# The Vegetation and Plants on mining tenement ELA27521, Winchelsea Island

Supplementary report: Wet Season survey

April 2019

Kym Brennan April 2019

#### **SUMMARY**

This report provides the results of a wet season survey of the plants of mining tenement ELA27521, Winchelsea Island. It was conducted over 2 days (14-15 April 2019) after recognition that an earlier survey in November 2018 was deficient due to unfavourable seasonal conditions. The focus of this survey was on annuals and seasonally deciduous or seasonally dormant perennials, particularly those currently recognised as significant or threatened, or as introduced weeds. We also inspected the site of a proposed barge landing at the southern end of the island.

This survey added 64 species to the total obtained in November 2018; the November survey had therefore missed around 40% of the species due to adverse seasonal factors. With results from surveys prior to 2018, 52 of the 64 species were new records for the Island. One of them, the small kapok tree *Cochlospermum gregorii* was a new record for the greater Groote Eylandt archipelago.

Although collectively, a substantial number of additional species records was obtained from across ELA27521, the frequency of occurrence of herbaceous annuals was astonishingly low with this element of the flora being almost completely suppressed by shade from shrub layers and thick leaf litter.

No threatened plant species were found but one additional significant species, *Cyanthillium cinereum var. lanatum*, listed as NE (not evaluated) was recorded. However, this species is not endemic to the NT or geographically restricted to the Groote Eylandt region - it is widespread across the Top End. Therefore, of the 3 significant species now known from Winchelsea Island only *Sida sp*. Groote Eylandt is geographically restricted to it. On this survey *Sida sp*. Groote Eylandt proved to be widespread across the island with a possible affinity to areas where outcrops of manganese-bearing rocks occur.

Two additional introduced species were found. The tamarind tree, *Tamarindus indica* is abundant in the monsoon vine forests around the southern end of the tenement but is accepted as a common component of coastal fringe vegetation across the Top End, having been introduced prior to European settlement by Makassan seafarers. *Passiflora foetida*, stinking passionfruit can be an aggressive weedy vine. The only place it was seen was at the beach, under a casuarina tree used as a staging point by work groups and others coming to and from the island by boat. The potential for future weed introductions from Groote Eylandt is considered high. All industrial areas on Groote Eylandt have dense weedy perimeters which include, Snake Weed *Stachytarpheta jamaicensis*, Hyptis *Mesosphaerum suaveolens* and Mission Grass *Cenchrus pedicellatus;* and there is recent evidence that another significant weed, Grader Grass *Themeda quadrivalvis* is spreading from the community of Angurugu.

The vegetation on the rocky slopes above the proposed barge landing site (lat -13.77698, long 136.49574) is typical of vegetation class 9, *Eucalyptus tetrodonta* open forest. *Sida sp.* Groote Eylandt was a common component in the shrub layer at the site. No weeds were seen at the site.

Overall, the flora of ELA27521 contains a range of plants that are widespread in Eucalypt woodland and open forest environments across the Top End. The most significant plant is *Sida sp*. Groote Eylandt which is relatively common across Winchelsea Island and could largely be restricted to it. While *Sida sp*. Groote Eylandt has also been collected from neighbouring Groote Eylandt the extent of its occurrence there has not been fully established. There is an urgent need for the taxonomic status of this species to be resolved and for its threat level to be properly assessed. Winchelsea

Island is essentially weed-free but this could easily change through the movement of people, and plant and equipment from weed contaminated industrial estates at Groote Eylandt.

#### METHODS FOR THE WET SEASON SURVEY

The earlier November survey used plot-based techniques at sites of proposed drill pads with other records obtained from along the routes of tracks to be cleared to access them. Most of the sites were accessed by bushwalking. This approach was not possible for the wet season survey. Seasonal growth of rampant vines, mostly *Amplelocissus acetosa* and *Smilax australis* rendered already thick shrubby understories almost impenetrable. However, in the months since the November survey, additional work to cut access paths across the interior of the island was completed which resulted in two navigable tracks through the middle of ELA27521; one running east-west and the other running north-south (Figure 1). These paths intersected all the main vegetation types so we used them as transects along which to search for:

- species not seen during the November survey with a particular focus on
- additional records of significant / threatened species and
- additional records of weedy species

Where the paths ran close to previously sampled drill pad sites these were revisited to record any plants not seen on the first visit.

