



NT Planning Commission
GPO Box 1680,
DARWIN NT 0801

28th August 2020

Mode of delivery
Via email ntpc@nt.gov.au
29th August 2020

Dear NT Planning Commission,

Re: Planning for Gunn Point Peninsula – Proposed updates to the Litchfield Subregional Land Use Plan

The Environment Centre NT (ECNT) is the peak community sector environment organisation in the Northern Territory, Australia raising awareness amongst community, government, business and industry about environmental issues and assisting people to reduce their environmental impact and supporting community members to participate in decision making processes and action. ECNT welcomes the opportunity to comment on the planning for Gunn Point Peninsular.

General Comment

ECNT has reviewed the proposed updates to the Litchfield Subregional Land Use Plan – Gunn Point Peninsular (LSLUP) and related reports. As we have said in numerous land use submissions and development proposals for over thirty years, we do not support the development of industry on the Gunn Point and Glyde Point Peninsular. The LSLUP policy documents continue to ignore the existing zoning and intend usages of this area as Conservation (CN) and Public Open Space (PS). Under the NT Planning Scheme, the primary purpose of Zone CN is to “conserve and protect the flora, fauna and character of natural areas”. “Development is to be sensitive to the natural features and habitats of the zone and be so sited and operated as to have minimal impact on the environment. The primary purpose of Zone PS is to provide public areas for recreational activity. Identifying Glyde Point for major industrial development ignores the intended protection of this area, the significant environmental values, the current recreational use and enjoyment of this area and underestimates the commitment of the very broad community to maintain its current zoning use.

As the LSLUP acknowledges, the ‘Murrumujuk Township’ is only viable if Glyde Point is industrially developed. Previous analysis has indicated that industrial development of the Glyde Point area is unlikely to be economically feasible¹ and also identified significant environment and heritage constraints and issues (page 26).

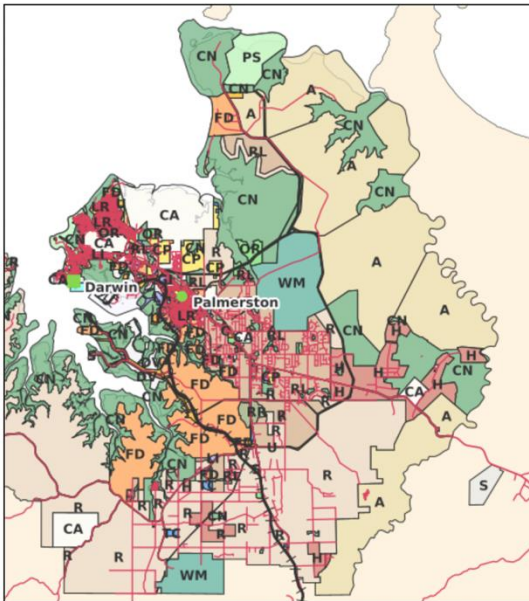
¹ Department of the Environment, Water, Heritage and the Arts
Comparative Analysis of the Feasibility of Alternative Locations for the Development of a Liquefied Natural Gas Precinct, January 2009

See: <https://www.environment.gov.au/system/files/pages/fc49dadf-a5c8-4a02-ba06-40745a29fc93/files/kimberley-alternatives.pdf>

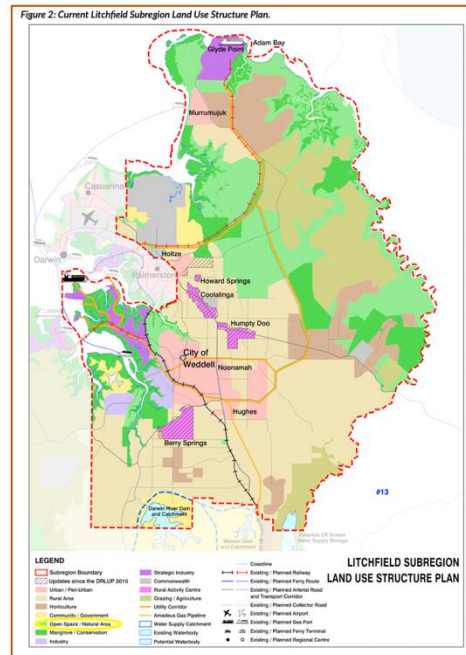
While this 'policy' position of industrial development for Glyde Point continues to be held, opportunities that take advantage of this site of conservation significance are being lost. This area could be a tourism and recreational jewel, if managed properly.

