

Appendix F

Ecological Assessment



PROPOSED DEVELOPMENT FRASER DRIVE - SOUTH TWEED

Ecological Assessment

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PROPOSED DEVELOPMENT FRASER DRIVE - SOUTH TWEED ECOLOGICAL ASSESSMENT

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1. INTRODUCTION

This Ecological Assessment has been prepared by Cardno on behalf of Villa World Ltd in respect of Lot 2 on DP1000385 and Lot 9 on DP1039569, Fraser Drive, South Tweed Heads. The site locality is illustrated in Figure 1.

The objectives of this report are to provide an analysis of the nature conservation values of the site and any potential constraints to development of the site, or parts thereof, which may arise there-from.

The report is based on field surveys, examination of aerial photography, and a review of relevant literature resources including the Tweed Vegetation Management Strategy and a previous flora and fauna assessment of the site prepared by James Warren and Associates, 2002.

This assessment report provides:

1. In Section 2.0, information concerning the general characteristics of the site.
2. In Section 3.0, information on the assessment methodology and field survey techniques.
3. In Section 4.0, a description of the vegetation communities and flora species occurring within the site.
4. In Section 5.0, information concerning fauna species observed at the site, including details of species of conservation significance that may potentially utilise the site or adjacent land.
5. In Section 6.0, a description of the proposed plan of development.
6. In Section 7.0, an assessment of the degree of compliance the proposed plan of development achieves with the requirements of the local planning scheme and relevant Commonwealth and State government legislation having a biodiversity conservation focus.

2. SITE DESCRIPTION

The site is located at Fraser Drive, South Tweed Heads and encompasses a total area of approximately 32.9 ha. An aerial photograph of the site is presented in Figure 2.

The site is bound:

- to the east by Fraser Drive and partially cleared land forming part of Sullivans Pioneer Park;
- to the south by an established residential area;
- to the west by an established residential area and Terranora Broadwater; and
- to the north by a coastal wetland, cleared land, residential dwellings and Acacia Street.

The majority of the site has been previously cleared for agricultural purposes. The site is currently not being used for any specific purpose with the exception of occasional livestock grazing. Previous land uses include banana farming and other agricultural uses.

In 2002, the Tweed Shire Council granted consent for the filling of the lower sectors of the site for future development. These earthworks are currently being carried out and involve the removal of an area of vegetation in the north-eastern sector of the site which is not illustrated in the presented aerial photography.

The site has an "Urban Expansion" designation pursuant to the Tweed Local Environment Plan 2000 ("LEP"). The primary objective of this designation is *"to identify land for urban expansion (which will comprise mainly residential development focused on multi-use neighbourhood centres) and to ensure its optimum utilisation consistent with environmental constraints and the need to minimise residential landtake."*

The north-western sector of the site supports a wetland characterised by mangroves and swamp sclerophyll forest which forms part of a State Environmental Planning Policy No. 14 (SEPP 14) Coastal Wetland. The location and extent of this SEPP 14 Coastal Wetland is illustrated in Figure 3. The balance of the site is comprised of predominantly cleared land with isolated clumps of vegetation comprised of a mixture of native and exotic species. The site is also situated within the vicinity of Terranora Creek, Terranora Broadwater and associated islands such as Daveys Island and Big Island.

3. ASSESSMENT METHODOLOGY

3.1 Overview

To assess the biodiversity and conservation values of the site and the potential impacts of the urban development on these natural the following investigations were conducted.

1. An initial review of background information on the flora and fauna of the site and adjacent properties from relevant sources, including a review of the Tweed Vegetation Management Strategy (the TVMS) and a report prepared by James Warren and Associates, 2002 (the JWA Report).
2. A field survey to verify the accuracy and currency of the information contained within the TVMS and JWA Report in respect of:
 - vegetation communities and flora species that occur on the site and on adjacent properties;
 - vertebrate fauna observed on the site, or those that are considered likely to utilise the site or adjacent properties due to the presence of suitable habitat; and
 - areas or aspects of the site identified as having functional wildlife conservation values or a high conservation status.
3. Evaluation of the potential impacts of the proposed plan of development on the ecological values of the site locality with particular attention given to those aspects which are of recognised conservation significance.
4. Evaluation of the degree of compliance the proposed plan of development achieves with the requirements of the local planning scheme and relevant State and Commonwealth legislation having a biodiversity conservation focus.

3.2 Field Survey Techniques

A field survey was conducted on site on the 25 October 2006 by Cardno. The aim of the survey was to collate site-specific information on the vegetation types and flora species that occur within the site and confirm the findings of the TVMS and the JWA Report. The survey effort focused on detecting and assessing the presence of suitable habitat areas for flora species of formally recognised conservation significance that have been previously recorded, or are considered likely to occur, in the locality of the site.

The survey effort also focused on detecting and assessing the presence of suitable habitat areas and resources for native fauna species, with particular emphasis on those species of formally recognised conservation significance that have been previously recorded, or considered likely to occur, in the locality of the site. In this respect, a search of the NSW National Parks and Wildlife Service online Atlas of NSW Wildlife database and the Commonwealth Department of the Environment & Heritage's (DEH) online *Environment Protection and Biodiversity Conservation 1999* ("EPBC Act") database were used to assess records of species occurring, or likely to occur, within a 5 km radius of the site. The habitat requirements and the functional contribution that specific areas or aspects of the site may make towards the preservation of populations of these species in the site locality were then assessed.

The field surveys, that are relied on for the purposes of this report, and assessment of biodiversity impact significance have been carried out in general accordance with the "Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities, Working Draft, 2004" prepared by the Department of Environment and Conservation (NSW).

4. FLORA HABITAT VALUES

4.1 Overview

The majority of the vegetation within the site has been previously cleared for agricultural purposes. The site currently supports large expanses of cleared grassland, scattered trees and an area of wetland vegetation in the north-western sector of the site which is associated with a mapped SEPP 14 Coastal Wetland. A large area in the north-eastern sector of the site is currently devoid of vegetation due to recent approved earthworks to fill the low-lying portions of the site.

The flora habitat values described within this section are based on field observations by Cardno, previous site surveys conducted by James Warren and Associates, the mapping contained within the Tweed Vegetation Management Strategy 2004 and the information contained within the NSW National Parks and Wildlife Service online Atlas of NSW Wildlife database. Further detail in respect to flora species and vegetation communities recorded within the site are provided below, whilst the distribution of broad vegetation types across the site is illustrated in Figure 3.