In total there was around 13km of cleared pathways which we traversed over 2 days on April 14-15, 2019.

# **RESULTS**

This wet season survey added 52 species to the list presented in Table 1 of the January 2019 report. One hundred and seventy species are now known from Winchelsea Island (updated Table 1 below). The earlier survey in November had therefore missed at least 40% of the species due to unfavourable seasonal conditions. Overall, only 9 species recorded from visits earlier than 2018 were not seen during our 2018/2019 surveys. However, many of these 9 species normally only occur in wetlands, a habitat we did not target as there was no wetland habitat at proposed drill pad sites or along the lines to be cleared to get to them. Of the new records for Winchelsea island, the kapok tree, *Cochlospermum gregorii*, seen at the rear of a beach to the east of the barge landing site, proved to be a new record for the greater Groote Eylandt archipelago. It is not a threatened species.

Although collectively, a substantial number of additional species records were obtained from across ELA27521, the frequency of occurrence of herbaceous annuals was astonishingly low with this element of the flora being almost completely suppressed by shading from dense shrub layers and a more-or-less continuous cover of thick leaf litter. The records of most of the annual herbs were from just one or two observations over the entire two-day survey. There were no annual grasses seen and only 5 species of perennial grass, which again were very sparsely distributed except for two spinifex grasses, *Triodia procera* and *Triodia microstachya* which became common on areas adjacent to sandstone around the northern periphery of ELA27521.

Table 1. Updated species list from ELA27521 with lifeform and IUCN threat status codes (TPWC Act 2014

Family	Species	Lifeform	IUCN threat status	2018-9 surveys	Previous surveys
ACANTHACEAE	Hypoestes floribunda	fo	lc (=least concern)	<mark>۷</mark>	
ACANTHACEAE	Pseuderanthemum variabile	fo	lc	<mark>√</mark>	
AMARANTHACEAE	Ptilotus conicus	fo	lc	V	
AMARYLLIDACEAE	Crinum arenarium	fo	lc	V	
ANACARDIACEAE	Buchanania obovata	tr	lc	٧	٧
ANNONACEAE	Uvaria glabra	vn	lc	V	٧
APOCYNACEAE	Alyxia spicata	vn	lc	V	
APOCYNACEAE	Carissa lanceolata	sh	lc	٧	٧
APOCYNACEAE	Cynanchum viminale subsp. brunonianum	vn	lc	<mark>۷</mark>	
APOCYNACEAE	Gymnanthera oblonga	vn	lc	V	٧
APOCYNACEAE	Marsdenia trinervis	sh.fo	lc	V	
APOCYNACEAE	Tabernaemontana orientalis	tr.sh	lc	٧	٧
APOCYNACEAE	Tylophora cinerascens	vn	lc	٧	
APOCYNACEAE	Tylophora flexuosa	vn	lc	V	٧
ARISTOLOCHIACEAE	Aristolochia pubera	fo	lc	V	٧
ASPARAGACEAE	Asparagus racemosus	vn	lc	٧	
ASTERACEAE	Cyanthillium cinereum var. lanatum	fo	ne (=not evaluated)	<mark>۷</mark>	
BIXACEAE	Cochlospermum gregorii	tr	lc	V	
BORAGINACEAE	Trichodesma zeylanicum	fo	lc	V	
BURSERACEAE	Canarium australianum	Tr	lc	٧	
CAPPARACEAE	Capparis quiniflora	vn	lc	V	٧
CELASTRACEAE	Denhamia cunninghamii	tr	lc	٧	
CELASTRACEAE	Denhamia obscura	tr	lc	٧	٧
CLEOMACEAE	Cleome viscosa	fo	lc	V	
COMBRETACEAE	Terminalia canescens	tr	lc	٧	
COMBRETACEAE	Terminalia carpentariae	tr	lc	٧	٧
COMBRETACEAE	Terminalia pterocarya	tr	lc	٧	
CONVOLVULACEAE	Bonamia pannosa	fo	lc	<mark>۷</mark>	
CONVOLVULACEAE	Xenostegia tridentata	vn	lc	V	
CUPRESSACEAE	Callitris intratropica	tr	lc	٧	
CYCADACEAE	Cycas arnhemica	pm	lc	٧	٧
CYPERACEAE	Bulbostylis barbata	se	lc	V	
CYPERACEAE	Schoenus sparteus	se	lc	٧	
DILLENIACEAE	Hibbertia lepidota	sh	lc	٧	
DILLENIACEAE	Hibbertia oblongata subsp. oblongata	sh	lc	٧	
DILLENIACEAE	Hibbertia tomentosa	sh	lc	٧	
DIOSCOREACEAE	Dioscorea bulbifera	vn	lc	٧	٧
DIOSCOREACEAE	Dioscorea transversa	vn	lc	<mark>۷</mark>	

