Ecological Assessment of Planning Proposal, Nambucca Local Environmental Plan Amendment No. 24: Re-Zoning of Lot 2 DP 514920, Lot 11 DP 1017408 & Lot 12 DP 1017408 - Giinagay Way, Nambucca Heads

Prepared for

De Groot and Benson, Coffs Harbour

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Figures and tables

This report has been prepared by G. Elks of Idyll Spaces Environmental Consultants. The information presented is, in the opinion of the author, a true and accurate record of a study undertaken solely in response to the brief. While every attempt has been made to ensure the accuracy and objectivity of the report, the variability of the natural environment and the paucity of comparative research data may require that professional judgement be applied in reaching conclusions. Any opinions expressed in the report are the professional opinions of the author. They are not legal advice, nor are they intended to advocate any specific proposal or position.

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Executive Summary

A planning proposal for Lots Lot 2 DP 514920, Lot 11 DP 1017408 & Lot 12 DP 1017408 Giinagay Way, Nambucca Heads would rezone part (3.7ha) of the land for R1 General Residential and part (1.8ha) adjoining the Nambucca River for E3 Environmental Management.

Two remnant native vegetation communities occur in the proposed E3 zone. They are Swamp Oak Forested Wetland (0.25ha), listed as an Endangered Ecological Community under the NSW *BC Act 2016* and Tallowwood – Small-fruited Grey Gum – Ironbark – Forest Oak dry sclerophyll forest (0.09ha), which is not a community of conservation concern. The remainder of the proposed E3 zone consists of exotic pasture. No threatened flora are likely to occur in those remnants, but they are potential habitat for several threatened fauna species known to occur in the locality. However, as the proposed rezoning would increase the level of protection afforded to those remnants, no significant impact on threatened flora, fauna, communities or their habitats is considered likely.

Native vegetation in the proposed R1 zone is limited to one Brush box and one Fig tree. The remainder of this area consists of exotic lawns and pastures and exotic and introduced trees of little or no value as habitat for threatened flora or fauna likely to occur in the locality. The potential removal of those two trees, should it be required for subsequent residential development, has been assessed under the heads of consideration of the 5-part test, which indicates that their removal would not be likely to cause a loss of biodiversity, fragment ecological communities, degrade riparian zones, result in the spread of exotic species or the loss of ground layer habitat or be likely to have a significant impact on threatened flora, fauna, communities or their habitats.

Existing mapping of potential high environmental value land (NCREP 2016) is appropriate at the landscape scale as a broad indication of where high environmental land is most likely to occur, but provides little guidance as to the actual environmental value of that land at the local scale. In the study area the actual occurrence of high environmental land is confined to native vegetation remnants and to a lesser extent the Nambucca River floodplain, all of which (two trees excepted) is included in the proposed E3 Environmental Management zone, which is therefore appropriate. The area proposed as R1 General Residential is exotic lawn and grassland with exotic and introduced trees and is of little value as threatened species habitat, does not constitute high environmental value land and its development is unlikely to have an ecological impact on adjoining habitats or on threatened biodiversity generally.

Introduction

Background

Nambucca Shire Council (2018) has a planning proposal for Lots Lot 2 DP 514920, Lot 11 DP 1017408 & Lot 12 DP 1017408 Giinagay Way, Nambucca Heads. Parts of these lots were the subject of a similar study in 2004 (Elks 2004) that identified two small areas of native vegetation occupying the bank of the Nambucca River.

Council has requested that the report be updated and that it also considers the existing potential high environmental value mapping identified in the North Coast Regional Environmental Plan 2036 and whether the proposed E3 boundary identified in the planning proposal is appropriately located.

De Groot & Benson Pty Ltd has commissioned Greg Elks BSc MLitt, Botanist & Ecologist of Idyll Spaces Ecological Consultants to undertake these works.

Aims and objectives

The aim of this study is to identify the environmental significance of vegetation remnants and fauna habitats in the study area and to provide preliminary advice as to the potential impacts of rezoning from RU2 Rural to R1 General Residential and E3 Environmental Management on flora and fauna habitat.

The objectives are to:

- Prepare a map showing native vegetation locations, structure and condition.
- Identify constraints to the proposal, if any, arising from occurrences of flora species or ecological communities or fauna habitat of conservation significance.
- Identify potential for impacts on, and recommend measures likely to be necessary so as to avoid, mitigate or offset any impacts on threatened species, communities or their habitat potentially occurring within the study area.
- Provide a preliminary evaluation of the likely impacts (if any) under the provisions of the Biodiversity Conservation Act.
- Consider adequacy and appropriateness of existing mapping of potential high environmental land (NCREP 2016) and proposed E3 Environmental Management zoning.

Subject site, study area and locality

For the purposes of this assessment the locality is the area within a square of approximately 10kmx10km centred on the study area (**Figure 1**).

The study area consists of the properties located at Lot 2 DP 514920, Lot 11 DP 1017408 & Lot 12 DP 1017408 - Giinagay Way, Nambucca Heads. These adjoining lots are bounded to the north by Giinagay Way, to the south by the Nambucca River, to the east and west by an existing motel and a caravan park respectively.

The subject site includes all remnant native vegetation and associated terrestrial fauna habitats on the property. It does not include aquatic habitats associated with the Nambucca River..