4.1.1 Broad-leaved Paperbark Closed Forest to Woodland

This vegetation community is described in the Tweed Vegetation Management Strategy as:

Vegetation Code 401: **A swamp sclerophyll closed forest to woodland**, largely confined to the coastal plains and subjected to periodic inundation. It occurs in low-lying waterlogged saline depressions, often on Pleistocene sandplains and riverine and estuarine alluvium of moderate fertility.

Broad-leaved Paperbark (Melaleuca quinquenervia) often occurs as the sole dominant species in this type. Broad-leaved Paperbark closed forest to woodland is largely confined to the coastal plains and subjected to extensive clearing in the past. Occasional associated canopy species include Forest Red Gum (Eucalyptus tereticornis), Swamp She-oak (Casuarina glauca), Swamp Mahogany (E. robusta), Pink Bloodwood (Corymbia intermedia), Swamp Box (Lophostemon suaveolens), Bangalow Palm (Archontophoenix cunninghamiana), Scribbly Gum (E. signata/racemosa), Hoop Pine (Araucaria cunninghamii) and Blackbutt (E. pilularis). Other associated species at more open sites include Brush Box (L. confertus), Hickory Wattle (Acacia aulacocarpa), Blackwood Wattle (A. melanoxylon), Cypress Pine (Callitris columellaris), White Bottlebrush (Callistemon salignus), Umbrella Cheese Tree (Glochidion sumatranum), Coast Banksia (Banksia integrifolia var. integrifolia), Tuckeroo (Cupaniopsis anacardioides), Cottonwood (Hibiscus tiliaceus) and Camphor Laurel (Cinnamomum camphora).

The ground layer usually contains sedgeland species.

This community corresponds to the following vegetation communities described in the JWA Report:

- Community 1a – Tall Open Ecotonal Forest (Broad-leaved paperbark/Swamp she-oak +/- Flooded gum/Brushbox); and
- Community 1b – Tall Open Swamp Sclerophyll Forest (Broad-leaved paperbark).

This community is analogous to the following *TSC Act* listed Endangered Ecological Community: *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*.

4.1.2 Swamp She-oak Closed Forest to Woodland

This vegetation community is described in the Tweed Vegetation Management Strategy as:

*Vegetation Code 601 - A **swamp sclerophyll closed forest to woodland**, developing on Holocene intertidal sediments where soils are saline or sub-saline.*

Swamp She-oak (Casuarina glauca) forests usually form as pure stands but do occasionally associate with other species including, Broad-leaved Paperbark (Melaleuca quinquenervia), Swamp Mahogany (Eucalyptus robusta), Forest Red Gum (E. tereticornis), Grey Mangrove (Avicennia marina var. australasica), Milky Mangrove (Excoecaria agallocha), Black mangrove (Bruguiera gymnorhiza) and Cottonwood (Hibiscus tiliaceus).

This community corresponds to the following vegetation communities described in the JWA Report:

- Community 1a – Tall Open Ecotonal Forest (Broad-leaved paperbark/Swamp she-oak +/- Flooded gum/Brushbox);
- Community 1c – Tall Open Woodland (Swamp she-oak); and
- Community 2a – Mid-High Open Forest (Swamp she-oak).

This community is analogous to the following *TSC Act* listed Endangered Ecological Community: *Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions*.

4.1.3 Mangrove Forest - Woodland

The central sectors of the mapped SEPP 14 wetland support a mangrove open forest community dominated by species such as Milky mangrove (*Excoecaria agallocha*), Grey mangrove (*Avicennia marina*), Black mangrove (*Bruguiera gymnorhiza*) and River mangrove (*Aegiceras corniculatum*).

This vegetation community, although not mapped as occurring within the site pursuant to the Tweed Vegetation Management Strategy, is considered to be broadly analogous to the following vegetation type as described in the Tweed Vegetation Management Strategy.

*Vegetation Code 602 **Mangrove Low Closed Forest to Woodland.** This type occurs as a low closed forest to woodland in tidal estuaries on mud banks of the intertidal zone. Within the Shire the majority of its distribution falls within the Tweed River estuary with small areas located in Cudgen Lake, Cudgen Creek, Cudgera Creek and Mooball Creek. The Tweed River estuary is one of only two in NSW that possesses all five mangrove species recorded within the State. Ukerebagh Nature Reserve contains 15% of the Shire's mangrove communities.*

*Species that occur are, Grey Mangrove (*Avicennia marina* var. *australasica*), Milky Mangrove (*Excoecaria agallocha*), Black Mangrove (*Bruguiera gymnorhiza*), River Mangrove (*Aegiceras corniculatum*) and Spider Mangrove (*Rhizophora stylosa*). These species are associated with Cottonwood (*Hibiscus tiliaceus*) which occurs at the upper limit of the tidal influence. Other associated species include: Swamp She-oak (*Casuarina glauca*), Salt Marsh (*Sarcocornia quinqueflora*), Samphire Meadow (*Suaeda australis*) and Salt Grass (*Sporobolus virginicus*).*

This community corresponds to the following vegetation communities described in the JWA Report:

- Community 2b – Mid-high Open Forest (Milky mangrove);
- Community 2c – Mid-high Open Forest (Grey mangrove/Black mangrove);
- Community 2d – Low Closed Forest (River mangrove); and
- Community 2e Low Open Woodland – Scattered Trees (Grey mangrove).

This community is not analogous to any TSC Act listed Endangered Ecological Community.

4.1.4 Saltmarsh

The central sectors of the mapped SEPP 14 wetland also support a saltmarsh community. This vegetation community, although not mapped as occurring within the site pursuant to the Tweed Vegetation Management Strategy, is considered to be broadly analogous to the following vegetation type as described in the Tweed Vegetation Management Strategy.

*Vegetation Code 603 **Saltmarsh Communities.** Pressey and Griffith (1992) identified Saltmarsh communities within the Tweed as occurring as three different community type based on dominant species and structure, all on interbedded estuarine sediments. The following are their descriptions of those community types.*

S1 - Sporobolus virginicus – Sarcocornia quinqueflora dwarf to mid-high closed tussock grassland/chenopod shrubland. This type is inundated by spring high tides and grades into the Mangrove Low Closed Forest to Woodland Type – 602 downslope and may grade diffusely into the other community types S2 and S3 where seldom inundated by high tides.

