GOVERNMENT OF
WESTERN AUSTRALIA

Browse LNG Precinct




Browse Liquefied Natural Gas Precinct
Strategic Assessment Report

(Draft for Public Review)
December 2010

Appendix E-7

Legal Requirements, Marine Species Invasion Table and Mitigation Management Measures

(Final Report to the Kimberley Land Council)

Kimberley Land Council

Kimberley LNG Precinct Strategic Assessment

ETHNOBIOLOGICAL REPORT, JAMES PRICE POINT

DRAFT REPORT

APPENDIX A - LEGAL REQUIREMENTS, MARINE SPECIES INVASION TABLE & MITIGATION MANAGEMENT MEASURES

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Disclaimer:

The term 'Traditional Owner' (TO) is used throughout the Strategic Assessment Agreement, including the ToR. This term is not used in the NTA, the AHA, or any other legislation which applies to the area the subject of the strategic assessment. Other reports prepared as part of the Indigenous Impacts Report have taken the term 'Traditional Owners' to mean those persons or groups who are the common law holders of native title for the relevant area of land and waters; that is, native title holders. However, at the time of preparation of this report the authors are aware that the assessment / study area is subject to the Goolarabooloo / Jabirr Jabirr Native Title Claim. As this claim is currently undetermined and is subject to some contestation within the native title claimant group, the 'Traditional Owners' whose interests have been identified for the purposes of this report are those persons who:

- ***are members of the current Goolarabooloo / Jabirr Jabirr claim; or***
- ***identify as Jabirr Jabirr; or***
- ***identify as Goolarabooloo.***

This approach has been taken to ensure the assessment and report are appropriately comprehensive but is not taken to be a comment on who may or may not have rights and interests in the study area that are either 'native title', historical, or come from some other basis.

Rights over the ethnobiological knowledge contained in this report are held by the common law holders. No part of the report should be used without the prior informed, written consent of the relevant Traditional Owners.

In the Kimberley the spelling of Aboriginal language words and the names of the languages themselves have varied over time. There is still conjecture about correct spelling for some languages and words. In this report we have used the spellings recommended where possible. However, in some instances we have used spellings preferred by senior elders or spellings accepted in wide usage. (Wightman, G., 2003)

Please note that the authors of this report have done their up most to record associated traditional owner languages correctly, fairly and appropriately. This has been done with the best intentions and apologies are made for any discrepancies, misquotes or incorrect use of language

CONTENTS

1 LEGAL REQUIREMENTS 4
2 MARINE SPECIES INVASION TABLE 8
3 MITIGATION MANAGEMENT MEASURES 9
3.1 Vegetation Clearing and Rehabilitation Management Measures 9
3.1.1 General 9
3.2 Topsoil Removal Management Measures 10
3.3 Invasive species and weed Management measures 11
3.3.1 Invasive Species 11
3.3.2 Management Measures 12
3.3.3 Ongoing Weed Control Monitoring Measures. 13
4 REFERENCES 14

1 LEGAL REQUIREMENTS

Table 1 outlines the environmental and cultural legislation and standards that apply to the proposed LNG Precinct.

Table 1 Key Environmental and Cultural Legislation and Standards relating to Ethnobiology.

Legislation/Standard	**General Description**	**Source**	**Issues Relevant to JJP LNG Precinct**
Environment Protection and Biodiversity Conservation Act 1999	This Act is the primary Commonwealth legislation directed to protecting the environment in relation to Commonwealth land and controlling significant impacts on matters of national environmental significance. The Act requires assessment and approval of actions that are likely to have a significant impact on a matter of national environmental significance, or are undertaken by a Commonwealth agency or involve Commonwealth land and will have a significant impact on the environment.	Com.	No flora species, communities or issues considered as matters of NES on the LNG Precinct site. Seven species are listed as 'Vulnerable' under the EPBC Act – • whale shark • (Rhincodon typus), • freshwater sawfish • (Pristis microdon) • green sawfish • (Pristis zijsron), • Green Turtle • (Chelonia mydas), • Flatbacl Turtle • (Natator depressus), • Australian Painted Snipe (Rostratula benghalensis subsp.australis), • Bilby(Macrotis lagotis)