Recommendations

1. The updated map in the LSLUP acknowledges the current zoning of Conservation and Public Open Space and intended and current use of the Glyde Point and Gunn Point areas.



NRM Maps – Tenure = Reserve; Town Planning = Conservation (CN)



Current LUSP

2. All the lands currently zoned as conservation (CN) under the NT Planning Scheme should be classified as conservation in the LSLUP 2020, to:
 - a. protect the inherent environmental values of the land;
 - b. provide a buffer to protect biodiversity values associated with rainforest, mangroves and habitat for threatened species including the rainforest orchid *Crepidium marsupichilum* (Vulnerable TPWCA). Other threatened species of concern include those associated with groundwater dependent communities such as *Cleome insolata*, *Styloidium ensatum*, *Typhonium taylori*, *Utricularia dunstaniae* and the Howard Toadlet (Stokeld et. al. 2020). These species are particularly susceptible to modifications to hydrology arising from adjacent land use.
 - c. Protect these areas from mining or other inappropriate land use that will have a significant negative impact on the environmental values.



(As per recommendations of the Keep Top End Coasts submission to the Planning Commission for Gunn Point Peninsula – August 2020)

3. **The Northern Territory government (NTG) abandon plans for the Glyde Point industrial estate and associated massive residential development for 36,000 people.**
4. **The Northern Territory Government further examine the relative merits and benefits of a range of possible reservation, management and sustainable economic activity options for the area, such as Indigenous Protected Area/Marine Park status to support an expanded eco, fishing and cultural tourism industry in the area, and ‘ecosystem services’ benefits such as fish habitat, with the consent of Traditional Owners.**
5. **Examine alternative sites for appropriate industrial (and residential) development away from sensitive and pristine coastal environments and based on appropriate, best practice, and transparent site selection criteria.**
6. **Invest in economic development in our existing communities and industrial areas, including Middle Arm and East Arm instead of pouring millions into a new, white elephant and destructive development.**

Specific Comments

STRATEGIC INDUSTRY

Glyde Point has been eyed for development multiple times over the last few decades and each time has been resisted by ECNT and others because of the significant environmental values of the site.

In 2003, the NT Government proposed a port facility and heavy industry site, with accompanying residential development. That didn’t go ahead but the proposal for a deep water port was revived ten years later which also did not proceed. As a result of consistent and passionate action by recreational fishers, environmentalists and the broad community who recognise the important natural, social and cultural values, the whole Gunn Point and Glyde Point area (NT Por 2626) was rezoned for its long term protection, supported by the government at that time².

ECNT strongly opposes the construction of any port at Glyde Point when so much development is focused on Darwin Harbour at East Arm and Middle Arm, where disturbance has already occurred and it is more easily managed. Inpex undertook significant dredging of Darwin harbour, removing a rocky shoal to create a deep sea port to support its large LNG gas development. Analysis by the Department of the Environment, Water, Heritage and the Arts (2009) concluded that industrial development at Glyde Point was “unlikely to be economically feasible for a stand-alone green field LNG processing plant as it would be located at a considerable distance from existing industrial infrastructure”. Any other industrial development proposal would also likely to receive the same analysis. Thus any expanded port activities for the greater Darwin region should instead focus on the already disturbed sites at East Arm Wharf and Middle Arm, where infrastructure is already in place.

² See Martin C and Lawrie D ‘Glyde Point Protected’ 03 October 2007, NTG Media Release. Copy submitted with this submission.

The Environment Centre NT strongly supports the designation of the Glyde Point region as an area for marine and coastal conservation and recreation. Glyde Point is an important recreational and commercial fishing site as well as providing important reef habitat at the 'Blue Holes'. The 'blue holes' near Glyde Point site support important coral reefs that would be placed at risk from dredging and pollution of any industrial development. The native vegetation in the region is ecologically intact, including rainforests, mangroves and tall forests. The region is highly valued by recreational fishers. The region experience strong tides which presents navigational hazards, including for large ships with potentially hazardous and polluting cargoes. We urge the Planning Commission to consider the environmental values detailed in the report by Calnan (2006) provided in appendix 1 and also identified by the Department of the Environment, Water, Heritage and the Arts (2009). Calnan also identified the impacts of industrial development on the Glyde Point area, detailed in appendix two below. As identified in the LSLUP the establishment of a 'Murrumujuk Township' relies in a deep water port and strategic industrial development of the area. Given the very many environmental, social and cultural constraints to industrially developing Glyde Point, including economic constraints, we urge the Planning Commission to adopt our recommendations:

The Northern Territory government (NTG) abandon plans for the Glyde Point industrial estate and associated massive residential development for 36,000 people.