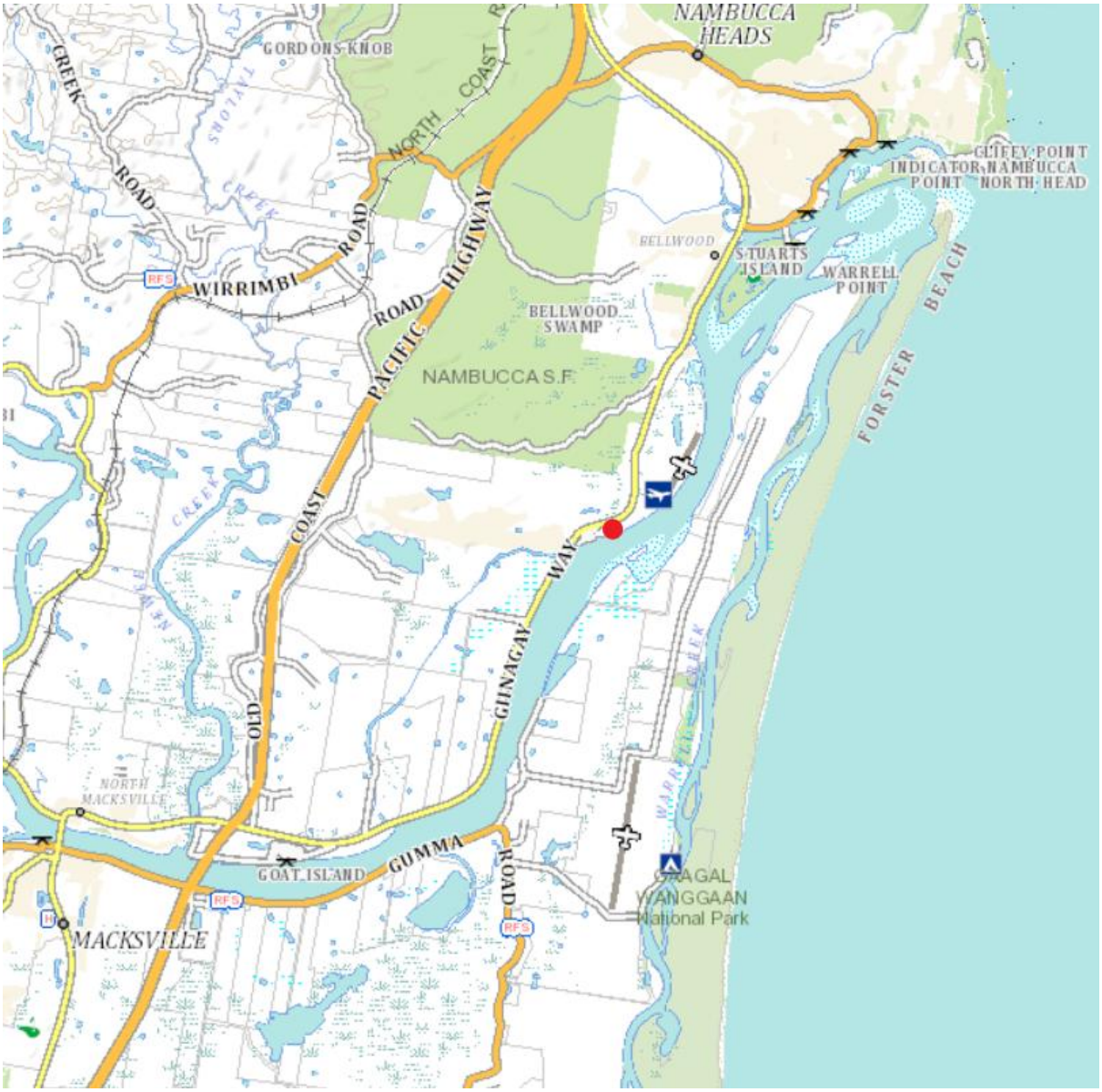

Figure 1. The study area (red dot) and locality

Landform, geology, and soils

The property consists of a low ridgeline, rising in the south-western corner to a low bluff, falling to flats beside the Nambucca River.

Elevated parts of the property are located on the Nambucca Beds, late Carboniferous metasediments of slate and phyllite; low-lying areas are located on the alluvial levee plain of the Nambucca River (Eddie 2000).

Elevated areas are mapped as the Newry soil landscape (Eddie 2000). Soils are Podsols, commonly with quartz gravels. They may be soils of moderate fertility but topsoils may be very acid and they are highly erodible. In near-coastal locations the soils are also sodic and hardsetting.

Low-lying areas are mapped as the Raleigh soil landscape, which has formed on deep, unconsolidated Holocene fluvial sediments. Soils in this landscape are very variable, are typically of moderate fertility but have poor subsoil drainage.

Map and data review

A Bionet Wildlife Atlas search undertaken on 10 June 2019 of Valid Records of Threatened (listed on TSC Act 1995) Entities in selected area [North: -30.63 West: 152.93 East: 153.03 South: -30.73] returned a total of 784 records of 49 species.

The Biodiversity Offset Scheme Entry Tool online map (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap) accessed 11 June indicated that there was no area of mapped biodiversity value on the property.