Legislation/Standard	General Description	Source	Issues Relevant to JJP LNG Precinct
Environmental Protection Act 1986 Environmental Protection (Clearing Native Vegetation) Regulation 2004	An Act to create an Environmental Protection Authority, for the prevention, control and abatement of environmental pollution, for the conservation, preservation, protection, enhancement and management of the environment. The *Environmental Protection Act 1986* (EP Act) is the overarching environmental legislation that deals with the protection of the environment and environmental offences. The EP Act is administered and enforced by the Western Australia Department of Environment and Conservation (DEC).	WA	Native vegetation clearing must be carried out according to the *EP Act.*

Legislation/Standard	General Description	Source	Issues Relevant to JJP LNG Precinct
wildlife Conservation Act 1950 Wildlife Conservation (Reptiles and Amphibians) Regulations 2002 Wildlife Conservation Regulations 1970	An Act to provide for the conservation and protection of wildlife. The Act designates the regulations surrounding the collection and taking of flora and fauna, and administers protection of flora and fauna throughout the State, and the special protection of flora and fauna as declared by notice published in the *Government Gazette*. Conservation of flora and fauna is currently administered through the DEC.	WA	No flora species listed under the Wildlife Conservation Act have been identified on the LNG Precinct. The following fauna listed under the Wildlife Conservation Act have been identified within the LNG Precinct. **Schedule 4** (fauna that are in need of special protection) • Saltwater Crocodile • (Crocodylus porosus) • Peregrine Falcon (Falco peregrinus). **Schedule 2** • Bilby (Macrotis lagotis) **Priority 4** (Taxa in need of monitoring • Bush Stone-curlew (Burhinus grallarius) • Water-rat (Hydromys) • Grey Falcon (Falco hypoleucos) • Pictorella Mannikin (Heteromunia pectoralis) • Eastern Curlew (Numenius madagascariensis) • Flock Bronzewing(Phaps histrionic) • Australian Bustard Priority (Ardeotis australis) **Priority 3** (Taxa with several, poorly known populations, some on conservation lands) • Scaly-tailed Possum (Wyulda squamicaudat

Legislation/Standard	General Description	Source	Issues Relevant to JJP LNG Precinct
The *Agriculture and Related Resources Protection Act* 1976.	The *Agricultural and Related Resources Protection Act* Act provides for the management, control and prevention of certain plants and animals, for the prohibition and regulation of the introduction and spread of certain plants and of the introduction, spread and keeping of certain animals, for the protection of agriculture and related resources generally, and for incidental and other purposes.	WA	One plants on the site are listed under this Act. *Sida acuta* Management of the species is required.
Bush Fire Act 1954	An Act to make better provision for diminishing the dangers resulting from bush fires, for the prevention, control and extinguishment of bush fires, and the repeal of the *Bush Fires Act 1937*.	WA	Relates to the ongoing management of fire within the LNG Precinct area.
Threatened Ecological Community (TEC)	Species listed by the department of Environment and Conservation (DEC)	WA	Relates to the Monsoon Vine Thicket community that occurs behind the sand dunes within the LNG Precinct.
Priority Ecological Community (TEC)	Species listed by the department of Environment and Conservation (DEC)	WA	*Acacia timida var. kulparn*

Legislation/Standard	General Description	Source	Issues Relevant to JJP LNG Precinct
Aboriginal Heritage Act 1972-section 5,6	An Act to make provision for the preservation on behalf of the community of places and objects customarily used by or traditional to the original inhabitants of Australia or their descendants, or associated therewith, and for other purposes incidental thereto.	WA	Two Registered Aboriginal Sites exist within the proposed LNG Precinct boundary (refer to chapter 3 of main body for map) ▪ 13076 – Walmadan (JPP) ▪ 12902 – Kundandu Four Registered Aboriginal Sites exist within the proposed LNG Precinct Buffer zone ▪ 12684 – Inbalal Kannbor ▪ 12427 – Pidirakundjunu Creek- ▪ 12901 – Murrdudun ▪ 12900 – Ngarrimarran Juno Quarry

2 MARINE SPECIES INVASION TABLE

TABLE 2 Shortlist of aquatic bio-invasion species causing major impact around the world.[1]