S2 – Juncus kraussii tall to very tall closed rushland. This type grades sharply or diffusely into community type S1 downslope with more inundation from spring high tides and grades sharply or diffusely into S3 or the Swamp She-oak Closed Forest to Woodland Type – 601 higher above the level of tidal influence.

S3 – Baumea juncea tall to very tall closed sedgeland, which grades sharply or diffusely into community type S1 or S2 where occasionally subject to tidal inundation and often grades into the Swamp She-oak Closed Forest to Woodland Type – 601 further upslope.

Species that were identified in this type during field survey Murray & James (1998) include the following dominant or co-dominant species, Sporobolus virginicus, Sarcocornia quinqueflora, Juncus kraussii, Baumea juncea, Suaeda australis, Phragmites australis, Fimbristylis ferruginea, Erichloa procera, Zoysia macrantha, Triglochin striata and Bacopa monniera. Emergent species included, Grey Mangrove (Avicennia marina), Swamp She-oak (Casuarina glauca) and Black Mangrove (Bruguiera gymnorhiza).

This community is not individually recognised within the JWA Report but is considered as a component of the mangrove forest-woodland communities.

This community is analogous to the following TSC Act listed Endangered Ecological Community: *Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions.*

4.1.5 Predominantly Cleared Land

The majority of the site supports land that has been subjected to broad-scale clearing episodes and does not support any mapped vegetation communities pursuant to the Tweed Vegetation Management Strategy. Within this part of the site are located relatively small clusters and bands of vegetation that is comprised of a mixture of native and exotic species regrowth.

This community corresponds to the following vegetation communities described in the JWA Report:

- Community 3a – Mid-high Open Forest (Camphor laurel/rainforest regrowth);
- Community 3b – Mid-high Open Forest (Swamp she-oak regrowth);
- Community 3c – Mid-high Open Forest (Forest red gum/ Pink bloodwood); and
- Community 4a – Low-mid-high Closed Grassland with Scattered Trees.

This community also encompasses areas of land in the north of the site that have been subject to substantial earthworks, understood to have been carried out under cover of a consent issued by the Tweed Shire Council in 2002.

This community is not analogous to any TSC Act listed Endangered Ecological Community.

4.2 Flora Species of Significance

A review of flora records from the site locality was undertaken to assess the occurrence or likely occurrence of significant flora species pursuant to the *TSC Act*, the *EPBC Act* and the *Noxious Weeds Act 1993*. Records utilised included records held within the Atlas of NSW Wildlife and *EPBC Act* Online databases.

4.2.1 Threatened Species

A review of flora records from the site locality indicated 23 species of conservation significance that may potentially occur on the site based upon the availability of suitable habitat. These species and their relevant status under the *EPBC Act* and *TSC Act* are provided in Table 1.

Table 1 Significant flora species likely to occur within the site locality

Species Name	Common Name	Status *	Recorded on Site ^
<i>Cassia brewsteri</i> var. <i>marksiana</i>	Brush cassia	NE	
<i>Acacia bakeri</i>	Marblewood	NV	
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	CV, NV	JWA / Cardno
<i>Endiandra muelleri</i> subsp. <i>bracteata</i>	Green-leaved rose walnut	NE	
<i>Gossia fragrantissima</i> (<i>Austromyrtus fragrantissima</i>)	Sweet myrtle	CE, NE	
<i>Syzygium moorei</i>	Durobby	CV, NV	
<i>Geodorum densiflorum</i>	Pink nodding orchid	NE	
<i>Phaius australis</i>	Southern swamp orchid	CE, NE	
<i>Macadamia tetraphylla</i>	Rough-shelled bush nut	CV, NV	JWA / Cardno
<i>Randia moorei</i>	Spiny Gardenia	CE, NE	
<i>Bosistoa transversa</i>	Yellow satinheart	CV, NV	
<i>Diploglottis campbellii</i>	Small-leaved tamarind	CE, NE	
<i>Lepiderema puchella</i>	Fine-leaved tuckeroo	NV	
<i>Amorphospermum whitei</i>	Rusty plum	NV	
<i>Acronychia littoralis</i>	Scented Acronychia	CE, NE	
<i>Bosistoa selwynii</i>	Heart-leaved Bosistoa	CV, NV	
<i>Diospyros mabacea</i>	Red-fruited ebony	CE, NE	
<i>Endiandra floydii</i>	Floyd's walnut	CE, NE	
<i>Floydia praealta</i>	Possum nut	CV, NV	
<i>Hicksbeachia pinnatifolia</i>	Monkey nut, Bopple nut	CV, NV	
<i>Marsdenia longiloba</i>	Clear milkvine	CV	
<i>Syzygium hodgkinsoniae</i>	Smooth-barked rose apple	CV, NV	
<i>Tinospora tinoporoides</i>	Arrow-head vine	CV, NV	

* CE, CV = Commonwealth (*Endangered, Vulnerable*) – EPBC Act
NE, NV = New South Wales (*Endangered, Vulnerable*) - TSC Act

^ JWA = Flora and Fauna Assessment Report prepared by James Warren and Associates, 2002
Cardno = Site inspection carried out on 25 October 2006.

4.2.2 Weed Species

The *Noxious Weed Act 1993* aims to reduce the negative impacts of weeds by preventing the establishment of significant new weeds whilst the restricting the spread and reducing the distribution of existing significant weeds. It also provides for monitoring and reporting on the outcome of weed management within the State. Pursuant to the *Noxious Weed Act 1993*, a weed may be classified as one of the following categories.

Class 1, State Prohibited Weeds: Class 1 noxious weeds are plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent.

Class 2, Regionally Prohibited Weeds: Class 2 noxious weeds are plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies and are not present in the region or are present only to a limited extent.

Class 3, Regionally Controlled Weeds: Class 3 noxious weeds are plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.

Class 4, Locally Controlled Weeds: Class 4 noxious weeds are plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.

Class 5, Restricted Plants: Class 5 noxious weeds are plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State.

A noxious weed that is classified as a Class 1, 2 or 5 noxious weed is referred to in the Noxious Weed Act as a notifiable weed. The significant weed species pursuant to the Noxious Weeds Act 1993 for the Far North Coast County Council that were recorded on the site are detailed in Table 2.