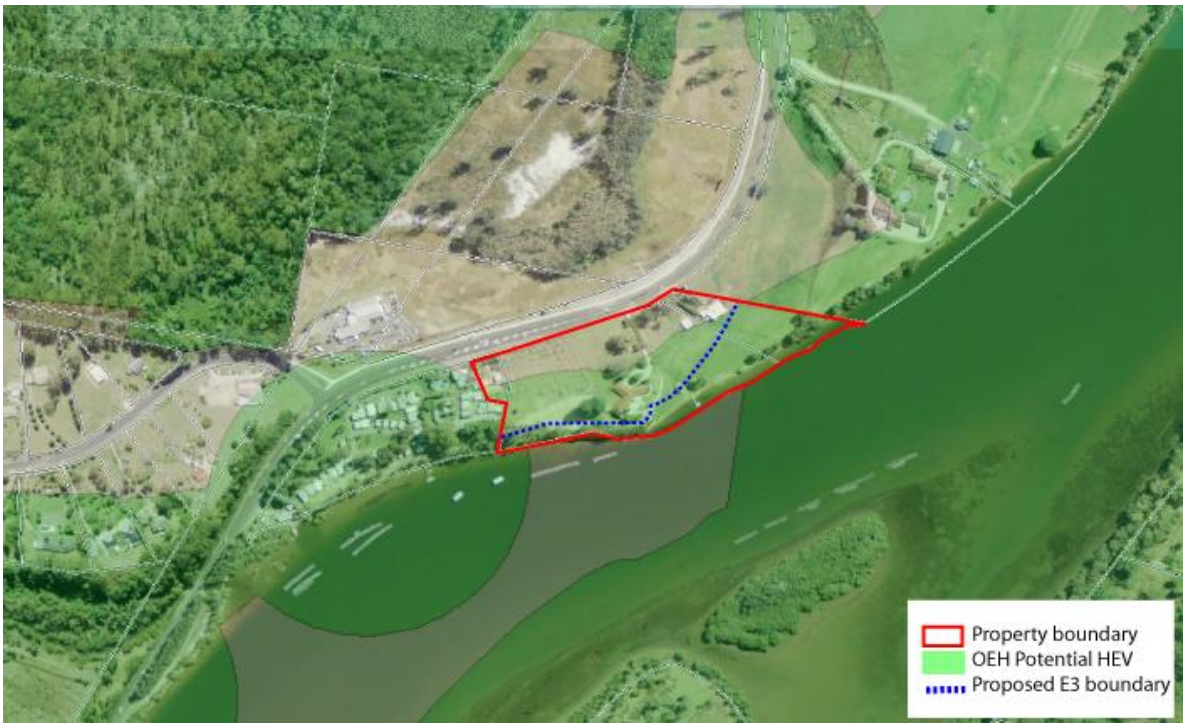

Figure 2. OEH Potential HEV land and proposed E3 Zone.

The mapping of Potential High Environmental Value (HEV) land undertaken by the NSW Office of Environment and Heritage (OEH) was downloaded from OEH Data Services and is shown in **Figure 2**, together with the proposed E2/R1 zone boundary. Potential HEV captures areas of native vegetation of high conservation value, threatened ecological communities, key fauna habitats and important wetlands, coastal lakes and estuaries. It covers that part of the property within about 100m of the Nambucca River estuary.

Nambucca Shire Vegetation Mapping (OEH 2015) coverage maps small areas of open forest (PCT 2160, shaded brown) in the south-western corner of the property, swamp forest (PCT 1917, shaded blue) adjoining the estuary and patches of exotic vegetation (PCT 9999 shaded yellow) elsewhere on the property (**Figure 3)**.

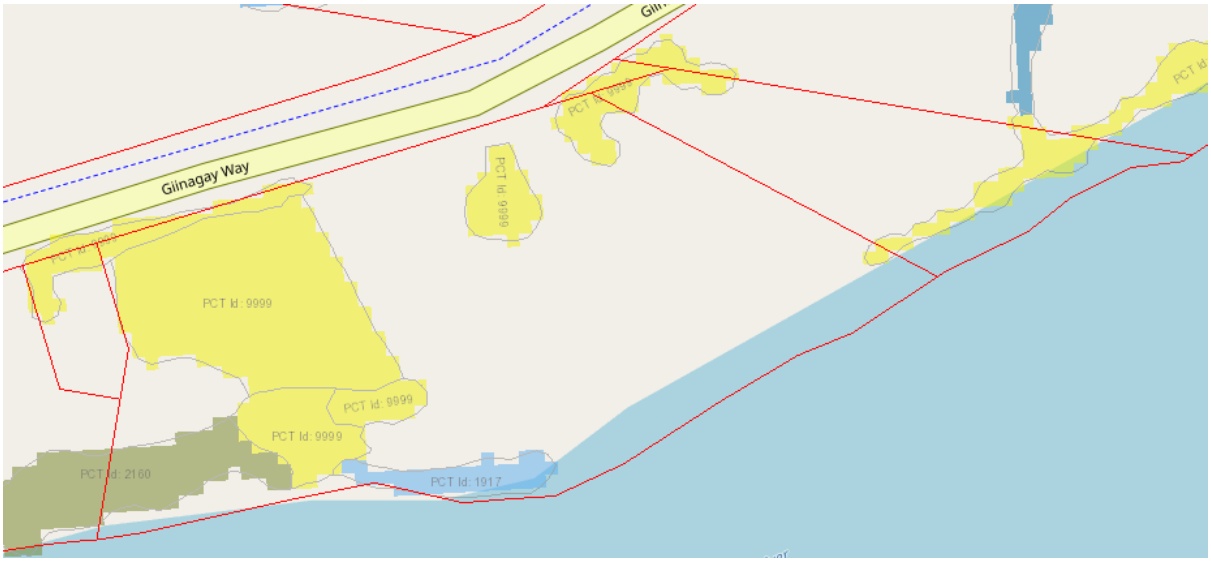

Figure 3. Nambucca Shire vegetation map

Field survey

The property was examined over 2 hours on 11 June 2019 to identify native vegetation species, field check Nambucca Shire Vegetation Mapping and search for threatened species, habitats and indications of resident fauna such as scats, nests, whitewash, tree hollows, burrows and large woody debris.

