed to wind and sea spray and has poorly developed soil
- Low (to 50 cm) open shrubland of *Scaevola spinescens*, *Rhagodia preissii* and *Sarcostemma viminale* subsp *australe* (formerly *S. australe*) on limestone plains and ridges inland from the exposed coastal limestone
- Low (to 50 cm) open shrubland of *Sarcostemma viminale* subsp *australe*, *Capparis spinosa* and *Pittosporum phylliraeoides* on more sheltered and inland parts of undulating limestone terrain
- Open grassland of *Spinifex longifolius* on white sands of coastal dunes
- Closed mixed grassland/herbland of *Setaria dielsii* and *Amaranthus pallidiflorus* on the deeper orange sands of inland plains
- Low (to 50 cm) open shrubland of *Sarcostemma viminale* subsp *australe* with mixed grassland on orange sand particularly where it is shallow over limestone
- Disturbed vegetation within the DCLM lease

The vegetation map of Varanus Island is currently under review using a 1:3,000 aerial image of the island taken in September 2005 and field verification. This revised map is not available at the present time but will be included in the Varanus Island Vegetation Management Plan when completed.

3.4.1 Flora

Since 1999, a total of 122 species of plants have been recorded on Varanus Island and neighbouring Bridled Island in the Lowendal Island Group. No species currently listed on the Department of Conservation and Land Management's (DCLM) Declared Rare and Priority Flora List (DCLM, 2000) has been found on either island.

Several species found on Varanus Island are considered to be significant as documented by Astron (2001, 2002, 2004) and are listed in Table 2. The significant status has been applied for one or more of the following reasons:

- there are less than 2 or 3 remaining populations on Varanus Island and they occur within the DCLM lease, therefore significant in terms of local biodiversity and for maintaining original species composition on the island
- the species is at the extreme limit of its known range
- species is not abundant on the island and is known to be difficult to regenerate
- species has not been fully determined.

The majority of the plant species located in the proposed areas for clearing or disturbance are colonising or invasive species that readily inhabit degraded and previously disturbed areas. Perennial shrubs are isolated occurrences within these areas.

A Vegetation Management Plan for Varanus Island is currently in preparation by Apache.