Name	Native to	Introduced to	Impact
Cholera *Vibrio cholerae* (various strains)	Various strains with broad ranges	South America, Gulf of Mexico and other areas	Some cholera epidemics appear to be directly associated with ballast water
Cladoceran Water Flea *Cercopagis pengoi*	Black and Caspian Seas	Baltic Sea	Reproduces to form very large populations that dominate the zooplankton community and clog fishing nets and trawls, with associated economic impacts
Mitten Crab *Eiocheir sinensis*	Northern Asia	Western Europe, Baltic Sea and West Coast North America	Undergoes mass migrations for reproductive purposes. Burrows into river banks and dykes causing erosion and siltation. Preys on native fish and invertebrate species, causing local extinctions during population outbreaks. Interferes with fishing activities
Toxic Algae(Red/Brown/ Green Tides) Various species	Various species with broad ranges	Several species have been transferred to new areas in ships' ballast water	May form Harmful Algae Blooms. Depending on the species, can cause massive kills of marine life through oxygen depletion, release of toxins and/or mucus. Can foul beaches and impact on tourism and recreation. Some species may contaminate filter-feeding shellfish and cause fisheries to be closed. Consumption of contaminated shellfish by humans may cause

[1] www.globallast.imo.org/poster4_english.pdf

			severe illness and death
Round Goby *Neogobius melanostomus*	Black, Asov and Caspian Seas	Baltic Sea and North America	Highly adaptable and invasive. Increases in numbers and spreads quickly. Competes for food and habitat with native fishes including commercially important species, and preys on their eggs and young. Spawns multiple times per season and survives in poor water quality
North American Comb Jelly *Mnemiopsis leidyi*	Eastern Seaboard of the Americas	Black, Azov and Caspian Seas	Reproduces rapidly (self fertilising hermaphrodite) under favourable conditions. Feeds excessively on zooplankton. Depletes zooplankton stocks; altering food web and ecosystem function. Contributed significantly to collapse of Black and Asov Sea fisheries in 1990s, with massive economic and social impact. Now threatens similar impact in Caspian Sea.
North Pacific Seastar *Asterias amurensis*	Northern Pacific	Southern Australia	Reproduces in large numbers, reaching 'plague' proportions rapidly in invaded environments. Feeds on shellfish, including commercially valuable scallop, oyster and clam species
Zebra Mussel *Dreissena polymorpha*	Eastern Europe (Black Sea)	Introduced to: Western and northern Europe, including Ireland and Baltic Sea;eastern half of North America	Fouls all available hard surfaces in mass numbers. Displaces native aquatic life. Alters habitat, ecosystem and food web. Causes severe fouling problems on infrastructure and vessels. Blocks water intake pipes, sluices and irrigation ditches. Economic costs to USA alone of around US$750 million to $1 billion between 1989 and 2000
Asian Kelp *Undaria pinnatifida*	Northern Asia	Southern Australia, New Zealand, West Coast of the United States, Europe and Argentina	Grows and spreads rapidly, both vegetatively and through dispersal of spores. Displaces native algae and marine life. Alters habitat, ecosystem and food web. May affect commercial shellfish stocks through space competition and alteration of habitat
European Green Crab *Carcinus maenus*	European Atlantic Coast	Southern Australia, South Africa, the United States and Japan	Highly adaptable and invasive. Resistant to predation due to hard shell. Competes with and displaces native crabs and becomes a dominant species in invaded areas. Consumes and depletes wide range of prey species. Alters inter-tidal rocky shore ecosystem

3 MITIGATION MANAGEMENT MEASURES

Mitigation and Management Measures will be managed and monitored by Traditional Owners through the LNG Precinct Indigenous Social Impact Monitoring and Management Board, with the following management measures set as a minimum (baseline) standard. TOs are to be engaged with all planning and implementation outcomes.

3.1 Vegetation Clearing and Rehabilitation Management Measures

The proponent shall ensure that the following vegetation clearing management measures are implemented as a minimum (baseline) standard:

3.1.1 General

- Seeds and landscaping materials are to be collected by licensed seed collector from designated construction area prior to clearing. This seed is to be grown on and re-established as tubestock within the designated rehabilitation areas;