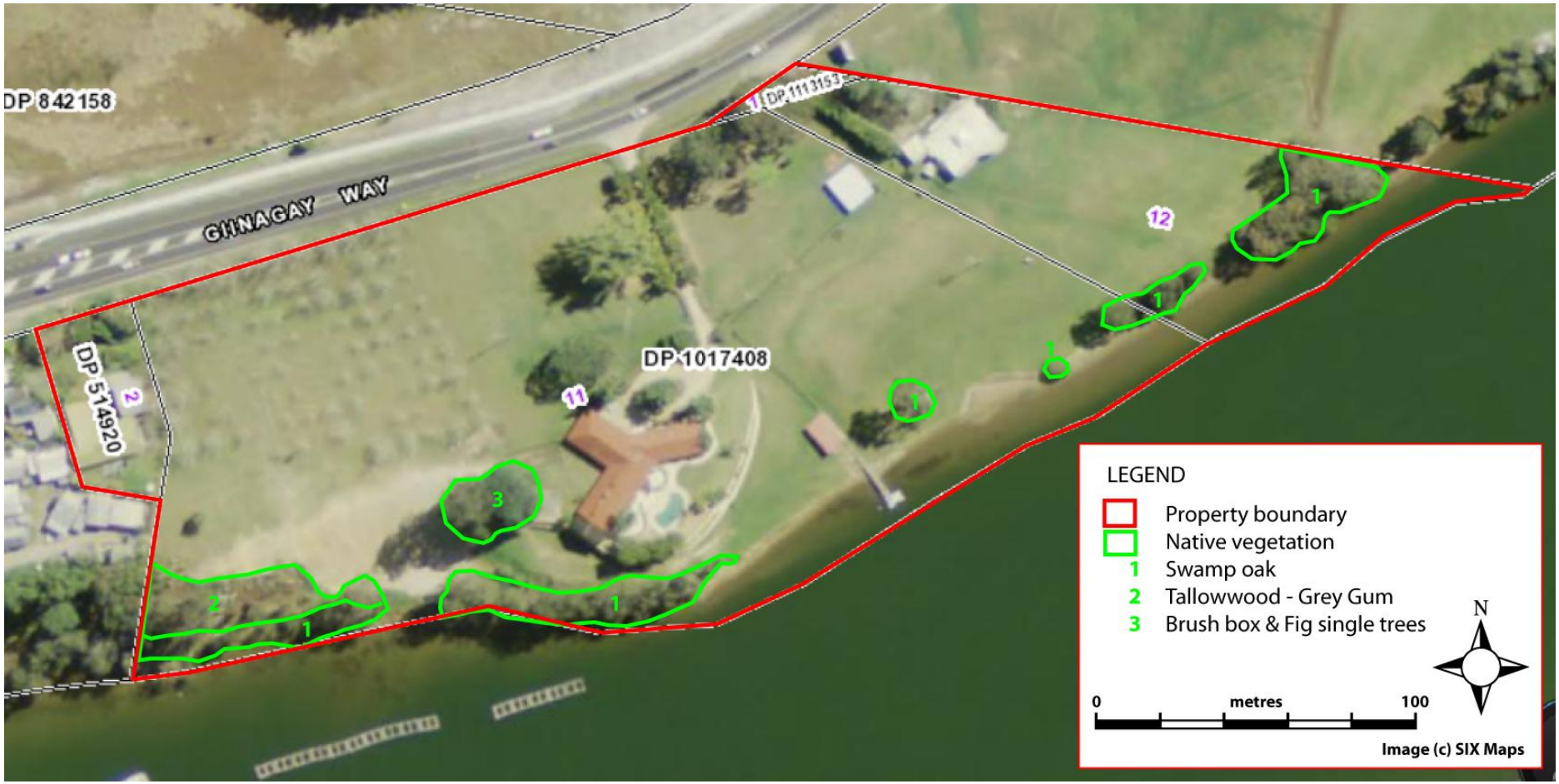

Figure 4. Map of native vegetation in the study area

Results

Vegetation communities

ForW01 Swamp Oak forested wetland

Floristics and structure

The sole canopy tree species is Swamp oak *Casuarina glauca* (**Photo 2**). The midstratum consists of two isolated small trees of Tuckeroo *Cupaniopsis anacardioides* and patches of the exotic vine Mile-a-minute *Ipomoea cairica.*

Ground layer vegetation ranges from sparse to dense. Sparse vegetation mostly occurs on low-lying areas of the creek bank and includes Wire grass *Entolasia stricta*, Beard grass *Oplismenus aemulus*, Native spinach *Tetragonia tetragonioides* and Berry saltbush *Einadia hastata*. Elsewhere there is dense cover of exotic pasture grasses such as Green Panic *Panicum maximum*, Rhodes grass *Chloris gayana* and Broadleaved paspalum *P. mandiocanum*.

Ecology, disturbance and mapping

The community occurs as a narrow interrupted remnant within about 10m of the water's edge. The mapped area includes occasional Grey mangrove *Avicennia marina* and River mangrove *Aegiceras corniculata* in the adjoining tidal zone.

The riverbank along the water's edge has been armoured with rock for the entire length of the property boundary to combat erosion and the associated disturbance as well as some saltwater incursion has limited vegetation cover near the water's edge. The landward side of the remnant has been invaded by grasses from the adjoining pasture. Species diversity is low for Swamp oak forested wetland, probably because of the small size, isolation and disturbance history of the remnant, which have facilitated weed invasion.

The community is partly mapped as NAM_ForW01 Swamp Oak forested wetland and partly mapped incorrectly as PCT9999 – Exotic.

Classification

Classified in Nambucca Shire by OEH (2015) as *NAM_ForW01 Swamp Oak forested wetland of saline areas of coastal estuaries.*

Equivalent community classifications: Plant Community Type PCT 1235 & Biometric NR 255 - *Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion*

Listed under the NSW Biodiversity Conservation Act as the Endangered Ecological Community (EEC) *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.*

DOF11 Tallowwood – Small-fruited Grey Gum – Ironbark – Forest Oak dry sclerophyll forest

Floristics and structure

The canopy tree species are Tallowwood *Eucalyptus microcorys*, Small-fruited Grey Gum *E. propinqua* and Pink Bloodwood *Corymbia intermedia* (**Photo 3**). Midstratum vegetation is sparse and consists of a Port Jackson fig *Ficus rubiginosa*, a Sandpaper fig *Ficus coronata* and a *Guioa semiglauca*.

Ground layer vegetation is generally sparse and dominated by a mixture of exotic weeds such as Rhodes grass, Green panic and Pigeon grass *Setaria sphacelata* together with seedlings and a few saplings of bird-dispersed fruiting species such as Cockspur *Maclura cochinchinensis* and Lillypilly *Acmena smithii*. There are only occasional remnant natives typical of this dry sclerophyll community such as Wire grass, Coral pea *Kennedia rubicunda*, Scrambling lily *Geitonoplesium cymosum* and Flax lilies *Dianella spp.*

Ecology, disturbance and mapping

The community occurs as a small remnant located on the steep fall to the river from the highest point in the south-western corner of the property. It was recorded as having an understorey dominated by weeds in 2004 (Elks 2004).