Figure 3 Vegetation communities of Varanus Island

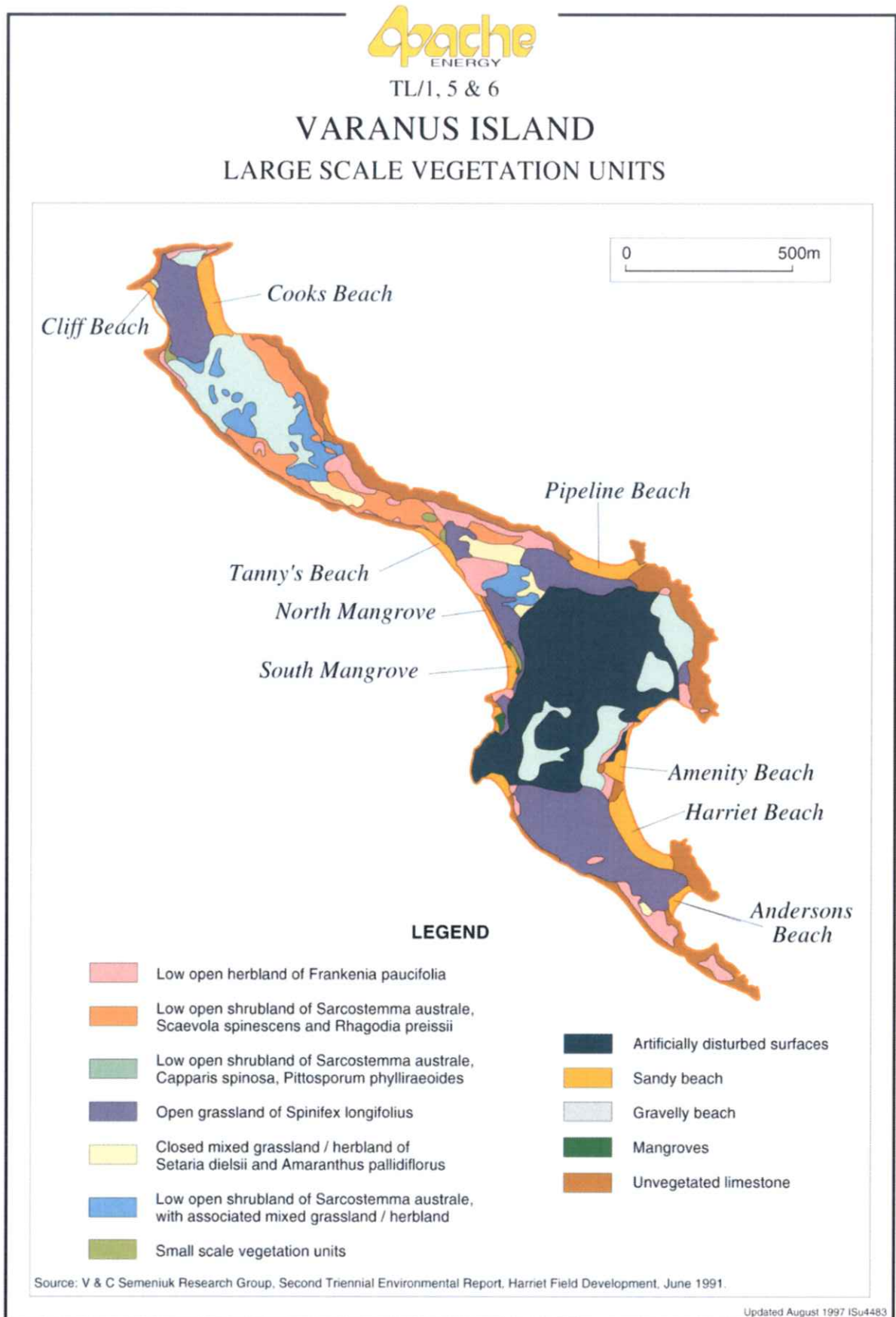


Table 2. Species of high conservation value on Varanus Island

Species	Within lease	Outside lease	Within areas described in Table 1
<i>Capparis umbonata</i>	√	×	No
<i>Lepidium platypetalum</i>	√ (1 location)	×	No
<i>Diclandera forrestii</i>	√ (2 locations)	×	No
<i>Abutilon indicum</i> var <i>australiense</i>	√ (1 location)	√ (1 location)	No
<i>Jasminum calcarium</i>	×	√ (1 location)	No
<i>Jasminum didymium</i>	×	√ (1 location)	No
<i>Acanthocarpus verticillata</i>	×	√ (1 location)	No
<i>Striga ?multiflora</i>	×	√ (1 location)	No
<i>Euphorbia</i> aff <i>drummondii</i>	√ Several locations	√ Several locations	No

No flora of conservation significance has been recorded as present within the areas proposed for clearing or disturbance in Table 1.

The limestone hill east of the crude storage tanks, known as East Tank Hill, has a diverse number of species, some of which exhibit a restricted range on Varanus Island. The significance of the vegetation community on East Tank Hill is based upon several characteristics:

- the entire distribution of *Capparis umbonata* on Varanus Island is currently restricted to a small population (c. 10 shrubs) on the East Tank Hill
- *Capparis umbonata* uniquely occurs in association with the two other *Capparis* species on the island, *C. lasiantha* and *C. spinosa* on the East Tank Hill. Although the latter two species exist individually throughout the island, the inclusion of all three *Capparis* species together represents an unusual vegetation stand.
- the only area on Varanus Island where both *Ficus virens* and *Ficus brachypoda* (was *platypoda*) exist within the same vegetation community.
- Aside from those on East Tank Hill, there is only one other known *F. virens* individual on Varanus Island.
- the status of the *Rhagodia preissii* sub-species that occur on this hill also needs to be determined. *Rhagodia preissii obovata*, which is thought to occur in this area, has not been found in any other area of Varanus Island, although it is known from Barrow Island. The other sub-species *Rhagodia preissii preissii* occurs more commonly throughout the island.
- greater diversity of species on East Tank Hill, for example, thirty species were recorded in a small area approximately 150 x 75 x 20 m compared to areas in similar habitats that had 9 and 14 species respectively (Astron, 2003).

3.4.2 Mangroves

Mangroves on Varanus Island are restricted to a disjoint population of white mangrove (*Avicennia marina*) along the southern portion of a sandy beach on the west coast of the island, occupying only a thin strip along the high water mark, and being separated by a series of small rocky headlands (Figure 2,3). Both the nature and location of these mangroves are suggestive of high levels of environmental pressure and physiological stress, a feature reflected in the cyclic events of growth and senescence, and the absence of reproductive recruitment, among the resident trees.