Table 2 Significant weed species recorded on the site

Species Name	Common Name	Status*
<i>Schinus terebinthifolius</i>	Broad-leaved pepper tree	W2
<i>Ageratina adenophora</i>	Crofton weed	W3
<i>Ageratina riparia</i>	Mistflower	W3
<i>Baccharis halimifolia</i>	Groundsel bush	W2
<i>Cinnamomum camphora</i>	Camphor laurel	W4(d)
<i>Lantana camara</i>	Lantana	W3

* Within the Far North Coast Weeds district the following Control Categories apply.

W1 = The presence of these weeds on land (or on/in water) must be reported to the Local Control Authority, and the weed must be fully and continuously suppressed and destroyed

W2 = The weed must be fully and continuously suppressed and destroyed

W3 = The weed must be prevented from spreading and its numbers and distribution reduced

W4 = The action specified in the declaration must be taken in respect of these weeds

W4(b) = The weed must not be sold, propagated or knowingly distributed and any existing weed must be prevented from flowering and fruiting

W4(d) = The weed must not be sold, propagated or knowingly distributed and the weed must be fully and continuously suppressed and destroyed if it is:

- three (3) metres in height or less; or
- within half a kilometre of remnant urban bushland, as defined by SEPP 19, and is not deemed by a local control authority as having historical or heritage significance; or
- is over three metres in height and not included in a Management Plan approved by the local control authority.
- The W4(d) declaration applies to Copmanhurst, Kyogle, Richmond Valley and Lismore Council areas and that part of Ballina Council area south of the Bruxner Highway

W4(f) = Shall not be sold, propagated or knowingly distributed. Occupiers must implement any biological control or other program directed by the local control authority must be implemented.

W4(g) = The weed must not be sold, propagated or knowingly distributed.

Additional environmental weed species that were recorded within the site include Castor oil plant (*Ricinus communis*), Asparagus fern (*Asparagus aethiopicus*), Umbrella tree (*Schefflera actinophylla*), Easter cassia (*Senna pendula* var. *glabrata*), Singapore daisy (*Sphagneticola trilobata*), Mile-a-minute (*Ipomoea cairica*) and Cockspur coral (*Erythrina crista-galli*).

5. FAUNA HABITAT VALUES

5.1 Fauna Habitat Assessment

The fauna habitat values described within this section are based on field observations by Cardno, previous site surveys conducted by James Warren and Associates, the information contained within the online Atlas of NSW Wildlife database and the mapping contained within the Tweed Vegetation Management Strategy 2004.

The Atlas of NSW Wildlife online database indicates that a total of 290 fauna species have been recorded within a 5km radius of the site (Appendix A). This high number of recorded fauna species can be attributed to the diversity of habitats that occur within the vicinity of the site. In this respect, the site supports a mapped SEPP 14 coastal wetland, scattered trees and cleared grasslands and is located within the vicinity of the Terranora Broadwater, Tweed River, islands such as Daveys Island and Big Island which support mangrove and paperbark communities, Ukerebagh Nature Reserve and the open coastline and marine environments.

The site is in a highly disturbed state as the majority of the site, with the exception of the north-western sector, has been previously cleared for agricultural purposes. The wetland vegetation in the north-western sector provides habitat resources for a variety of native fauna species. The balance of the site which is dominated by cleared grasslands provides some foraging resources for native fauna species, however given the lack of shelter and protection within these areas, smaller ground-dwelling species may be excluded from utilising the available habitat. The sparse, open vegetation cover would result in higher levels of predation of smaller ground-dwelling species by fauna such as avian predators, foxes and domestic cats from nearby residential areas.

A comprehensive fauna survey of the site has been previously carried out by James Warren and Associates, the results of which are documented in the JWA Report. In summary the surveys documented in the JWA Report identified:

1. four (4) species of amphibian, none of which are listed as Threatened pursuant to the *TSC Act*;
2. two (2) species of reptile, neither of which are listed as Threatened pursuant to the *TSC Act*;
3. Fifty-six (56) species of bird, of which two (2) species are listed as Threatened pursuant to the *TSC Act*, being:
 - the Osprey (*Pandion haliaetus*); and
 - the Collared Kingfisher (*Todiramphus chloris*).
4. Eleven (11) species of mammal, of which four (4) species are listed as Threatened pursuant to the *TSC Act*, being:
 - the Grey-headed flying-fox (*Pteropus poliocephalus*);
 - the Eastern long-eared bat (*Nyctophilus bifax*)
 - Little bent-winged bat (*Miniopterus australis*); and
 - Southern myotis (*Myotis adversus*).

5.2 Corridor Values

The area of greatest ecological importance within the site is the north-western sector of the site which supports the SEPP 14 wetland. This sector of the site contributes to a functional ecological corridor that extends into the adjacent land to the north of the site and to the Terranora Broadwater to the west of the site. The Terranora Broadwater forms part of a significant, larger movement corridor that extends out to the Tweed River and the coast in the east and north to the Cobaki Broadwater. This ecological corridor provides important foraging, nesting and roosting habitat for a range of native fauna species, particularly wetland bird species.

The southern sectors of the site do not form part of any functional ecological corridor given that these sectors support disturbed cleared land and the site is bounded to the south and west by roadways and established residential areas. The Pioneer Country to the east of the site provides some fragmented habitat resources however Fraser Drive intersects these two parcels of land and as illustrated in Figure 2, Pioneer Country predominantly supports cleared grassland with some retained clumps of vegetation.

The site and the majority of the adjoining lots have a 'Residential' designation pursuant to the Tweed LEP. Whilst it is acknowledged that the complete development of this land may be constrained by the provisions of other Commonwealth, State and Local government legislation, Council's intent is for the majority of the site and adjoining land to be developed for urban purposes. The orderly development of the site and adjoining land as a 'Residential' area would greatly reduce the amount of available fauna habitat and would limit the movement of native fauna within the area.

5.3 Significant Fauna Species

Field surveys, the Atlas of NSW Wildlife and the DEH Online databases have been utilised to compile a list of significant fauna species that may occur on the site or on adjacent properties. Previous distribution records and habitat requirements for these species have been examined to identify the likelihood of occurrence within the site. Each species has been allocated a rating of Very High, High, Moderate or Low according to the following criteria:

Very High: species observed on the site.

High: no site observations but both the Atlas of NSW and DEH database records for the species in the site locality, with substantial areas of suitable habitat on the site.

Moderate: no site observations, but Atlas of NSW records for the species in the site locality, with suitable habitat at the site.

Low: no site observations, but either Atlas of NSW records or DEH records for the species in the site locality, with little or no suitable habitat at the site.