- Prior to any disturbance, strict clearing zones are to be adhered to. Clearing areas are to be clearly marked by pegs or flagging. Clearing will not occur outside the marked clearing lines and all construction plant and vehicles to stay within this boundary;
- The construction contractor(s) will develop detailed construction procedures and a clearing checklist to minimise clearing of native vegetation. The checklist will include hold or staging points that require further approval;
- Native vegetation to be cleared is to be first mulched or slashed above ground level. The slashed/mulched vegetation is to be then stockpiled and reused as soon as practicable for soil stabilisation and rehabilitation.
- Bush mulch collected from initial slashing is most appropriate for soil fixing and local seed regeneration/rehabilitation.
- No burning of cleared vegetation shall be permitted within the project site; and,
- Within the light industrial and accommodation development areas, vegetation and trees of particular significance i.e. above 100mm dia trunk calliper shall be conserved wherever practicable and these areas/trees shall be clearly marked prior to the commencement of clearing;
- Dumped rubbish, including garden waste, will be removed from bushland prior to clearing and appropriately disposed of;
- Access tracks, vehicle parking and temporary materials storage will be located on existing cleared areas or on disturbed sites which incur minimum loss of vegetation;
- All stockpiles, including mulch and topsoil shall only be placed in existing cleared areas;
- Clearing of vegetation shall be undertaken in stages and along one front to allow fauna to move to adjacent separate habitats;
- Trap and move native fauna from the area prior to clearing if necessary;
- The use of a fauna clearance team should be used to remove and relocate disturbed fauna and venomous animals, during any periods of vegetation clearing for subdivision development;

3.2 Topsoil Removal Management Measures

Topsoil contains native seeds which is a valuable resource. Topsoil must be carefully protected where possible or otherwise removed, stored and re-used where appropriate. Topsoil removed during construction is to be stockpiled for a short period only and reused within the LNG Precinct.

The proponent shall ensure the following actions are undertaken:

- Following vegetation clearing, topsoil within disturbance zones and other areas where earthworks will occur will be stripped to a depth of 150 mm and temporarily stockpiled within an already cleared area that is free of any Declared weed species;
- Machines used for pushing and heaping operations will be fitted with root rakes or similar equipment and operated in a manner such that as little topsoil as possible is removed and heaped with the cleared vegetation material;
- Topsoil that has been removed and cannot immediately be used will be stockpiled. Topsoil stockpiles shall be located in areas that will not restrict or interfere with site drainage or retained vegetation;
- Compaction of the topsoil during stockpiling shall be avoided. Topsoil shall be left in the stockpiles for a maximum period of six months, as practicable, stockpiles will be kept to a maximum height of 1.5m;

- The quality of topsoil in stockpiles will be maintained by measures including protection against contamination from other materials, minimising stockpiling periods and prevention of erosion by surface runoff or wind;
- Monitoring for erosion and erosion risk will be undertaken regularly to ensure that any erosion that does occur is promptly mitigated;
- Any spoil will be removed from site and taken to a site agreed with the Shire of Broome; and
- Topsoil will be respread where applicable within the site boundary for drainage swales or rehabilitation of degraded areas.

3.3 Invasive species and weed Management measures

3.3.1 Invasive Species

Ten introduced species were recorded within the flora survey site[2]

- Gallon's Curse (*Cenchrus biflorus*);
- Buffel Grass (*Cenchrus ciliaris*);
- Birdwood Grass (*Cenchrus setiger*);
- Kapok Bush (*Aerva javanica*);
- Sneaky Tree (*Leucaena leucocephala subsp. leucocephala);*
- Siratro *(Macroptilium atropurpureum);*
- *Merremia aegyptia;*
- *Merremia dissecta;*
- *Sida acuta; and,*
- Wild Passionfruit (*Passiflora foetida var. hispida*).

In addition to these, 12 less serious introduced flora species were recorded.

Weeds that are, or may become, a problem to agriculture or the environment can be formally classified as Declared Plants under the *Agriculture and Related Resources Protection Act, 1976*. The Department of Agriculture and Food Western Australia (DAFWA) and the Agriculture Protection Board maintains a list of Declared Plants for Western Australia. If a plant is declared for the whole of the State or for particular Local Government Areas, all landholders are obliged to control that plant on their properties. Declarations specify a category, or categories, for each plant according to the control strategies or objectives which the Agriculture Protection Board believes are appropriate in a particular place.