DROSERACEAE	Drosera dilatato-petiolaris	fo	lc	<mark>۷</mark>	
EBENACEAE	Diospyros humilis	tr.sh	Ic	٧	٧
EBENACEAE	Diospyros maritima	tr	lc	٧	
EBENACEAE	Diospyros rugosula	tr.sh	lc	٧	
ELAEOCARPACEAE	Elaeocarpus arnhemicus	tr	lc	٧	
EUPHORBIACEAE	Croton habrophyllus	tr	lc	V	
EUPHORBIACEAE	Euphorbia	fo	lc	V	
FABACEAE	Abrus precatorius subsp. precatorius	vn	lc	V	
FABACEAE	Acacia alleniana	sh	lc	٧	
FABACEAE	Acacia auriculiformis	tr	lc	٧	
FABACEAE	Acacia difficilis	tr.sh	lc	٧	
FABACEAE	Acacia holosericea	sh	lc	٧	٧
FABACEAE	Acacia lamprocarpa	tr	lc	٧	
FABACEAE	Acacia latescens	tr	lc	٧	٧
FABACEAE	Acacia leptocarpa	tr	lc		٧
FABACEAE	Acacia linarioides	sh	lc	٧	
FABACEAE	Acacia multisiliqua	sh	lc	٧	
FABACEAE	Acacia nuperrima	sh	lc	٧	
FABACEAE	Acacia oncinocarpa	sh	lc	٧	
FABACEAE	Acacia simsii	sh	Ic	٧	٧
FABACEAE	Acacia torulosa	tr	lc	٧	٧
FABACEAE	Acacia umbellata	sh	lc	٧	
FABACEAE	Bossiaea bossiaeoides	sh	Ic	٧	
FABACEAE	Chamaecrista nigricans	sh.fo	Ic	V	
FABACEAE	Crotalaria medicaginea var.	fo	lc	<mark>۷</mark>	
FABACEAE	medicaginea Crotalaria retusa	fo	lc	٧	
FABACEAE		fo		V	
FABACEAE	Desmodium trichostachyum		lc	,	<b>√</b>
	Erythrophleum chlorostachys  Jacksonia dilatata	Tr.sh	lc	٧	٧
FABACEAE	Indigofera colutea	sh	lc	٧	
FABACEAE	J ,	sh.fo	lc	<mark>√</mark> ,	٧
FABACEAE	Indigofera hirsuta		lc	<mark>√</mark>	٧
FABACEAE FABACEAE	Indigofera linifolia Rhynchosia minima	fo	lc lc	<b>√</b>	
	•	vn tr.ch		V.	
FABACEAE FABACEAE	Sophora tomentosa subsp. australis  Tamarindus indica	tr.sh TR	lc V (=ovotic)	<mark>√</mark>	٧
FABACEAE	Tephrosia (narrow leaflets)	sh	X (=exotic)	√ √	
FABACEAE	Tephrosia (narrow leanets)	sh.fo	lc	٧ -/	
FABACEAE	Tephrosia juncea  Tephrosia phaeosperma / sp.	sn.ro sh	lc lc	<mark>√</mark>	
PADACEAE	Pentecost River	511	IC .	٧	
FABACEAE	Tephrosia sp. Muddy Bay (P.I.Forster 15313)	sh	lc	<mark>۷</mark>	
FABACEAE	Tephrosia spechtii	sh	lc	٧	
FLAGELLARIACEAE	Flagellaria indica var. australiensis	vn	lc	٧	
LAMIACEAE	Clerodendrum tomentosum var. tomentosum	tr.sh	Ic	<mark>۷</mark>	٧