No mangroves are present within the areas proposed for clearing or disturbance in Table 1.

3.4.3 Weeds and Introduced Species

Twelve weed species and six introduced mainland plants have been recorded on Varanus Island. Weed species are classified according to the Environmental Weed Strategy for Western Australia (DCLM, 1999), where they are listed and rated according to their potential impact on the biodiversity of natural ecosystems. To date there has been no record of Declared Noxious Weeds (APB, 2000) on either Varanus Island or Bridled Island.

Weeds found on Varanus Island (and their ratings according to DCLM) and mainland introductions are listed in Table 3.

Table 3. Weeds found on Varanus Island

Species name	Common name	DCLM rating
<i>Aerva javanica</i>	Kapok	High
<i>Cenchrus ciliaris</i>	Buffel grass	High
<i>Cenchrus setiger</i>	Birdwood grass	High
<i>Chloris barbata</i>	Purple Top Chloris	Moderate
<i>Conyza albida</i>	Tall Fleabane	Low
<i>Digitaria ciliaris</i>	Summer grass	Low
<i>Euphorbia</i> sp.		TBA
<i>Malvastrum americanum</i>		Moderate
<i>Sonchus asper</i>	Prickly Sow Thistle	Moderate
<i>Sonchus oleraceus</i>	Milk Thistle	Moderate
<i>Taraxacum officinale</i>	Dandelion	Low
<i>Tridax procumbens</i>	Tridax	Moderate
Mainland introductions		
<i>Acacia ampliceps</i>		
<i>Acacia coriacea</i>		
<i>Austrostipa</i> sp.		
<i>Cynodon dactylon</i>	Couch grass	
<i>Eucalyptus camaldulensis</i>	River Gum	
<i>Ipomoea muelleri</i>	Poison Morning Glory	

3.4.4 Vegetation Monitoring

A specific vegetation assessment was not commissioned for this permit application, given the small quantity of vegetation and its previously disturbed status. Nonetheless, the vegetation and surrounding waters of Varanus Island have been, and continue to be monitored annually, by the following programmes:

- Vegetation monitoring – vegetation communities on Varanus Island and Bridled Island (used as a reference location) are monitored in September each year. Transects monitored on Varanus Island cover both disturbed and undisturbed areas.
- Weed monitoring and control – weed monitoring, searches, mapping and eradication of introduced species found on Varanus Island is undertaken on an ongoing basis.
- Mangrove monitoring – a comparative assessment between the health of the mangrove populations on Varanus Island with control populations on nearby undisturbed Bridled Island is undertaken in November/December each year.

3.5 Fauna

Varanus Island has high conservation value due to the number of seabirds and turtles that are found nesting on the island, and approximately 87 bird species have been recorded on the

Lowendal Islands and about a dozen types of lizards have been observed. Over 200 species of corals have been identified in the region.

Many of the sandy beaches are important nesting sites green, hawksbill and flatback turtles, which lay their eggs above the high tide mark during the summer months. In late summer, the turtle hatchlings make their way down the beaches and into the water. All three species of turtles are classified as either endangered or vulnerable species.

Behind the beaches are the shifting sand dunes to which cling hardy shrubs and creepers. Wedge-tailed shearwaters dig their burrows into the soft sand, breed and raise their chicks between October and April. Large piles of sticks are the nests of ospreys, brahminy kites or sea eagles that use the cliff tops to survey their territory and raise their young.

The rocky shores of the island are important sites for oysters, crabs and chitons, which cling to the rock in the surging ocean. Starfish, anemones, sea slugs, hermit crabs and a host of different marine snails can be found in the rock pools.

Seabirds abound in the region. The offshore waters provide valuable feeding grounds for a number of species – some which are protected under international conventions. Some seabirds, such as the rosette terns, crested terns and lesser crested terns perch and breed on the rocky shores of the islands.

Patch and fringing reefs around the island providing shelter to a myriad of marine life including fish, marine worms, sponges, moray eels, lobsters and shellfish. Algae beds cover vast expanses of the sandy bottoms encompassing the Lowendal Islands. Sandy seabeds support a diversity of invertebrates such as marine worms, sponges, soft corals, sea pens, prawns, crabs and starfish.