One introduced species recorded within the study area are listed as Declared Plants;

- *Sida acuta*

The following additional weed species are to be monitored and managed[3];

[2] Chukowry, P., Maier M., 2009

- Camel Melon *Citrullus lanatus;*
- Butterfly Pea *Clitoria ternatea;*
- Siratro *Macroptilium atropurpureum;*
- Hairy Merremia, *Merremia aegyptia;*
- White Creeper *Merremia dissecta;*
- Stinking Passion Vine *Passiflora foetida;*
- Neem *Azadirachta indica;*
- Coffee Bush *Leucaena leucocephala;*
- Taylor Fruit *Ziziphus mauritiana*;
- Gallons Curse *Cenchrus biflorus;*
- Buffel Grass *Cenchrus cilliaris;*
- Mossman River Grass *Cenchrus echinatus;*
- Mintweed *Hyptis suaveolens;*
- Mossman River Grass *Cenchrus echinatus; and,*
- Triumfetta, *Triumfetta petandra;*

Other high threat weeds that have been located within the Dampier Peninsular and should be on the control list, should they later be located within the development zone:

- Tiger paw Ipomoea pes-tigridis
- Rubber vine Cryptostegia madagascariensis Declared plant P1, P2
- Coffee Senna, Senna occidentalis Declared plant P1, P2
- Candle Bush Senna alata
- Khaki weed Alternanthera pungens
- Praxelis Praxelis clematidea Declared plant P1/ National Alert list species

3.3.2 Management Measures

There is a risk that construction works may introduce new weed species into the area or spread or increase the abundance of weeds within the remaining native vegetation within and adjacent to the site.

Management actions for controlling weeds during construction/operation phase(s) are presented below;

- The movement of weed seeds and weed seed contaminated soils must be minimised by ensuring that machinery is cleaned of loose dirt and vegetative material before entering or leaving the construction area;

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3 As per Environs Kimberley's recommendation which is an independent community environmental organization dedicated to protecting the nature and culture of the Kimberley region (www.environskimberley.org.au)

- Areas of remnant native vegetation should not be disturbed by soil excavation and vehicle access, or by stockpiling of materials;
- Clean down of all vehicles and machinery of plant material and soil before entering the work site from other work sites which may contain weed species should occur. Clean down should consist of either brushing, gouging and/or scraping to remove any compacted soils or plant material, accompanied and followed by jetting with compressed air/water such that all soil and plant residue is removed;
- Any imported soil or materials will be sourced from areas that are free from noxious weeds or significant environmental weeds;
- Soil from the areas where Declared Plants and other identified, significant, environmental weeds occur will be isolated and will remain at, or as close as possible to the source location;
- Any spoil containing Declared Plants or from areas where they were present will be disposed to an area which is not at threat from weed infestation or from which the weeds cannot spread (e.g. a designated landfill site);
- Seasonal selective weed control will be included. This responds to the flush of growth promoted by the wet season. Earth works should be timed in order to prevent seed spread[4]; and,
- Invasive weeds are to be monitored and sprayed where and when outbreaks occur during construction/operation phase(s).

3.3.3 Ongoing Weed Control Monitoring Measures.

Vegetation monitoring will primarily consist of ongoing weed monitoring and control.

Where a plant is declared for the whole of the State or for particular Local Government Areas, all landholders are obliged to control that plant on their properties. Occurrences of Declared Plants need to be controlled using recommended methods outlined by the Western Australian Department of Agriculture and Food.

The control of Declared Plants shall be an on-going requirement for proponent(s). Although Declared Weeds should be removed prior to the construction phase of the LNG Precinct, there is potential for re-establishment.

The following ongoing management measures shall occur during operational and decommissioning phases;

- Land managers will undertake measures to control the Declared Plants, *Sida acuta* on areas of retained vegetation;
- The relevant land manager for the area will undertake ongoing monitoring of surrounding remnant vegetation, corridors and rehabilitation areas;
- Groundcover vegetation removal is kept to a minimum within and adjacent site works, this may include nominated taped / fenced no go zones and the stipulation that storing of material or parking of vehicles within retained tree root zones is prohibited;
- Cleaning of site vehicles and machinery upon entrance and exiting of site especially if dealing with known infested invasive weed areas;
- Only certified weed free soils and materials are to be imported onto site, as required; and,
- All litter and waste materials are strictly contained and regularly / appropriately removed from site.

[4] As per Environs Kimberley's recommendations (www.environskimberley.org.au)

4 REFERENCES

Chukowry, P., Maier M., 2009. *A Vegetation and Flora Survey of James Price Point: West Season 2009*. Biota Environmental Sciences, Department of State Development.

http://globallast.imo.org/poster4_english.pdf (Viewed March 2010)

Environs Kimberley, *Weeds and Biodiversity* http://www.environskimberley.org.au/weeds.htm (viewed July 2010)