A summary of the significant species which have a Very High, High and Moderate likelihood of occurrence, based on the availability of suitable habitat, are listed in Table 3.

In respect of the above categories it is noted that the Atlas of NSW Wildlife database is based on actual recorded sightings of a species whilst the DEH *EPBC Act* Protected Matters Report also includes species for which there are no actual sighting records. In this respect the Atlas of NSW Wildlife database records provide a more reliable indication that the species occurs in the survey area.

Table 3 Significant fauna species likely to occur within the site

Common Name	Species Name	Status*	Habitat Requirements	Recorded on Site [^]	Likelihood of Occurrence
Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	CV, NV	Wet and dry sclerophyll forests	JWA	Very High
Black flying-fox	<i>Pteropus alecto</i>	NV	Subtropical forest and woodlands, mangroves, paperbark forests		Moderate
Wallum froglet	<i>Crinia tinnula</i>	NV	Paperbark swamps		Moderate
Collared kingfisher	<i>Todiramphus chloris</i>	NV	Tidal creeks, mangroves and mud flats	JWA	Very High
Little bent-wing bat	<i>Miniopterus australis</i>	NV	Melaleuca swamps, wet and dry sclerophyll forests.	JWA	Very High
Osprey	<i>Pandion haliaetus</i>	NV, CMi, CMa	Estuaries, inlets and islands	JWA	Very High
Eastern long-eared bat	<i>Nyctophilus bifax</i>	NV	Paperbark forests, open woodland, rainforest	JWA	Very High
Southern myotis	<i>Myotis adversus</i>	NV	Mangroves, paperbark swamps, wet and dry sclerophyll forest and open woodland	JWA	Very High
Koala	<i>Phascolarctos cinereus</i>	NV	Sclerophyll forest and woodland		Moderate
Mangrove honeyeater	<i>Lichenostomus fasciularis</i>	NV	Mangroves, nearby eucalypt woodlands		Moderate
Rose-crowned fruit-dove	<i>Ptilinopus regina</i>	NV	Swamp woodlands, mangroves		Moderate
White-eared Monarch	<i>Monarcha leucotis</i>	NV	Paperbarks, mangroves, adjacent eucalypt forest		Moderate

* CV, CMi, CMa = Commonwealth (Vulnerable, Migratory, Marine) – EPBC Act
NE, NV = New South Wales (Endangered, Vulnerable) – NC Act

[^] JWA = Flora and Fauna Assessment Report prepared by James Warren and Associates, 2002
Cardno = Ecological Assessment Report prepared by Cardno, 2006

5.4 Overview

The majority of the site is highly disturbed with the exception of the mapped wetland in the north-western sector. This wetland area and associated vegetation provide potential habitat resources for the threatened species listed in Table 3. However, given the relatively small size of the wetland area, the surrounding urban land uses and the larger areas of more suitable habitat within the vicinity, such as Terranora Broadwater, Tweed River and Ukerebagh Nature Reserve, the site is not considered to provide critical habitat resources for the above listed threatened species. Notwithstanding the above, the area of greatest ecological importance within the site is the mapped SEPP 14 wetland which should be conserved and appropriately protected as part of any plan of development.

6. PROPOSED DEVELOPMENT

Villa World Ltd propose development of the site for the purposes of creating a residential subdivision and associated areas of public open space. The proposed plan of development includes the establishment of:

- 168 residential allotments ranging in size from approximately 450 m² to 1.33 hectares;
- an integrated housing precinct encompassing an area of approximately 2.7 hectares;
- public open space dedications totally approximately 2.1 hectares;
- in addition to the public open space dedications, the preservation of the SEPP 14 Coastal Wetland and an associated 50 metre wide buffer; and
- associated infrastructure and roadways.

The proposed plan of development is illustrated in Figure 4.

From an ecological perspective key elements of the proposed development include the following.

1. The section of the SEPP 14 wetland that occurs within the site is to be protected and conserved within an area of public open space. A 50m buffer to the wetland is provided to ensure that the ecological values associated with the wetland are maintained.
2. The establishment of a comprehensive stormwater quantity and quality management system to ensure that there are no significant alterations to either the quantity or quality of stormwater run-off leaving the developed sectors of the site and passing through the SEPP 14 wetland reserve.
3. The two specimens of the threatened Stinking Cryptocarya (*Cryptocarya foetida*), which were recorded on the site by James Warren and Associates, are located within the proposed buffer to the wetland. As such, these specimens will be protected and conserved within this area of public open space. Field surveys also recorded a specimen of the threatened Rough-shelled bush nut (*Macadamia tetraphylla*) in the western sector of the site. The Rough-shelled bush nut is likely to be removed by the proposed plan of development, however the proposal does provide for the collection of seed from this tree prior to its removal. The seeds will be propagated and 10 specimens are to be planted out within the proposed areas of open space within the site.
4. The potential exists for the rehabilitation and enhancement of the proposed open space areas within the site. The rehabilitation of these area should, at a minimum, incorporate the removal of declared weed species and, where applicable, the planting out of suitable native, endemic species.
5. Where relevant, the use of local species for landscaping and rehabilitation works to compliment the functional value of retained areas of native vegetation. Where practicable, existing native trees would be incorporated into the landscaping of the proposed development.

7. COMPLIANCE WITH BIODIVERSITY CONSERVATION REGULATIONS

7.1 Environment Protection and Biodiversity Conservation Act 1999

The *EPBC Act* requires that a person must receive Commonwealth approval for any action that has, will have, or is likely to have a significant impact on matters of national environmental significance. Matters of national environmental significance that are recognised by the *EPBC Act* and which can act as a trigger for the Commonwealth assessment and approval process include:

- World Heritage properties;
- National Heritage Places;
- Ramsar wetlands of international significance;
- Nationally threatened species and communities;
- Migratory species protected under international agreements;
- Nuclear actions, including uranium mining; and
- The Commonwealth marine environment.

In respect of the matters of national environmental significance recognised by the *EPBC Act*, the field surveys did record two specimens of Stinking Cryptocarya (*Cryptocarya foetida*) and one specimen of Rough-shelled bush nut (*Macadamia tetraphylla*), which are both listed as *Vulnerable* pursuant to the *EPBC Act*. In respect of listed threatened fauna species, field surveys recorded the *Vulnerable* Grey-headed flying-fox (*Pteropus poliocephalus*) utilising habitat within the site.

No other matters of national environmental significance have been recognised on the site.