The Northern Territory Government further examine the relative merits and benefits of a range of possible reservation, management and sustainable economic activity options for the area, such as Indigenous Protected Area/Marine Park status to support an expanded eco, fishing and cultural tourism industry in the area, and 'ecosystem services' benefits such as fish habitat, with the consent of Traditional Owners.

“The whole of the coast within the plan area is included in a broad land use unit designated in this plan as the Coastal Park...the inclusion of this new park in the Gunn Point Peninsula Land Use Structure Plan 1990 will provide a continuous link between these coastlands and other coastal resources relating to the Vernon Islands and Cape Hotham... the park includes elements which contribute significantly to the conservation, recreation, scientific and fisheries resources of the Darwin region.”

(The Gunn Point Peninsula Coastal Park proposal, NT Department of Lands and Housing (DLH 1990b))

PRIMARY INDUSTRY

Construction Materials

ECNT strongly object to the statement that “Access to extractive mineral sites must be maintained, but with greater consideration of the adverse impacts of the local road network” in combination with removal of the statement that “There is also a need to ensure that depleted leases be properly rehabilitated to suit future land use” contained in the current 2016 version. This change in wording suggests an emphasis on protecting infrastructure such as the road network and possibly nearby landholders from the negative impact of heavy vehicles, while diluting concern about addressing other negative impacts of mining on the environment. While there is a requirement for construction materials for Darwin to expand, the proposed wording “must be maintained” conveys an attitude that these mining activities are a priority land use. Yet despite this apparent assertion, there is a lack of transparency as to where these extractive activities may be conducted.

Extractive mining results in the removal of surface materials and the extensive modification of environmental values both on-site and off-site. Off-site impacts often include modified surface and subsurface hydrology, spread of weeds and modified access which impacts on fire regime. The footprint of extractive mining often extends well past the boundary of the mining pit. Furthermore, the removal of substrate fundamentally changes the characteristics of the mined areas (particularly hydrologic characteristics) and typically places severe limitations on future land use. Arguably one of the few future land uses that may be subject to minimal negative influence from extractive mining is industrial estates, yet there is little evidence of industrial estates near Darwin being targeted on old extractive areas.

Furthermore, historically there has been a significant negative impact on lands identified as “Priority Environmental Management Areas - Litchfield” in previous Land Use Plans through extractive operations. Given the historical precedent of extractive mining focusing on lands not earmarked or already developed for purposes such as rural living or horticulture in the Litchfield Shire, it would appear likely that extractive operations will focus on lands with a proposed LSLUP classification of “Open Space / Natural Area” in the Gunn Point Peninsular. Extractive mining is incompatible with maintaining a “Natural Area” and is not a use under the current Conservation zoning.

Recommendation

All the lands currently zoned as conservation (CN) under the NT Planning Scheme should be classified as conservation in the LSLUP 2020, to:

- 1) protect the inherent environmental values of the land;**
- 2) provide a buffer to protect biodiversity values associated with rainforest, mangroves and habitat for threatened species including the rainforest orchid *Crepidium marsupichilum* (Vulnerable TPWCA). Other threatened species of concern include those associated with groundwater dependent communities such as *Cleome insolata*, *Stylidium ensatum*, *Typhonium taylori*, *Utricularia dunstaniae* and the Howard Toadlet (Stokeld *et al.* 2020). These species are particularly susceptible to modifications to hydrology arising from adjacent land use.**
- 3) Protect these areas from mining or other inappropriate land use that will have a significant negative impact on the environmental values.**

All the lands currently zoned as conservation (CN) under the NT Planning Scheme should be classified as conservation in the LSLUP 2020. This includes lands adjacent to Leaders Creek, the band of country that extends to the west, located north of the old prison farm and all the land to the west of the land zoned as Public Open Space near Glyde Point. This north-western section of the Peninsular contains a mix of woodlands, rainforest and mangrove communities. In addition to the intrinsic value of these communities, this area is notable for the only occurrence in the NT of the threatened ground orchid *Crepidium marsupichilum* (Vulnerable TPWCA) in a slightly wetter microhabitat within the monsoon rainforest than the surrounding forest (Stokeld *et al.* 2020).