3.5.1 Fauna Monitoring

A specific fauna assessment was not commissioned for this vegetation clearing permit application, given the small quantity of vegetation proposed to be cleared and its generally disturbed status. Nonetheless, the fauna of the island and its surrounding waters has been, and continues to be monitored on an annual basis, and includes:

- Vermin (rats and mice)
- Marine assemblages (corals and macroalgae)
- Seabirds
- Shearwaters
- Sea turtles

The vegetation to which this clearing application applies is not likely to be used as a feeding, nesting or shelter resource to any threatened species, but may be used by some of the common lizard species. The loss of, or damage to, this minor quantity of habitat is not likely to represent a significant habitat loss for such species, given the availability of similar (and generally better quality) habitat nearby.

3.5.2 Vermin

In addition to the annual monitoring programme to check for the presence of rodents (rats and mice) on Varanus Island, Apache have a Vermin Management Plan that details the necessary response to control the spread and eradication of vermin.

4. POTENTIAL ENVIRONMENTAL IMPACTS

Table 4 summarises the potential impacts to the environmental elements outlined in Section 3 as a result of disturbance or clearing of vegetation within the designated areas outlined in Table 1 and Figure 2.

Table 4. Potential impacts of vegetation clearing on environmental elements of Varanus Island

Environmental element	Potential impact from vegetation clearing
Climate	<u>No impacts.</u> Greenhouse gas emissions associated with clearing activities considered negligible. No smoke or ash emissions will result from the burning of cleared vegetation in the incinerator, as per Apache's DoE licence. Should the incinerator not be in operation, the burning will take place within a burn pit along with other wastes on Varanus Island.
Geology and landform	<u>No impacts.</u> No geological impacts predicted as there are no subsurface works associated with this permit application. Clearing and disturbance activities undertaken mainly in areas already topographically modified.
Hydrogeology	<u>No impacts.</u> There is no permanent surface water on Varanus island, thus there will be no soil erosion into waterways and the surrounding ocean. Minor quantities of vegetation clearing in already cleared/disturbed areas will not result in changes to the height, flows or quality of the groundwater table.
Native vegetation	<u>Negligible impacts.</u> Areas covered by this permit application largely consist of vegetation that is characteristic of disturbed areas, no clearing or disturbance is included within areas of undisturbed vegetation. Potential areas of vegetation removal and/or disturbance represent a maximum of 34% of the Apache lease (9.68 ha). Existing vegetation planning, implementation, monitoring and management procedures will ensure surrounding areas of vegetation are adequately protected.
Weeds	<u>Negligible impacts.</u> Most works will involve low-impact clearing methods, such as hand-pulling of plants or spraying, which involves minimal mechanical disturbance of soils and therefore low chance of weed invasion and/or spread. Regular weed control activities undertaken by qualified contractors.
Fauna	<u>Negligible impacts.</u> Affected vegetation not known to provide habitat for threatened or significant fauna species. Abundant high quality vegetation within and adjacent to lease provides alternative habitat for potentially affected common fauna species, such as lizards and insects.
Vermin	<u>Negligible impacts.</u> Recent vermin (rat, mouse) monitoring indicates that no vermin are currently present on the island. A program of seagull culling is proposed to be undertaken on Varanus Island (in association with other petroleum companies operating in the NWS, and with relevant Commonwealth and State government permits) to control predation on turtle hatchlings as a result of increased gull populations.

5. ENVIRONMENTAL MANAGEMENT

The continuous protection of Varanus Island's unique flora and fauna is guided by the following conditions (many of which are part of the conditions in the DCLM lease):

- The collection of any plants or animal species is strictly forbidden, including the collection of live shells.
- Firearms or fauna taking devices are banned.
- No pets are allowed on the island and no imported plants can be grown. Strict quarantine rules apply to all personnel and goods transported to the island.
- The use of bright lights near the beaches is avoided between November and March to avoid attracting turtles and hatchlings away from the water.
- The rookeries of nesting turtles, hatchlings or bird rookeries are not interfered with.
- Foot access outside the Apache lease is forbidden (allowed only on the beach tide lines and rocky shores), unless for biological studies.
- No vehicle shall be operated outside the lease area (except for fighting fire or for cleaning up oil spills).
- Existing tracks on the island are left alone to allow for regeneration.
- All topsoil stockpiled shall be satisfactorily stabilised to prevent erosion.
- Apache shall not create a disturbance within 10 m from any existing wedge-tailed shearwater nesting burrow.
- No personnel shall approach or enter any seabird nesting areas outside the lease unless for biological monitoring purposes.
- Annual reporting to DCLM and DoE on monitoring results.