Given the presence on the site and within the site locality of matters of national environmental significance, any development or use of the site would be constrained by the *EPBC Act* if that development or use will have, or is likely to have, a significant impact on matters of national environmental significance. With reference to the *EPBC Act Policy Statement 1.1 - Significant Impact Guidelines* as it relates to Threatened (*Vulnerable*) Species, development or use of the site would be constrained to the extent that such development or use should not, or be likely to:

- lead to a long-term decrease in the size of population of a species, or
- reduce the area of occupancy of population, or
- fragment an existing population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of population, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful a species becoming established in the species' habitat*, or
- introduce disease that may cause the species to decline, or
- interferes substantially with the recovery of the species.

In respect of the above, the development is not likely to have a significant impact on the Grey-headed flying-fox for the following reasons:

1. Whilst the Grey-headed flying-fox may seasonally utilise parts of the site for foraging when the dominant tree species are in flower, the site does not represent a significant or critical habitat resource for this species; and
2. Areas of functional value as forage habitat or as a potential camp site to the Grey-headed flying-fox would be retained within the SEPP 14 wetland reserve and substantial buffers would be established between this reserve and adjacent residential land uses.

In respect of the above, the development is not likely to have a significant impact on the listed threatened flora species for the following reasons:

1. only two specimens of the Stinking Cryptocarya and one specimen of the Rough-shelled bush nut were recorded on the site;
2. all of the Stinking Cryptocarya are located and would be conserved within the proposed SEPP 14 wetland reserve;
3. whilst the Rough-shelled bush nut is likely to require removal as a consequence of the development, it is proposed that seed would be collected from this tree prior to its removal and at least 10 specimens will be propagated and planted out within the proposed areas of open space within the site.

In summary, it is considered that the proposed plan of development would not have a significant impact on any matters of national environmental significance recognised by the *EPBC Act*.

7.2 Native Vegetation Act 2003

The objectives of the *Native Vegetation Act 2003* are to ensure the following aims are undertaken in accordance with the principles of ecologically sustainable development.

- a. to provide for, encourage and promote the management of native vegetation on a regional basis in the social, economic and environmental interests of the State; and
- b. to prevent broadscale clearing unless it improves or maintains environmental outcomes; and
- c. to protect native vegetation of high conservation value having regard to its contribution to such matters as water quality, biodiversity, or the prevention of salinity or land degradation; and
- d. to improve the condition of existing native vegetation, particularly where it has high conservation value; and
- e. to encourage the revegetation of land, and the rehabilitation of land, with appropriate native vegetation;

Pursuant to Schedule 1, Part 3 of this regulation, land within a zone designated "residential" (but not "rural-residential"), "village", "township", "industrial" or "business" under an environmental planning instrument or, having regard to the purpose of the zone, having the substantial character of a zone so designated, not being land to which a property vegetation plan applies, is excluded from the operation of the *Native Vegetation Act 2003*.

As previously stated, the site has an "Urban Expansion" designation pursuant to the Tweed LEP and, as such, any vegetation clearance within the site is exempt from the provisions of the *Native Vegetation Act 2003*. The provisions of the *Native Vegetation Act 2003* do not, therefore, constrain clearance of vegetation within the site.

7.3 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* ("TSC Act") outlines the protection of threatened species, communities and critical habitat in New South Wales. It provides for the identification, conservation and recovery of threatened species and their populations and communities. It also aims to reduce the threats faced by those species. The Act contains lists of threatened species, which are divided into several categories:

- species presumed extinct;
- endangered species;
- endangered populations;
- endangered ecological communities;
- vulnerable species; and
- vulnerable ecological communities.

The objects of this Act are as follows:

- a. to conserve biological diversity and promote ecologically sustainable development, and
- b. to prevent the extinction and promote the recovery of threatened species, populations and ecological communities, and
- c. to protect the critical habitat of those threatened species, populations and ecological communities that are endangered, and
- d. to eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities, and
- e. to ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed, and
- f. to encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management.

The Act specifies seven criteria (7 part test) that are to be used to determine whether a development is considered likely to have a significant impact on threatened species and ecological communities. Sections 7.3.1 to 7.3.7 provide an assessment of whether or not each of these criteria are satisfied in respect of the listed threatened species and ecological communities that occur on the site.

7.3.1 Criteria (a) of 7 part test

Criteria (a) of the *TSC Act* seven part test reads as follows:

- (a) *in the case of a threatened species, whether the action proposed 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,*

All of the listed threatened species that are known to occur on the site, with the exception of a single specimen of the Rough-shelled bush nut (*Macadamia tetraphylla*), are closely associated with the vegetation contained within the site's SEPP 14 wetlands. All of the listed fauna species known to utilise the site are known to exhibit preference for the foraging and roosting habitats contained within the vegetation communities associated with the site's SEPP 14 wetlands. This vegetation also contains the known occurrence of Stinking Cryptocarya (*Cryptocarya foetida*).

The proposed plan of development makes provision for the establishment of a SEPP 14 Wetland reserve that extends at least 50 metres beyond the boundaries of the defined wetland area. In fact the proposed plan of development would provide a substantially greater degree of separation between the site's SEPP 14 wetland habitats and residential land uses than currently occurs to the north-west of the site. This aspect of the proposed plan of development in combination with the implementation of appropriate vegetation and stormwater run-off management strategies should ensure that any adverse effects upon the life cycle of listed species that may be attributable to the proposed development are not of a nature or magnitude that viable local population of the species at risk of extinction.

The proposed plan of development is likely to result in the loss of a single known specimen of the listed Rough-shelled bush nut (*Macadamia tetraphylla*). The loss of a single specimen of this species will not have any discernible impact on the life cycle of the local population of this species. Notwithstanding this fact it is proposed that additional specimens will be propagated from this tree and established within the developments public open space reserves to ensure that the site continues to make a contribution towards the persistence of a local population of this species.

Given the above, the *TSC Act* seven part test criteria (a) for having a significant impact, is not satisfied.

7.3.2 Criteria (b) of 7 part test

Criteria (b) of the *TSC Act* seven part test reads as follows:

- (b) *in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,*

In respect of this criteria it is noted that none of the listed species that have been identified on, or considered likely to utilise, the site are members of an endangered population.

Given the above, the *TSC Act* seven part test criteria (b) for having a significant impact, is not satisfied.