Stokeld *et al.* suggest the hydrologic regimes and lower disturbance at this location may be contributing to the maintenance of the population. The groundwater dependent nature of this site was clearly evident at the time of an early dry season site visit during May 2020. Surface water was trickling from two small streams and there was an abundance of bird life such as red headed honeyeaters sourcing fresh water where the small creeks entered the mangroves. Within a couple of hundred meters on the landward edge of the mangroves, the tree *Avicennia marina* exceeds 50 cm in diameter at breast height and stands in the

order of 20 m tall. The combination of local topography with woodland, rainforest and mangrove communities are providing an exceptional array of biodiversity values in this area.

The whole of Shoal Bay Coastal Reserve should be classified as “Mangrove / Conservation”. This area includes wetlands of international significance and provides an important feeding and roosting area for migratory shorebirds in their non-breeding season (Harrison *et al.* 2009). Shoal Bay is a Site of Conservation Significance and Shoal Bay Coastal Reserve provides important protection for the environmental values of the Site.

On the eastern portion of the Gunn Point Peninsular the lands currently zoned as conservation (CN) including the mangrove systems and adjacent lands near the mouth of the Adelaide River should be classified as “Mangrove / Conservation”.

Furthermore, a series of corridors of native vegetation zoned as “Mangrove / Conservation” should link these areas already recognised in the Town Planning Zones and provide the opportunity to incorporate other high value sites including Bankers Jungle which is an important spring fed rainforest that supports threatened species. See further comments below.

In the Biodiversity Assessment of the Gunn Point Area (Stokeld *et al.* 2020) noted a series of conditions required to protect the biodiversity values. The first two of these conditions are:

- 1) “Avoid development activities which may impair hydrological inputs to groundwater dependent ecosystems and retain native vegetation buffers to minimise impacts on groundwater dependent ecosystems.
- 2) Protect rainforest patches from disturbance and retain sufficient native vegetation to create wildlife corridors and maintain habitat connectivity for species’ movements.”

Other conditions pertain to fire, weeds and introduced animals.

There is a failure to adequately address these two conditions in the draft LSLUP. Stokeld *et al.* (2020, page 18) identify both permanent and seasonal groundwater dependent ecosystems with the area of seasonal groundwater dependent ecosystems exceeding permanent. In a report on groundwater of the Gunn Point Area, Woltman (2020, page 21) describes two key aquifers in the study area. An “Upper seasonal aquifer” and a “Lower productive aquifer” with the focus of that report on the lower productive aquifer. In a brief discussion of the upper seasonal aquifer on page 22, Woltman observes that “Groundwater dependence of vegetation in these areas is unknown, but spring flows do extend into the dry season well after rainfall has ceased.” This illustrates the uncertainty that exists in understanding what is required to maintain the groundwater regime and hence long-term maintenance of habitat for threatened species including *Crepidium marsupichilum*, *Cleome insolata*, *Stylidium ensatum*, *Typhonium taylori*, *Utricularia dunstaniae* and the Howard Toadlet on the Gunn Point Peninsular.

While the details for particular sites are uncertain, an analogy can be made with upland areas acting as a sponge soaking up wet season rainfall which then seeps out into lower parts of the landscape well into the dry season. Recommendations included in the biodiversity assessment (Stokeld 2020, Table 12) include vegetation buffers equal to or greater than 250 m to protect groundwater dependent species, however, no evidence is presented to support this is an adequate buffer to maintain the hydrologic regime required for these species. **Application of the precautionary principle means a larger buffer of land to be zoned as conservation (CN) under the planning scheme is prudent to look after these high biodiversity value assets and maintain the mix of vegetation communities on the Gunn Point Peninsular.**

In the Darwin and Palmerston area the vast majority of upland woodlands have been cleared and connectivity between patches of bush has largely been destroyed due to a failure to plan adequate vegetation corridors. This land use plan provides an opportunity to avoid the same fate for Gunn Point Peninsular by incorporating substantial corridors of native vegetation. These corridors can be designed to include representative samples of Eucalypt woodlands or forest and incorporate high density stands of the threatened *Cycas armstrongii*. **Furthermore, these corridors should be zoned as conservation (CN) under the planning scheme and protected from activities such as extractive mining. At a minimum a series of east to west corridors should connect Shoal Bay in the west to Melacca Swamp, Bankers Jungle and Black Jungle Conservation Reserve to the east. Linkages should also extend to Gunn Point and Point Stephens.**