LAMIACEAE	Vitex glabrata	tr	lc	٧	
LAURACEAE	Cassytha filiformis	vn	lc	٧	٧
LAURACEAE	Litsea glutinosa	tr	lc	٧	
LECYTHIDACEAE	Planchonia careya	tr.sh	lc		٧
LOGANIACEAE	Strychnos lucida	tr	lc	٧	
MALVACEAE	Brachychiton diversifolius subsp. diversifolius	tr	lc	٧	
MALVACEAE	Brachychiton paradoxus	tr.sh	lc	٧	
MALVACEAE	Corchorus aestuans	fo	lc		٧
MALVACEAE	Corchorus sidoides subsp. rostrisepalus	sh	lc	٧	
MALVACEAE	Helicteres cana subsp. cana	sh	ne	٧	
MALVACEAE	Hibiscus	sh		٧	
MALVACEAE	Hibiscus geranioides	fo	lc	٧	
MALVACEAE	Malvastrum americanum	fo	Х		٧
MALVACEAE	Melhania oblongifolia	sh	lc	٧	
MALVACEAE	Sida sp. Groote Eylandt	sh	ne	٧	٧
MALVACEAE	Sterculia quadrifida	tr	lc	٧	
MALVACEAE	Triumfetta denticulata	sh.fo	lc	٧	
MALVACEAE	Waltheria indica	sh.fo	lc	v v	٧
MELIACEAE	Aglaia brownii	tr	lc	V	
MOLLUGINACEAE	Glinus oppositifolius	fo	lc		٧
MORACEAE	Ficus henneana	TR	lc	٧	
MYRTACEAE	Asteromyrtus symphyocarpa	tr.sh	lc		٧
MYRTACEAE	Calytrix brownii	sh	lc	٧	
MYRTACEAE	Corymbia ferruginea subsp. ferruginea	tr	lc	٧	
MYRTACEAE	Corymbia kombolgiensis	TR	lc	٧	
MYRTACEAE	Corymbia polycarpa	TR	lc	٧	٧
MYRTACEAE	Eucalyptus jensenii	Tr	lc	٧	
MYRTACEAE	Eucalyptus tetrodonta	TR	lc	٧	٧
MYRTACEAE	Homalocalyx ericaeus	sh	lc	٧	
MYRTACEAE	Melaleuca cajuputi subsp. cajuputi	tr	lc		٧
MYRTACEAE	Melaleuca ferruginea	tr	lc	٧	
MYRTACEAE	Melaleuca viridiflora	tr.sh	lc	٧	٧
MYRTACEAE	Syzygium suborbiculare	tr	lc	٧	
OPILIACEAE	Opilia amentacea	vn	lc	٧	
ORCHIDACEAE	Dendrobium dicuphum	foe	lc	V	
PANDANACEAE	Pandanus spiralis	pm	lc	٧	٧
PASSIFLORACEAE	Passiflora foetida	vn	X	√	
PHYLLANTHACEAE	Antidesma ghesaembilla	tr.sh	lc	V	٧
PHYLLANTHACEAE	Breynia cernua	tr.sh	lc	V	
PHYLLANTHACEAE	Bridelia tomentosa	tr.sh	lc	V	٧
PHYLLANTHACEAE	Flueggea virosa subsp. melanthesoides	sh	lc	V	
PHYLLANTHACEAE	Glochidion xerocarpum	tr	lc	٧	٧
PHYLLANTHACEAE	Phyllanthus exilis	fo	lc	V	
PHYLLANTHACEAE	Phyllanthus hebecarpus	fo	lc	V	٧