7.3.3 Criteria (c) of 7 part test

Criteria (c) of the TSC Act seven part test reads as follows:

- (c) *in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*
- (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 Swamp she-oak closed forest to woodland, the Broad-leaved paperbark closed forest to woodland and saltmarsh communities associated with the SEPP 14 wetland in the north-western sector of the site are considered to be broadly analogous to three Endangered Ecological Communities listed under the provisions of the *TSC Act*, namely:

- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions; and
- Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions.

In respect of these communities the proposed plan of development makes provision for:

1. the establishment of a SEPP 14 Wetland Reserve which includes a 50 metre wide buffer between development and the wetland boundaries, thereby preserving the current extent of the endangered ecological communities contained therein;
2. maintenance of the integrity of the endangered ecological communities via:
 - the provision of appropriate development setbacks;
 - implementation of best practice stormwater runoff quality and quantity controls; and
 - implementation of appropriate weed management programs to target existing infestations of environmental weeds which currently threaten these communities.

Given the above, the *TSC Act* seven part test criteria (c) for having a significant impact, is not satisfied.

7.3.4 Criteria (d) of 7 part test

Criteria (d) of the TSC Act seven part test reads as follows:

(d) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, 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 action, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

As it relates to the proposed plan of development and listed species and ecological communities the following points are noted.

1. The proposed plan of development makes provision for a SEPP 14 Wetland Reserve will contain the site's Endangered Ecological Communities and all known specimens of the listed Stinking Cryptocarya (*Cryptocarya foetida*).
2. The proposed plan of development is likely to result in the loss of a single known specimen of the listed Rough-shelled bush nut (*Macadamia tetraphylla*). The loss of a single specimen of this species will not have any discernible impact on the long-term persistence of local populations of this species.
3. The SEPP 14 Wetland Reserve contains that part of the site which possesses the greatest function habitat value to all of the listed fauna species that are known to utilise the site, including the Grey-headed flying-fox (*Pteropus poliocephalus*), Little bent-wing bat (*Miniopterus australis*), Eastern long-eared bat (*Nyctophilus bifax*), Southern myotis (*Myotis adversus*), Collared kingfisher (*Todiramphus chloris*) and Osprey (*Pandion haliaetus*).
4. The proposed pattern of development makes provision for the retention of existing connections between significant on-site and off-site habitat. In particular the proposal makes appropriate provision for the maintenance of the integrity of the SEPP 14 Wetlands that extend beyond the site's boundaries. In respect of this issue it is also relevant to note that all of the listed fauna species known to utilise the site have the capacity to move over residential development to access disjunct pockets of suitable habitat.
5. The on-site habitat to be removed as a consequence of the proposed development is predominantly cleared land that contains small pockets of mainly regrowth vegetation comprised of a mixture of native and exotic species. This habitat is not considered to be of any functional importance to the long-term persistence of native wildlife populations that occur in the locality, a fact that is reflected in the Tweed Shire Planning Scheme designations that apply to the site.

Given the above, the TSC Act seven part test criteria (d) for having a significant impact, is not satisfied.

7.3.5 Criteria (e) of 7 part test

Criteria (e) of the TSC Act seven part test reads as follows:

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The site does not contain any areas of formally recognised critical habitat pursuant to the TSC Act.

Given the above, the TSC Act seven part test criteria (e) for having a significant impact, is not satisfied.

7.3.6 Criteria (f) of 7 part test

Criteria (f) of the TSC Act seven part test reads as follows:

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan, and

None of the TSC Act listed species or ecological communities that occur on, or which are considered likely to utilise the site on a regular basis, are the subject of a final or draft recovery plan.

None of the established Threat Abatement Plans raise any particular issues of relevance to the proposed plan of development.

Given the above, the TSC Act seven part test criteria (f) for having a significant impact, is not satisfied.

7.3.7 Criteria (g) of 7 part test

Criteria (g) of the TSC Act seven part test reads as follows:

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

TSC Act recognised key threatening process that are of relevance to the proposed plan of development and its impacts to listed species and ecological communities, include:

- Clearing of native vegetation
- Lantana camara
- Exotic vines and scrambles
- Alteration to the natural flow regimes of rivers, streams, flood plains and wetlands

As it relates to the proposed plan of development the following assessment of each of these key threatening processes is provided:

1. **Clearing of native vegetation:** The vast majority of the site has been cleared of native vegetation in the past and used for agricultural purposes. The majority of native vegetation that currently occurs on the site, including all of the Endangered Ecological Communities, will be retained within the development's SEPP 14 Wetland reserve. Whilst the proposed development may result in the clearance of a single specimen of the listed Rough-shelled bush nut, appropriate mitigation measures are proposed to off-set this loss.
2. ***Lantana camara*:** Infestations of *Lantana camara* occurs in various places throughout the site, including within some of the listed Endangered Ecological Communities that occur on the site. The proposed development of the site provides opportunities to develop and implement an appropriate management regime to ensure that existing infestations of *Lantana camara* do not threaten the integrity of the site's SEPP 14 Wetlands and associated Endangered Ecological Communities.
3. **Exotic vines and scrambles:** As with *Lantana camara*, the site supports populations of several exotic vines and scrambles which have the capacity, in the absence of an appropriate management regime, to adversely affect the ecological integrity of the site's SEPP 14 Wetlands and associated Endangered Ecological Communities. Such species include: Asparagus fern (*Asparagus aethiopicus*), Singapore daisy (*Sphagneticola trilobata*) and Mile-a-minute (*Ipomoea cairica*). The proposed development of the site provides opportunities to develop and implement an appropriate management regime to ensure that existing infestations of exotic vines and scrambles do not threaten the integrity of the site's SEPP 14 Wetlands and associated Endangered Ecological Communities.
4. **Alteration to the natural flow regimes of rivers, streams, flood plains and wetlands:** The proposed plan of development will result in alterations to landform and drainage patterns that occur across the site. This aspect of the proposed development, in the absence of an appropriately designed and implemented stormwater run-off management system, has the potential to alter the quality, quantity and pattern of flows into the site's SEPP 14 Wetlands and associated Endangered Ecological Communities. In response to this potential an appropriate stormwater management system forms part of the proposed plan of development.

Given the above, it is assessed that the *TSC Act* seven part test criteria (g) for having a significant impact, is not satisfied.

7.3.8 Summary

In summary, application of the *TSC Act*'s seven part test criteria indicate that the proposed plan of development for the site will not be likely to result in any significant impacts to any listed threatened species or endangered ecological communities.