COMMERCIAL, AGRICULTURAL AND INDUSTRIAL LAND USE

The report “Groundwater resources of the Gunn Point Area” Woltmann (2020, page 21) focuses on the lower productive aquifer. This aquifer is essential for maintenance of the permanent groundwater dependent ecosystems at Bankers Jungle and Melacca Swamp. The rainforest at Bankers Jungle draws around half its water requirement from the lower aquifer late in the dry season (Liddle et al. 2008). A reduction in water supply from this aquifer is expected to negatively impinge on threatened rainforest species including the palm *Ptychosperma macarthurii* that occurs at this site. The proposed statement to “require the groundwater demand of land uses to not exceed the sustainable recharge of the aquifers” does not cater for long-term maintenance of these permanent groundwater dependent ecosystems. Sustainable recharge is not defined and while the water table may rebuild to former wet seasonal levels during the wet season, a failure of the permanent springs to keep flowing throughout the dry season will make the spring-fed rainforests vulnerable to fire impact as has happened at Whitewood Road Rainforest in the Girraween area (Liddle et al. 2006). The local population of *Ptychosperma macarthurii* at Whitewood Road has collapsed following draw-down of the water table and increased incursion of fire into the rainforest. **A far more meaningful requirement would be to “require the groundwater demand of land uses to not exceed that required to maintain groundwater dependant ecosystems”.**

ENVIRONMENTAL CONSIDERATIONS

Environmental Management

The stated objective to “Retain the cultural and landscape value of natural features and significant native vegetation” is not achievable under the land use proposed in the draft LSLUP. **The potential to achieve this will be increased significantly by using existing environmental information to identify and support the maintenance of existing conservation and public open space zoning, implementing a network of land designated for conservation with due regard for both seasonal and permanent groundwater dependent ecosystems, significant expansion of buffers to protect high environmental value sites and a series of substantial corridors connecting patches, where the corridors incorporate many of the values of Eucalypt woodlands.**

We urge the Planning Commission and the Northern Territory Government to consider our recommendations and create a new vision for the Gunn Point Peninsular, taking advantage of the significant cultural and environmental values of the region.

Yours Sincerely

Shar Molloy
Director, Environment Centre NT

Appendix one: Significant Fauna and Flora in the Gunn Peninsular region

Table 1: Significant* fauna species in the Gunn Peninsula region		
Taxonomic Group	Species	Status
Mammals	Northern Quoll (<i>Dasyurus hallucatus</i>)	Vulnerable (NT); Near Threatened (IUCN)
	Black footed tree rat (<i>Membriomys gouldii</i>)	Near Threatened (IUCN)
	Pale Field Rat (<i>Rattus tunneyi</i>)	Near Threatened (IUCN)
	Delicate Mouse (<i>Pseudomys deliculatus</i>)	Near Threatened (IUCN)
	Common Planigale (<i>Planigale maculata</i>)	Data Deficient (IUCN)
	Common Bent wing Bat (<i>Miniopterus schreibersii</i>)	Near Threatened (IUCN)
	Yellowbellied Sheathtailed Bat (<i>Saccolaimus flaviventris</i>)	Near Threatened (IUCN)
	Irrawaddy Dolphin (<i>Orcaella brevirostris</i>)	Data Deficient (IUCN)
	Dugong (<i>Dugong dugong</i>)	CITES and CMS
Indo-Pacific Hump-backed Dolphin (<i>Sousa sinensis</i>)	Data Deficient (IUCN)	
Birds	Eastern Curlew (<i>Numenius minutus</i>)	Near Threatened (IUCN); CAMBA; JAMBA; BONN
	Black necked Stork (<i>Ephippiorhynchus asiaticus</i>)	Near Threatened (IUCN)
	Australian Bustard (<i>Ardeotis australis</i>)	Vulnerable (NT)
	Red Goshawk (<i>Erythriothochis radiatus</i>)	Vulnerable (NT & National & IUCN)
	Bush Stone Curlew (<i>Burhinus grallarius</i>)	Near Threatened (IUCN)
	Asian Dowithcher (<i>Limnodromus semipalmatus</i>)	Near Threatened (IUCN)
	Australian Spotted Crake (<i>Pozanus fluminea</i>)	Data deficient (NT)
	Wood Sandpiper (<i>Tringa glareola</i>)	Data deficient (NT); CAMBA; JAMBA; BONN
	White Bellied Sea Eagle (<i>Haliaeetus leucogaster</i>)	CAMBA
	Fork-tailed Swift (<i>Apus pacificus</i>)	CAMBA; JAMBA
	Great Egret (<i>Ardea alba</i>)	CAMBA; JAMBA
	Cattle Egret (<i>Ardea ibis</i>)	CAMBA; JAMBA
	Eastern Reef Egret (<i>Egretta sacra</i>)	CAMBA
	Black Bittern (<i>Ixobrychus flavicollis</i>)	Data Deficient (NT)
	Beach Stone Curlew (<i>Esacus neglectus</i>)	Near Threatened (IUCN)
	Greater Sand Plover (<i>Charadrius leschenaultii</i>)	CAMBA; JAMBA; BONN
	Lesser Sand Plover (<i>Charadrius mongolis</i>)	CAMBA; JAMBA; BONN
	Grey Plover (<i>Pluvialis squatarola</i>)	CAMBA; JAMBA; BONN
	Pacific Golden Plover (<i>Pluvialis fulva</i>)	CAMBA; JAMBA
	Oriental Plover (<i>Charadrius veredus</i>)	JAMBA
	Restless Flycatcher (<i>Miagra inquieta</i>)	BONN
	Leaden Flycatcher (<i>Miagra rubecula</i>)	BONN
	Oriental Cuckoo (<i>Cuculus saturatus</i>)	CAMBA; JAMBA
	Oriental Pratincole (<i>Glareola maldivarum</i>)	CAMBA; JAMBA
	White winged Black Tern (<i>Chlidonias leucopterus</i>)	CAMBA; JAMBA
	Little Tern (<i>Sterna albifrons</i>)	CAMBA; JAMBA
	Lesser Crested Tern (<i>Sterna bengalensis</i>)	CAMBA
	Caspian Tern (<i>Sterna caspia</i>)	CAMBA; JAMBA
	Rainbow Bee Eater (<i>Merops ornatus</i>)	JAMBA
	Common Sandpiper (<i>Actitis hypoleucas</i>)	CAMBA; JAMBA; BONN
	Ruddy Turnstone (<i>Arenaria interpres</i>)	CAMBA; JAMBA; BONN
	Sharp Tailed Sandpiper (<i>Calidris acuminata</i>)	CAMBA; JAMBA; BONN
	Red Knot (<i>Calidris canutus</i>)	CAMBA; JAMBA; BONN
	Curlew Sandpiper (<i>Calidris ferruginea</i>)	CAMBA; JAMBA; BONN
	Red Necked Stint (<i>Calidris ruficollis</i>)	CAMBA; JAMBA; BONN
	Great Knot (<i>Calidris tenuirostris</i>)	CAMBA; JAMBA; BONN