PICRODENDRACEAE	Petalostigma banksii	tr	lc		٧
PICRODENDRACEAE	Petalostigma pubescens	tr	lc	٧	٧
PICRODENDRACEAE	Petalostigma quadriloculare	sh	lc	٧	
POACEAE	Aristida holathera var. holathera	gr	lc	٧	
POACEAE	Cymbopogon procerus	gr	lc	<mark>۷</mark>	
POACEAE	Eriachne avenacea	gr	lc	٧	
POACEAE	Sorghum plumosum	gr	lc	٧	
POACEAE	Triodia microstachya	hgr	lc	٧	
POACEAE	Triodia procera	hgr	lc	٧	
PORTULACACEAE	Portulaca bicolor	fo	lc	٧	
PTERIDACEAE	Cheilanthes	fn	lc	<mark>√</mark>	
PROTEACEAE	Grevillea heliosperma	tr	lc	٧	
PROTEACEAE	Grevillea pteridifolia	tr	lc	٧	٧
PROTEACEAE	Grevillea pungens	sh	lc	٧	
PROTEACEAE	Hakea arborescens	tr	lc	٧	٧
PROTEACEAE	Persoonia falcata	tr	lc	٧	٧
PROTEACEAE	Stenocarpus acacioides	tr.sh	lc	٧	
PUTRANJIVACEAE	Drypetes deplanchei	tr	lc	٧	٧
RHAMNACEAE	Alphitonia excelsa	tr	lc	٧	٧
RUBIACEAE	Aidia racemosa	Tr	lc	<mark>۷</mark>	
RUBIACEAE	Gardenia fucata	tr	lc	٧	
RUBIACEAE	Ixora timorensis	tr.sh	lc	<mark>۷</mark>	
RUBIACEAE	Morinda citrifolia	tr	lc	٧	
RUBIACEAE	Psydrax saligna f. filiformis	tr	lc	٧	
RUBIACEAE	Spermacoce elaiosoma	fo	lc	<mark>۷</mark>	
RUBIACEAE	Spermacoce gilliesiae	fo	lc	٧	
RUBIACEAE	Tabernaemontana orientalis	tr	lc	٧	
RUTACEAE	Boronia lanuginosa	sh	lc	٧	
RUTACEAE	Glycosmis trifoliata	tr.sh	lc	<mark>۷</mark>	
RUTACEAE	Harrisonia brownii	sh	lc	٧	
RUTACEAE	Micromelum minutum	tr	lc	٧	
RUTACEAE	Murraya paniculata	tr	lc	٧	
SANTALACEAE	Exocarpos latifolius	tr	lc	٧	٧
SAPINDACEAE	Atalaya variifolia	tr.sh	lc	٧	
SAPINDACEAE	Cupaniopsis anacardioides	tr	lc	٧	
SAPINDACEAE	Dodonaea hispidula var. hispidula	sh	lc	٧	٧
SAPINDACEAE	Dodonaea lanceolata var. lanceolata	sh	lc	٧	٧
SAPINDACEAE	Ganophyllum falcatum	Tr	lc	<mark>۷</mark>	
SAPOTACEAE	Mimusops elengi	Tr	lc	٧	
SAPOTACEAE	Planchonella arnhemica	tr	lc	٧	
SAPOTACEAE	Sersalisia sericea	tr	lc	٧	
SMILACACEAE	Smilax australis	vn	lc	٧	٧
VIOLACEAE	Hybanthus enneaspermus	fo	lc	<mark>۷</mark>	
VITACEAE	Ampelocissus acetosa	vn	lc	٧	٧
VITACEAE	Cayratia trifolia	vn	lc	V	



Life form codes: TR=large (canopy) tree, Tr=large (canopy) or small (mid-storey) tree, tr= small tree, sh=shrub, pm=palm, vn=vine, fo=forb (herbaceous plant not a grass or sedge), foe=epiphytic forb, fn=fern, se=sedge, gr=tussock grass, hgr=hummock grass, v = species recorded in wet season survey of Apr 2019, but not in Nov 2018.