Trees are mostly in the mature growth stage indicating that they have occupied this site for *ca* 100 years. There is no evidence of fire, the absence of which has contributed to the absence of native sclerophyll ground layer and midstratum trees such as Forest Oak.

The community is incorrectly mapped as NAM_DOF10 *Scribbly Gum Dry Open Grassy Forest on coastal hills on metasediments and granite;* Scribbly gum does not occur here.

Classification

Classified in Nambucca Shire as *NAM_DOF11 Tallowwood – Small-fruited Grey Gum – Ironbark – Forest Oak dry sclerophyll forest.*

Equivalent community classifications: Plant Community Type PCT 1262 & Biometric NR263 *Tallowwood - Small-fruited Grey Gum dry grassy open forest of the foothills of the NSW North Coast*

Not listed as a community of conservation concern.

Artificial vegetation communities: Lawns, pastures and introduced trees

Lawns and pastures are the most extensive type of vegetation in the study area. They are a mixture of exotic grasses and are maintained by mowing and the grazing of a single horse. The mixture varies according to topographic position, with moisture loving species such as Kikuyu dominant on low-lying areas and Broadleaved paspalum, Pigeon grass and Green panic dominant on drier more elevated areas. Native herbs such as Centella and Kidney weed also occur occasionally.

The lawns and pastures also include trees and other woody vegetation. They include two large trees native to NSW, a Brush box *Lophostemon confertus* and Port Jackson fig *Ficus rubiginosa* immediately west of the large central dwelling (**Figure 4**).

Introduced native trees include one each of Cadagi, Lemon-scented gum and an unknown eucalypt not referable to any species native to NSW (Harden 2002, Brooker & Kleinig 1999).

As to exotic trees, there are many flowering trees, shrubs and palms in each of the three domestic curtailments, a very large clump of Bamboo near the main entrance and a small plantation of Pecan trees in the western part of the study area. All woody vegetation in these artificial communities is appropriately mapped as PCT9999, which includes exotics as well as small areas of regrowth and remnant native vegetation.

Fauna habitat

Important habitat elements present on the property include

- a small area of mature remnant eucalypts that include preferred Koala feed tree species Tallowwood and Small-fruited grey gum, and
- two mature Port Jackson figs that area a source of large fleshy fruit.

The following fauna habitat elements and attributes are absent:

- large woody debris;
- nests and roosts;
- latrine or den sites for spotted-tailed quolls;
- flying-fox camps;
- trees producing winter nectar flows;
- dense ground-layer vegetation;
- swamps and saltmarshes;
- tree hollows are very rare or absent (one possible small hollow), and
- Permanent fresh water sources are absent.

Likelihood of occurrence of threatened flora and fauna

The likelihood of occurrence of threatened flora, communities and fauna that are known to occur in the locality was assessed on the basis of the occurrence of vegetation types and habitat elements on the subject site.

Assessment considered the presence, number and currency of species records in the locality, the species habitat requirements and habitat elements in the study area, as well as plant community types as outlined in the relevant Threatened Species profile at http://www.environment.nsw.gov.au/threatenedSpeciesApp/

The likelihood of occurrence of species in the subject site was defined as follows:

- Known - the species, or evidence of its occurrence, has been observed in the subject site.
- Likely - there is a medium to high probability that a species occupies the subject site, or is dependent on habitat resources for important lifecycle events, or visits the subject site during regular seasonal movements or migration.

- Possible - suitable habitat for a species potentially occurs in the subject site, or the species is unlikely to be dependent on site habitat resources for important lifecycle events, or there is insufficient information to categorise the species as likely or unlikely to occur.
- Unlikely - a low probability that suitable habitat for a species occurs in the subject site, or the species may be an occasional visitor but habitat similar to the subject site is widely distributed in the local area and the species is not dependent on habitat resources in the subject site for important lifecycle events.
- Nil - habitat in the subject site is unsuitable for the species.

Threatened flora

There are 9 threatened flora species recorded as occurring in the locality (**Table 1**). Two Critically Endangered species, Scrub turpentine and Native Guava, have been recorded within 1km of the subject site but neither these or any other threatened flora are considered likely to occur on the subject site

Threatened fauna

There are 29 threatened fauna species (excluding fauna confined to marine habitats) recorded as occurring in the locality (**Table 2**). Four of these species, the Grey-headed flying fox, Yellow-bellied glider, Black-necked stork and Osprey have been recorded within 1km of the study area and have numerous other records in the locality.

The mature eucalypt trees of DOF11 are potential nesting sites for the Black-necked stork and Osprey and potential forage for Little lorikeet. The Fig trees are potential foraging sites for the Barred cuckoo-shrike, Wompoo Fruit-Dove, Rose-crowned Fruit-Dove and Superb Fruit-Dove. The intertidal zone is a potential foraging site for Beach stone-curlew and Brolga.

Most of the property is a potential foraging site for the Sooty owl and Spotted-tailed quoll, although forage resources for these species would be primarily in the areas of remnant native vegetation.

The proposed rezoning would include all of these habitats in the E3 zone except for one Fig tree and some of the exotic grassland.