Table 1: Significant* fauna species in the Gunn Peninsula region *continued...*

Taxonomic Group	Species	Status
Birds	Grey Tailed Tattler (<i>Heteroscelus brevipes</i>)	CAMBA; JAMBA; BONN
	Bar Tailed Godwit (<i>Limosa lapponica</i>)	CAMBA; JAMBA; BONN
	Black Tailed Godwit (<i>Limosa limosa</i>)	CAMBA; JAMBA; BONN
	Little Curlew (<i>Numenius madagascariensis</i>)	CAMBA; JAMBA; BONN
	Whimbrel (<i>Numenius minutus</i>)	CAMBA; JAMBA; BONN
	Common Greenshank (<i>Tringa nebularia</i>)	CAMBA; JAMBA; BONN
	March Sandpiper (<i>Tringa stagnatalis</i>)	CAMBA; JAMBA; BONN
	Terek Sandpiper (<i>Xenus cinereus</i>)	CAMBA; JAMBA; BONN
	Brown Booby (<i>Sula leucogaster</i>)	CAMBA; JAMBA
	Sanderling (<i>Calidris alba</i>)	CAMBA; JAMBA
	Latham's Snipe (<i>Gallinago hardwickii</i>)	Data Deficient (NT) CAMBA; JAMBA
	Swinhoes Snipe (<i>Gallinago megala</i>)	Data Deficient (NT) CAMBA; JAMBA
	Glossy Ibis (<i>Plegadis falcinellus</i>)	CAMBA
Frogs	Giant Frog (<i>Cyclorana australis</i>)	Data Deficient (NT)
	Ornate Burrowing Frog (<i>Limnodynastes ornatus</i>)	Data Deficient (NT)
Reptiles	Green Turtle (<i>Chelonia mydas</i>)	Vulnerable (National/EPBC)
	Hawksbill Turtle (<i>Eretmochelys imbricata</i>)	Critically Endangered (IUCN); Vulnerable (National/EPBC); Data Deficient (NT)
	Sea Snakes (<i>Hydrophiidae and Laticaudidae</i>)	Protected (National/EPBC)
	Estuarine crocodile (<i>Crocodylus porosus</i>)	Protected (National/EPBC); BONN
	Howard River Toadlet (<i>Uperoleia Grey</i>)	Data Deficient
	Mangrove Monitor (<i>Varanus indicus</i>)	Data Deficient (NT) CITES
	Macleays Water Snake (<i>Enhydryis polylepis</i>)	Data Deficient (NT)
	Black Whip Snake (<i>Demansia atra</i>)	Data Deficient (NT)
	Olive Whip Snake (<i>Demansia olivacea</i>)	Data Deficient (NT)
	Papuan Whip Snake (<i>Demansia papuensis</i>)	Data Deficient (NT)
	Collared Whip Snake (<i>Demansia torquata</i>)	Data Deficient (NT)
	Taipan (<i>Oxyuranus scutellatus</i>)	Data Deficient (NT)
	King Brown (<i>Pseudechis australis</i>)	Data Deficient (NT)
	Western Brown Snake (<i>Pseudonaja nuchalis</i>)	Data Deficient (NT)
	Northern Small Eyed Snake (<i>Rhinoplocephalus pallidiceps</i>)	Data Deficient (NT)
	Northern Bandy Bandy (<i>Vernicella multifasciata</i>)	Data Deficient (NT)
	Common Blue Tongue Lizard (<i>Tiliqua scincoides</i>)	Data Deficient (NT)
	Mertens Water Monitor (<i>Varanus mertensi</i>)	Data Deficient (NT) CITES
	Spotted Tree Monitor (<i>Varanus scalaris</i>)	Data Deficient (NT) CITES
	<i>Varanus primordius</i>	Data Deficient (NT) CITES