Other environmental mitigation and management measures are developed for specific projects as they arise. In addition, the following policies and procedures are in place to ensure appropriate environmental management measures are followed at all times on Varanus Island:

- Environmental Management Policy (August 2004).
- Vegetation Management Plan (in prep, EA-60-RI-172).
- Refuelling Management Plan (DR-91-IG-001).
- Lighting Management Plan (EA-60-RI-153).
- NWS Operations consolidated Cyclone Response Plan (AE-91-IF-010).
- Waste Management Plan (EA-60-RI-167).
- OSCP Volume 1 – Operations (NWS) (AE-OO-EF-008).
- OSCP Volume 2 – Resource Atlas (NWS) (AE-OO-EF-008/2).
- Vermin Management Plan (EA-60-RI-131).
- Weed management procedure.
- Quarantine Procedure (AE-91-IQ-189).
- Procedure for VI Field Cyclone Response (AE-91-IF-005).
- Refuelling Operational Procedure Guide
- Incident Reporting Procedure (AE-91-IF-002).
- Contaminated Waste Management Procedure (VI-SA-ON-EN-000).

The vegetation maintenance conditions and policies and procedures listed above will ensure that any vegetation clearing undertaken under this permit is properly planned, managed and monitored.

6. ASSESSMENT OF PROPOSAL AGAINST CLEARING PRINCIPLES

Under Schedule 5 of the *Environmental Protection Amendment Act 2003*, vegetation clearing applications are assessed against 10 principles, which address biodiversity significance, land degradation and ground and surface water quality. Table 5 summarises how this clearing application addresses each of these principles.

Table 5. Assessment of proposal against clearing principles

Ref	Principle	Assessment
1	Native vegetation should not be cleared if it comprises a high level of biological diversity.	Most of the flora in the areas covered by this application are colonising or invasive species (indigenous and non-indigenous/native) that readily inhabit degraded and previously disturbed areas. These areas are already highly disturbed. No threatened or significant species or communities will be impacted.
2	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	The vegetation does provide some habitat for indigenous fauna species on Varanus Island, however, as a degraded area, this habitat is not significant. Large areas of better quality, contiguous habitat are abundant on Varanus Island and surrounding islands in the Lowendal, Barrow and Montebello island groups.
3	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No flora of conservation significance will be impacted.
4	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.	The vegetation within the proposed areas does not form part of any threatened ecological communities.
5	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	The vegetation within the proposed clearing area is degraded and not a remnant of native vegetation that has been extensively cleared. Varanus Island, outside the Apache lease area, still remains vegetated and undisturbed. There is a high level of habitat connectivity between vegetation communities on the island.
6	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	There are no defined watercourses or wetlands on Varanus Island.

7	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	This vegetation clearing will not cause appreciable land degradation. There is very little threat of increased soil salinity (given the island's low rainfall and high evaporation rate). Soil erosion (wind and water) is not likely as many of the proposed areas are located in areas with shallow soil and low relief and are already compacted.
8	Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	Although the whole of Varanus Island is classified as an ESA, the proposed vegetation maintenance areas are all within the Apache lease area, and distant from mangrove and rookery protection areas located outside the Apache lease. These minor works will not impact on the island's conservation values.
9	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	There is no surface water on Varanus Island, thus no impacts to surface water will occur as a result of the clearing/disturbance. Groundwater quality is not likely to be affected by the minor quantities of vegetation clearing, and the groundwater currently serves no beneficial human uses. Regular groundwater monitoring is undertaken. Watertable levels and groundwater flow patterns are subject to tidal influence (see Section 3.3). Given the strong tidal influence on groundwater quality, the proposed vegetation clearing is not likely to impact on water quality.
10	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	The small scale of proposed clearing/ and/or disturbance is not likely to cause or exacerbate the incidence or intensity of flooding. Flooding is only likely as a result of cyclonic events, in which case the quantity of island vegetation is not likely to heavily influence the severity of flooding.

7. REFERENCES

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