Endangered Ecological Communities

The Swamp Oak Forested Wetland of the subject site meets the floristic and locational criteria for the EEC *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.*

Table 1. Likelihood of occurrence of Flora species in subject site

ScientificName	**CommonName**	**NSW Status**	**Comm Status**	**Detectability**	**Habitat (DEC Threatened Species website, or Harden 1993-2003))**	**Likelihood of occurrence in study area**
Acronychia littoralis	Scented Acronychia	E1	E	Fruit (May to August) but leaf characters indicative	littoral rainforest and adjacent open forest	Unlikely
Alexfloydia repens	Floyd's Grass	E1		Flowering (August to November) but morphology indicative	Coastal stands of Swamp Oak or Paperbark in peat-like soil edging the upper tidal areas of mangroves or on the banks of estuarine creeks	Nil
Dendrobium melaleucaphilum	Spider orchid	E1,P,2		Flowering July-October but morphology indicative	frequently on *Melaleuca styphelioides*, less commonly on rainforest trees or on rocks in coastal districts	Nil
Marsdenia longiloba	Slender Marsdenia	E1	V	Flowering (Summer) but leaf characters indicative	Subtropical and warm temperate rainforest, moist eucalypt forest adjoining rainforest, and rock outcrops	Unlikely
Maundia triglochinoides		V		Flowering (Summer) but leaf characters indicative	swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients.	Nil
Niemeyera whitei	Rusty Plum	V		All year	Rainforest and the adjacent understorey of moist eucalypt forest	Unlikely
Parsonsia dorrigoensis	Milky Silkpod	V	E	All year	Rainforest or moist eucalypt forest	Unlikely
Rhodamnia rubescens	Scrub Turpentine	E4A		All year	littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic or sedimentary soils	Unlikely
Rhodomyrtus psidioides	Native Guava	E4A		All year	littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines	Unlikely

Table 2.Likelihood of occurrence of Fauna species habitat in subject site

Class	*ScientificName*	CommonName	NSW Status	Comm Status	Habitat type	Habitat	Occurrence of suitable habitat
Amphibia	*Litoria brevipalmata*	Green-thighed Frog	V,P		Breeding habitat	semi-permanent or ephemeral ponds or depressions in a range of vegetation communities, including rainforest, wet and dry forest, heath and grassland.	Nil
					Foraging habitat	from rainforest and moist eucalypt forest to dry eucalypt forest and heath	Nil
Amphibia	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		Breeding habitat	large hollow-bearing eucalypts	Nil
					Foraging habitat	open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of She-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata)	Nil
Aves	*Coracina lineata*	Barred Cuckoo-shrike	V,P		Breeding habitat	Unknown	
					Foraging habitat	Fruiting tree species in rainforest, wet sclerophyll forest, vegetation remnants or isolated trees	Possible
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		Breeding Habitat	cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy	Unlikely
					Foraging Habitat	eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Unlikely
Aves	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		Breeding habitat	Live or dead tree within or near foraging habitat. Usually isolated, live, paddock trees in NSW, but also in paperbarks and occasionally low shrubs within wetlands.	Possible
					Foraging habitat	Shallow open freshwater or saline wetlands and estuarine habitats, including swamps, floodplains, watercourses, wet heathland, wet meadows, farm dams, saltmarsh, mud- and sand-flats, mangroves.	Unlikely
Aves	*Esacus magnirostris*	Beach Stone-curlew	E4A,P		Breeding Habitat	Marine supralittoral zone, at backs of beaches, or on sandbanks and islands, of varying substrate, among low vegetation of grass, scattered shrubs or low trees. Also among open mangroves.	Unlikely
					Foraging Habitat	Intertidal zone of beaches and estuaries, on flats, banks and spits of sand, mud or gravel; also at edges of or among mangroves.	Possible
Aves	*Glossopsitta pusilla*	Little Lorikeet	V,P		Breeding habitat	Hollow-bearing trees. Typically but not solely large old Eucalyptus, often smooth barked species.	Unlikely
					Foraging habitat	Tree canopies. Typically nectar and pollen from Eucalyptus but also other tree species such as Angophora and Melaleuca plus native fruits such as mistletoe	Possible
Aves	*Grus rubicunda*	Brolga	V,P		Breeding Habitat	Shallow (< 50 cm) wetlands and margins of deeper waterbodies with emergent vegetation	Nil
					Foraging habitat	wetlands, mudflats, grasslands, cultivated areas or stubble	Possible
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	C	Breeding Habitat	mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat; nest trees are large emergent eucalypts often with emergent dead branches or large dead trees nearby	Unlikely
					Foraging habitat	bays and inlets, beaches, reefs, lagoons, estuaries and mangroves, saltmarsh, freshwater swamps, lakes, reservoirs, billabongs	Nil

Class	*ScientificName*	CommonName	NSW Status	Comm Status	Habitat type	Habitat	Occurrence of suitable habitat
Aves	Lophoictinia isura	Square-tailed Kite	V,P,3		Breeding habitat	generally located along or near watercourses, in a fork or on large horizontal limbs	Unlikely
					Foraging habitat	variety of timbered habitats including dry woodlands and open forests	Unlikely
Aves	Ninox strenua	Powerful Owl	V,P,3		Breeding habitat	Hollows >45 cm diameter that are 6 m or more above the ground in living or dead trees	Nil
					Foraging habitat	range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest	Unlikely
Aves	Pandion cristatus	Eastern Osprey	V,P,3		Breeding habitat	Emergent living or dead trees or artificial towers within 3 km of foraging habitat	Possible
					Foraging habitat	Open protected water	Nil
Aves	Ptilinopus magnificus	Wompoo Fruit-Dove	V,P		Breeding habitat	Rainforests or wet sclerophyll forest with foraging habitat nearby	Nil
					Foraging habitat	Fruiting plants, including introduced species, within vegetation types. Fruit between 5-30 mm diameter	Possible
Aves	Ptilinopus regina	Rose-crowned Fruit-Dove	V,P		Breeding habitat	Wet sclerophyll forest or rainforest including remnants dominated by camphor laurel. Requires foraging habitat nearby.	Nil
					Foraging habitat	Plants with fleshy fruits 5-25mm in size, including introduced species	Possible
Aves	Ptilinopus superbus	Superb Fruit-Dove	V,P		Breeding habitat	Wet schlerophyll forest or rainforest (including remnants dominated by camphor laurel) near foraging habitat	Nil
					Foraging habitat	Fruiting plants, including introduced species within vegetation types. Fruit between 5-20 mm diameter	Possible
Aves	Tyto novaehollandiae	Masked Owl	V,P,3		Breeding Habitat	Living or dead trees with hollows >40 cm diameter, cliffs or caves	Nil
					Foraging Habitat	Most	Possible
Aves	Tyto tenebricosa	Sooty Owl	V,P,3		Breeding Habitat	Hollows >30 cm diameter that are >10 m above the ground in live or dead trees, or in caves	Nil
					Foraging Habitat	Most forests	Unlikely
Aves	Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	Breeding habitat	Hollow-bearing trees, fallen logs, small caves, rock crevices, boulder piles, rocky-cliff faces or animal burrows	Nil
					Foraging habitat	range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline	Possible
Insecta	Ocybadistes knightorum	Black Grass-dart Butterfly	E1		Breeding Habitat	Floyd's Grass Alexfloydia repens	Nil
					Foraging Habitat	Floyd's Grass Alexfloydia repens	Nil
Mammalia	Miniopterus australis	Little Bentwing-bat	V,P		Breeding habitat	Caves	Nil
					Foraging habitat	Moist eucalypt forest, rainforest or dense coastal banksia scrub	Nil