(Species lists are collated from the database of NTPWS November 2005; KBR 2003a and marine animals – URS 2003).

* 'Significant' – is defined as those species in need of active management or protection as recognized in one or more of the following agreements and treaties.

CAMBA = China-Australia Migratory Bird Agreement (CAMBA 1986)

JAMBA = Japan-Australia Migratory Bird Agreement (JAMBA 1974)

BONN = Convention of the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979)

CITES = Convention on International Trade in Endangered Species

EPBC = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

IUCN = World Conservation Union Red List



Table 2: Significant* Flora Species in the Gunn Peninsula Region

Family	Species	IUCN Status
Apiaceae	<i>Trachymene rotundifolia</i>	Not Evaluated and Endemic to NT
Araceae	<i>Typhonium praetermissum</i>	Data Deficient and Endemic to NT
Aracaceae	<i>Ptychosperma macarthurii</i>	Endangered
Asclepiadaceae	<i>Cynanchum leibianum</i>	Data Deficient and Endemic to NT
Combretaceae	<i>Terminalia</i> D20544 Black Pt	Near Threatened
Convolvulaceae	<i>Jacquemontia browniana</i> var. <i>grandiflora</i> <i>Operculina turpethum</i>	Not Evaluated and Endemic to NT Near Threatened
Cycadaceae	<i>Cycas armstrongii</i>	Vulnerable and Endemic to NT
Cyperaceae	<i>Fimbristylis</i> A64431 Howard River <i>Fimbristylis dunlopii</i>	Data Deficient and Endemic to NT Data Deficient and Endemic to NT
Droseraceae	<i>Drosera brevicornis</i> <i>Drosera darwinensis</i>	Not Evaluated Not Evaluated and Endemic to NT
Eriocaulaceae	<i>Eriocaulon nematophyllum</i> <i>Eriocaulon tricornum</i>	Data Deficient Data Deficient and Endemic to NT
Euphorbiaceae	<i>Margaritaria indica</i>	Not Evaluated
Goodeniaceae	<i>Goodenia</i> D73968 <i>elaiosoma</i>	Data Deficient and Endemic to NT
Lentibulariaceae	<i>Utricularia hamiltonii</i> <i>Utricularia holtzei</i> <i>Utricularia quinquedentata</i> <i>Utricularia triflora</i>	Near Threatened and Endemic to NT Near Threatened and Endemic to NT Near Threatened Near Threatened and Endemic to NT
Lindsaeaceae	<i>Lindsaea ensifolia</i> subsp. <i>ensifolia</i>	Not Evaluated
Loganiaceae	<i>Mitrasacme secedens</i>	Data Deficient and Endemic to NT
Loranthaceae	<i>Decaisnina signata</i> subsp. <i>signata</i>	Not Evaluated
Menyanthaceae	<i>Nymphoides subacuta</i>	Near Threatened
Orchidaceae	<i>Chiloischista phyllorhiza</i> <i>Habenaria hymenophylla</i> <i>Habenaria triplonema</i> <i>Malaxis marsupichila</i>	Near Threatened Data Deficient Data Deficient Vulnerable
Pittosporaceae	<i>Pittosporum moluccanum</i>	Near Threatened
Poaceae	<i>Elionurus citreus</i> <i>Schizachrium perplexum</i>	Data Deficient Not Evaluated
Polygalaceae	<i>Polygala pycnophylla</i>	Not Evaluated
Rubiaceae	<i>Pavetta conferta</i>	Not Evaluated and Endemic to NT
Rutaceae	<i>Citrus gracilis</i>	Near Threatened and Endemic to NT
Stylidiaceae	<i>Stylidium capillare</i> <i>Stylidium cordifolium</i> <i>Stylidium fissilobum</i> <i>Stylidium tenerrimum</i>	Data Deficient Data Deficient Data Deficient Data Deficient and Endemic to NT
Tiliaceae	<i>Corchurus capsularis</i>	Data Deficient
Verbenaceae	<i>Avicennia integra</i>	Near Threatened and Endemic to NT