# Threatened / significant species

In addition to *Helicteres cana subsp. cana* and *Sida sp.* Groote Eylandt, recorded in the November 2018 survey, another 'not evaluated' species, the annual daisy, *Cyanthillium cinereum var. lanatum*, was recorded at two locations during this survey. However, from Table 4 (Jan 2019 report) it was not identified as either endemic to the NT or strongly restricted to the Groote region and therefore is not considered to be of particular importance. In contrast the range-restricted *Sida sp.* Groote Eylandt proved to be much more widespread than was evident in November when most plants were leafless. Seventeen new records were obtained from this survey (Figure 1), many associated with areas having surface expressions of manganese-bearing rock.

## Exotic species

Two additional introduced species were found during this survey. The tamarind tree, *Tamarindus indica* is abundant in the monsoon vine forests around the southern end of the tenement but is accepted as a common component of coastal fringe vegetation across the Top End, having been introduced prior to European settlement by Makassan seafarers.

Passiflora foetida, stinking passionfruit can be an aggressive weedy vine. The only place it was seen was at the beach, under a shady casuarina tree used as an assembly point by work groups and others coming to and from the island by boat. Once established it is commonly spread by birds, particularly parrots (pers. obs.).

The potential for future weed incursions from Groote Eylandt to Winchelsea Island is considered high. All industrial areas around Alyangula on Groote Eylandt have dense weedy perimeters which include, Snake Weed *Stachytarpheta jamaicensis*, Hyptis *Mesosphaerum suaveolens* and Mission Grass *Cenchrus pedicellatus*. Another significant weed on Groote Eylandt is Grader Grass *Themeda quadrivalvis*, currently established at, and largely confined to the community of Angurugu south of Alyangula, but now showing signs of spread along some bush tracks.

## Proposed barge landing site (lat -13.77698, long 136.49574)

The vegetation on the rocky slopes above the beach at the site of the proposed barge landing is woodland / open forest with *Eucalyptus tetrodonta* forming the canopy; a sparse mid-storey mostly of *Acacia latescens* and a dense shrubby understorey including *Dodonaea hispidula var. hispidula*, *Alphitonia excelsa*, *Acacia torulosa*, *Carissa lanceolata* and *Sida sp.* Groote Eylandt, with a range of

shrubby forms of vine thicket species such as *Dryptetes deplanchei*, *Glochidion xerocarpum* and *Tabernaemontana orientalis*. It is typical of vegetation class 9, *Eucalyptus tetrodonta* open forest. *Sida sp.* Groote Eylandt was a common component in the shrub layer at the site. No weeds were seen at the site.

### CONCLUSION

The flora of ELA27521 includes at least 170 species. There are probably more, but any additional species would most likely be annuals which were not detected during our survey due to their very low frequency of occurrence under conditions of shading from shrubs and thick leaf litter. Overall, the range of plants across ELA27521 are species that are widespread in Eucalypt woodland and open forest environments across the Top End with the exception of *Sida sp*. Groote Eylandt which is relatively common across Winchelsea Island and could be largely restricted to it. While *Sida sp*. Groote Eylandt has also been collected from neighbouring Groote Eylandt the extent of its occurrence there has not been fully established. There is an urgent need for the taxonomic status of this species to be resolved and for its threat level to be properly assessed. In the first instance Robyn Barker from the State Herbarium of South Australia, an Australian authority on *Sida*, is best placed to deal with the taxonomic component. Staff at the Herbarium of the Northern Territory could undertake any subsequent assessments to assign an IUCN threat code.

At present Winchelsea Island is essentially weed-free but this could easily change through the movement of people, and plant and equipment from weed-contaminated industrial estates at Groote Eylandt.