Class	*ScientificName*	CommonName	NSW Status	Comm Status	Habitat type	Habitat	Occurrence of suitable habitat
Mammalia	Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V,P		Breeding habitat	Maternity caves with very specific temperature and humidity regimes.	Nil
					Foraging habitat	forested areas, catching moths and other flying insects above the tree tops	Unlikely
Mammalia	Mormopterus norfolkensis	Eastern Freetail-bat	V,P		Breeding Habitat	Hollows in dead or alive trees, under bark or in man-made structures	Unlikely
					Foraging Habitat	Most	Possible
Mammalia	Myotis macropus	Southern Myotis	V,P		Breeding habitat	close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage	Unlikely
					Foraging habitat	waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation	Unlikely
Mammalia	Petaurus australis	Yellow-bellied Glider	V,P		Breeding habitat	Large trees with hollows > 10cm diameter	Nil
					Foraging habitat	favoured food trees in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils	Nil
Mammalia	Petaurus norfolcensis	Squirrel Glider	V,P		Breeding habitat	Tree hollows or fissures >2 cm diameter/width in eucalypt forests and woodlands	Nil
					Foraging habitat	Blackbutt-Bloodwood forest with heath understorey and abundant hollows	Nil
Mammalia	Phascogale tapoatafa	Brush-tailed Phascogale	V,P		Breeding Habitat	Tree hollows, logs or stumps with entrances > 2.5 cm wide	Nil
					Foraging Habitat	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter.	Nil
Mammalia	Phascolarctos cinereus	Koala	V,P	V	Breeding habitat	eucalypt woodlands and forests	Nil
					Foraging habitat	Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species; in any one area will select preferred browse species	Unlikely
Mammalia	Pseudomys gracilicaudatus	Eastern Chestnut Mouse	V,P		Breeding Habitat	vigorously regenerating heathland burnt from 18 months to four years previously	Nil
					Foraging Habitat	in heathland, most commonly in dense wet heath and swamps	Nil
Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Breeding habitat	Canopy trees associated with rainforest, or coastal scrub or riparian or estuarine communities and with sufficient forage resources available within 40km.	Nil
					Foraging habitat	Most	Possible
Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		Breeding habitat	Live or dead hollow-bearing trees, under exfoliating bark, or in buildings	Unlikely
					Foraging habitat	Forests woodlands and wetlands	Unlikely

Preliminary consideration of impacts

Nature and magnitude of impacts

The mature trees of the dry open forest DOF11 are potential nesting/breeding habitat for Black-necked stork and Osprey and potential forage habitat for Little lorikeet. The Fig trees are potential foraging sites for the Barred cuckoo-shrike, Wompoo Fruit-Dove, Rose-crowned Fruit-Dove and Superb Fruit-Dove. The intertidal zone is a potential foraging site for Beach stone-curlew and Brolga.

Most of the property is a potential foraging for the Sooty owl and Spotted-tailed quoll, although forage resources for these species would be primarily in the areas of remnant native vegetation.

Remnant native vegetation occupies about 3,400m^2 of the 1.8ha of proposed E3 Zone, the remainder of the study area being exotic lawns and pastures. All native vegetation except for a Brush box and a Fig tree adjoining the existing dwelling on Lot 11 are included in the proposed E3 Zone adjoining the Nambucca River.

Assessment of impacts

As the stated objectives for the E3 Environmental Management Zone in Nambucca LEP 2010 are to protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values, and to provide for a limited range of development that does not have an adverse effect on those values, it is unlikely that remnant native vegetation in the proposed E3 Zone would be directly impacted by the proposal. No clearing is proposed or considered likely to occur. Indirect impacts are also considered to be unlikely because of the inclusion of a large area of exotic lawns and pastures, which would act as a buffer to adjoining landuse, and because the remnant vegetation is robust, persistent under current disturbance regimes and well-adapted to its habitat.

The potential for clearing of the Brush box and Fig tree located in the existing Ru2 Rural Zone would not be increased by rezoning to R1, although the motivation to clear may well increase. Under the proposed zoning clearing would be assessed under the heads of consideration of the 5-part test in Section 7.3 of the *NSW Biodiversity Conservation Act 2016 (BC Act)*, which is an increase in the level of assessment required*:*

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Fig tree is a potential foraging site for the Barred cuckoo-shrike, Wompoo Fruit-Dove, Rose-crowned Fruit-Dove and Superb Fruit-Dove. These are all highly mobile aerial fauna with very large home ranges within which the Fig tree is a minute and typical part of the total foraging resource. Because of this, removal of the tree would not be likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The Fig tree and Brush box tree are not part of any endangered or critically endangered ecological community.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The area covered by the Fig tree is approximately 300m^2. It is an isolated fragment of vegetation and given the occurrence of a similar Fig tree nearby and the mobility of species likely to forage in it its removal would not be likely to significantly increase fragmentation or isolation or be important to the long-term survival of any species or ecological community in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No declared area of outstanding biodiversity value is mapped for the locality.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Removal of the trees would be part of the key threatening process Clearing of Native Vegetation.