(Species lists collated from NT Herbarium Database November 2005 and KBR 2003a)

*'Significant' – is defined as those species in need of active management or protection as recognised by the Northern Territory Parks and Wildlife Commission of the Northern Territory.

Appendix two

Proposed impacts of industrial development

Table 3: Some potential impacts of the proposed industrial development	
Activity	Impact
Dredging	Substrate removal and thus habitat and species removal; Alteration of bottom topography and hydrography, and thus destruction of local habitats and the risk of direct physical/mechanical stress to the species present. Dredging also releases bound heavy metals.
	Alteration of sediment composition leading to change of the nature and diversity of benthic communities - decline of individual density, species abundances or biomass; local resuspension of sediments. In muddy environments, substantial short-term turbidity can result. Smothering of adjacent environments.
Vegetation Clearance	Destruction of communities; habitat loss; changes in hydrology – drainage and groundwater levels; erosion; loss of ecological connectivity.
	The destruction of vegetated habitats such as seagrasses, saltmarshes, mangroves and algal communities presents problems analogous to that of vegetation clearance on land.
	Clearing of mangroves leads to increased erosion resulting in increased sedimentation and smothering of benthic organisms, and turbidity; also loss of coastal buffer stability.
	Clearing coastal wetlands results in the loss of beneficial filtering of water and potential acid-sulphate soil release.
Coastal Development	Destabilisation of coastal zones through clearing; reclamation and port structures; reduced habitat and increased pollution for marine and littoral environments.
Land Reclamation	Destruction of mangrove and littoral communities; required fill for reclamation sourced from benthic floor transported from site of extractive industry; potential acid-sulphate soil release.
Port and Groyne Structures	These not only directly impact on littoral and supra littoral habitats but can result in the loss of beach, seagrass and mangrove habitats when current and wave patterns are altered. Altering hydrology changes sediment transport and deposition patterns.
Shipping	Rubbish, galley wastes and wastewaters impact water quality, particularly in coastal and semi-protected waters. Introduction of exotic pests in bilge water. Shipping accidents can cause oil spills and other toxic contamination of the marine and coastal environment.
Spoil from Construction	Habitat loss due to burial and increased turbidity.
Toxic Substance Spills	Organochlorine, PCBs, heavy metals, acids and radioactive wastes – can cause direct poisoning and an array of secondary or cumulative effects (for more information see Table 2 - Industry Specific Impacts).
Release of Excessive Nutrients	Increased nutrient run-off and sewage disposal can result in eutrophication, leading to changes in communities, algal blooms, increased Biological Oxygen demand (BOD);
Sediments	Siltation and sedimentation can result in smothering, substrate change, clogging of gills in aquatic species, reduction in light and subsequent loss of vegetation;
Oil and Petroleum Spills	Spills can result in smothering of benthic organisms, and toxic effects from both the dissolved fraction of the oil and the chemicals used to clean it up.
Sewage	There are also complex mixtures, such as in sewage, which can contain many or all of the above components and have a range of effects.
Water Use	Water use exceeding the groundwater supplies; disrupts groundwater flows thus affecting vegetation communities; increases salinity of the groundwater supply.
Urban discharge	Runoff is characterised by high sediment and nutrient levels, leading to eutrophication, bacterial contamination, oxygen depletion, elevated turbidity and siltation.

Information compiled from ¹NOO (2002) and ²EA (2003)

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