Clearing of native vegetation may be considered as a threatening process in a generic sense *ie:* is the proposal likely to have a significant effect on threatened species, populations or ecological communities, or their habitats, and in particular, would it cause:

- destruction of habitat causing a loss of biological diversity;
- fragmentation of populations resulting in limited gene flow between small isolated populations;
- riparian zone degradation, such as bank erosion;
- the establishment and spread of exotic species, and
- loss of ground layer habitat for a wide variety of vertebrates and invertebrates.

Based on this assessment it is considered that the Proposal would not be likely to cause a loss of biodiversity, fragment ecological communities, degrade riparian zones, result in the spread of exotic species or the loss of ground layer habitat and therefore would not increase the impact of a key

threatening process or have a significant impact on threatened flora, fauna, communities or their habitats.

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Photographs

Photo 1. Panorama taken from the highest point in south-western corner of Lot 11. From left to right: exotic vegetation in dwelling curtilage; large Brush box and Fig; remnant Swamp oak; Remnant dry open forest.

Photo 2. Closeup of remnant Swamp oak at south-eastern corner of study area.

Photo 3. Closeup of remnant dry open forest at south-western corner of the study area

Appendix 1. Flora species list

Plot	*Scientific name*	Common name	%fc	status
1	*Casuarina glauca*	Swamp oak	50	n
1	*Panicum maximum*	Green panic	10	e
1	*Chloris gayana*	Rhodes grass	5	e
1	*Paspalum mandiocanum*	Broadleaved paspalum	5	e
1	*Ageratum houstonianum*	Billygoat weed	3	e
1	*Cynodon dactylon*	Couch	3	n
1	*Ipomoea cairica*	Mile-a-minute	2	e
1	*Entolasia stricta*	Wire grass	2	n
1	*Ehrharta erecta*	Veldt grass	2	e
1	*Avicennia marina*	Grey mangrove	1	n
1	*Ageratina adenophora*	Crofton weed	1	A
1	*Oplismenus aemulus*	Beard grass	1	n
1	*Senna pendula*	Winter senna	1	e
1	*Tetragonia tetragonioides*	Native spinach	1	n
1	*Aegiceras corniculata*	River mangrove	1	n
1	*Einadia hastata*	Berry saltbush	1	n
1	*Cupaniopsis anacardioides*	Tuckeroo	0.5	n
1	*Parsonsia straminea*	Common silkpod	0.5	n
1	*Lantana camara*	Lantana	0.1	A
1	*Ficus rubiginosa*	Port Jackson fig	0.1	n
2	*Eucalyptus propinqua*	Small-fruited grey gum	15	n
2	*Eucalyptus microcorys*	Tallowwood	7	n
2	*Paspalum mandiocanum*	Broadleaved paspalum	5	e
2	*Ficus rubiginosa*	Port Jackson fig	4	n
2	*Casuarina glauca*	Swamp oak	4	n
2	*Corymbia intermedia*	Pink bloodwood	3	n
2	*Ipomoea cairica*	Mile-a-minute	3	n
2	*Guioa semiglauca*	Guioa	2	n
1	*Chloris gayana*	Rhodes grass	1	e
1	*Panicum maximum*	Green panic	1	e
2	*Setaria sphacelata*	Pigeon grass	1	e
2	*Tagetes minuta*	Stinking roger	1	e
2	*Ficus coronata*	Sandpaper fig	1	n
2	*Cupaniopsis anacardioides*	Tuckeroo	1	n
2	*Entolasia stricta*	Wire grass	1	n
2	*Maclura cochinchinensis*	Cockspur	0.5	n
2	*Acmena smithii*	Lillypilly	0.5	n
2	*Lantana camara*	Lantana	0.1	A
2	*Senna pendula*	Winter senna	0.1	e
2	*Rapanea variabilis*	Muttonwood	0.1	n
2	*Morinda jasminoides*	Sweet morinda	0.1	n
2	*Dioscorea transversa*	Native yam	0.1	n
2	*Asparagus aethiopicus*	Asparagus fern	0.05	A

2	*Gomphocarpus fruticosus*	Cotton bush	0.05	e
2	*Kennedia rubicunda*	Coral pea	0.05	n
2	*Euroschinus falcatus*	Ribbonwood	0.05	n
2	*Clerodendron floribundum*	Clerodendron	0.05	n
2	*Sarcopetalum harveyanum*	Pearl vine	0.05	n
2	*Asparagus plumosus*	Climbing asparagus	0.02	A
2	*Tabernaemontana pandacaqui*	Banana bush	0.02	n
2	*Pittosporum revolutum*	Pittosporum	0.02	n
2	*Jagera pseudorhus*	Foambark	0.02	n
2	*Notelaea longifolia*	Mock olive	0.02	n
2	*Geitonoplesium cymosum*	Scrambling lily	0.01	n
2	*Dianella spp*	Flax lily	0.01	n
Transect	***Scientific name***	**Common name**	**abundance**	**status**
3	*Ficus rubiginosa*	Port Jackson fig	x1	n
3	*Lophostemon confertus*	Brush box	x1	n
3	*Corymbia citriodora*	Lemon scented gum	x1	in
3	*Corymbia torelliana*	Cadagi	x1	in
3	*Eucalyptus spp*	unknown eucalypt	x1	in
3	*Paspalum spp*	Broadleaved paspalum, Vasey grass, Bahia grass	vc	e
3	*Cenchrus clandestinus*	Kikuyu	vc	e
3	*Axonopus fissifolius*	Carpet grass	c	e
3	*Cynodon dactylon*	Couch	c	n
3	*Steotaphrum secundatum*	Buffalo grass	c	e
3	*Centella asiatica*	Centella	o	n
3	*Dichondra repens*	Kidney weed	o	n
3	*Desmodium gunnii*	Small tick-trefoil	r	n
3	*Chloris gayana*	Rhodes grass	c	e

status:

n - native in nSW
e - exotic, environmental weed
A - NCLLS weed, listed for Asset Protection
in - introduced, not native to NSW

abundance:

vc - very common
c - common
o - occasional
r - rare