7.4 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* provides a system of environmental planning and assessment for New South Wales. The objects of this Act include *"the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, ecologically sustainable development and the proper management, development and conservation of natural and artificial resources."*

As for the *TSC Act*, there is a requirement to assess whether there is likely to be any significant effects on threatened species, populations or ecological communities, or their habitats as a result of the proposed development. In this respect, the details of the seven part test which has been carried out on listed threatened species and ecological communities that have been recorded on the site are provided in Sections 7.3.1, 7.3.2 and 7.3.3. Therein it is assessed that development would not have a significant effect on any threatened species or their habitats or ecological communities and, as such, no Species Impact Statement is required.

7.5 State Environmental Planning Policy No. 14 – Coastal Wetlands

The State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP 14) aims to ensure that the coastal wetlands are preserved and protected in the environmental and economic interests of the State. The Coastal Wetlands pursuant to SEPP 14 are identified on a series of maps produced by the Department of Environment and Planning, NSW. The north-western sector of the site is mapped as forming part of a SEPP 14 wetland as illustrated in Figure 3, therefore the development of the site is constrained by the provisions of SEPP 14.

Pursuant to Part 7 of SEPP 14, restriction on development of certain land includes:

- (1) *In respect of land to which this policy applies, a person shall not:*
- (a) *clear that land,*
 - (b) *construct a levee on that land,*
 - (c) *drain that land, or*
 - (d) *fill that land,*
- except with the consent of the council and the concurrence of the Director.*

The SEPP 14 Coastal Wetland that occurs in the north-western sector of the site, and a 50m buffer to the wetland, is to be dedicated as public open space as part of the proposal. Therefore, the proposed plan of development:

- will not result in any direct physical disturbance of the SEPP 14 wetland; and
- makes appropriate provisions for the management of stormwater run-off quality and quantity prior to the release of urban stormwater run-off into or through the SEPP 14 wetland.

Given the above it is submitted that the plan of development achieves compliance with the provisions of SEPP 14.

In respect to any restoration works that may form part of the development, it is relevant to note that pursuant to Part 7A of SEPP 14, "a person must not carry out restoration works except with the consent of the council and the concurrence of the Director." As such it is not proposed that any works will be carried, as part of this development application, within the SEPP 14 wetland. Notwithstanding this fact, the development does provide opportunities for contributions to be made towards the development and implementation of an appropriate management plan designed to ensure the long-term viability of the functional ecological values of the SEPP 14 wetland.

7.6 State Environmental Planning Policy No. 44 – Koala Habitat Protection

The State Environmental Planning Policy No. 44 – Koala Habitat (SEPP 44) aims to manage and conserve natural vegetation that provides habitat for Koalas. According to SEPP 44, this is to be achieved:

- a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and
- b) by encouraging the identification of areas of core koala habitat, and
- c) by encouraging the inclusion of areas of core koala habitat in environment protection zones.

"Core koala habitat" is defined in the policy as *"an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population"*.

A field survey carried out on 25 October 2006 confirmed the analysis of JWA (2002), that whilst the site does support some scattered Koala food trees, such as Forest red gum (*Eucalyptus tereticornis*), there is no evidence of a resident Koala population, with no signs of Koala activity (i.e. sightings, scratch marks or scats). This is consistent with and attributable to the facts that the majority of the site supports cleared grassland with scattered trees and the site is predominantly surrounded by urban land uses. In this respect the site is not considered to represent core koala habitat.

"Potential koala habitat" is defined in the policy as *"areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component."* As stated above, whilst the site does support a small number of Forest red gum, which is listed in Schedule 2, this species is scattered in its distribution within the site and does not constitute 15% of the total number of trees in the upper or lower strata. As such the site does not constitute a potential koala habitat as defined in the SEPP 44.

As the site does not support core koala habitat or potential koala habitat, the development of the site is not constrained by the provisions of SEPP 44.

7.7 Tweed LEP

Pursuant to the Tweed Local Environmental Plan 2000 the entire site has a Residential – Urban Expansion designation. No part of the site has an Environmental Protection or Open Space designation. As such the proposed plan of development is consistent with the site's designations under the Tweed Local Environmental Plan 2000.

7.8 Development Control Plan No 3 - Banora Point West – Tweed Heads South

The Development Control Plan No. 3 Banora Point West - Tweed Heads South ("DCP 3") *"contains development objectives and other provisions in respect of "Banora Point West - Tweed Heads South: and relates to Tweed Local Environmental Plan 2000 which is the principal planning instrument governing development in the Shire."* The DCP 3 states that *"where an inconsistency arises between this plan and any environmental planning instrument applying to the same land, the provision of the environmental planning instrument prevails. An environmental planning instrument means a State Environmental Planning Policy, a Regional Environmental Plan or a Local Environmental Plan."*

The site forms part of the land to which the DCP 3 applies. In this respect, the following provisions relate directly to the site:

13.4 Special Requirements – Sullivans Land

- a. This clause relates to land west of Fraser Drive, South of James Road.*
- b. Any development application for the residential subdivision of the land shall maximise the opportunity to retain the vegetation directly to the east of SEPP 14 Area 18B, subject to being able to provide adequate water quality devices and subject to adequate buffering of the vegetation.*
- c. Any such development application shall include a flora investigation.*

The mapping contained within the DCP 3 (i.e. "Development Control Plan No 3 Layout Plan" and "Amendment 9 –Sullivan's Land, Fraser Drive, Tweed Heads South") indicates that the north-western sector of the site has a "Public Open Space" designation with an adjoining area mapped as a "Stormwater Management Buffer". The western sector of the site is mapped as a "Hazard Zone – Land Affected by Slip" pursuant to both of the above mentioned maps. The balance of the site has a "Residential A Zone" designation. As it relates to ecological matters, the proposed plan of development appears to be consistent with the requirements of DCP 3.

7.9 Development Control Plan No 16 – Subdivision Manual

The Development Control Plan No. 16 – Subdivision Manual ("DCP 16") of the Tweed Shire Council has been prepared in accordance with the *Environmental Planning and Assessment Act 1979* and provides guidelines on designing and the overall planning of subdivision developments, including more specific design guidelines and development standards in respect to urban and rural subdivisions. The aims and purposes of this DCP include, to present Council's strategic plan objectives for the development of subdivisions, to achieve the highest quality and "best practice" of subdivision development in the Shire and to implement the policies and provisions of the NSW State Government in terms of seeking to achieve quality of subdivision planning and development.

The relevant section of the DCP16 in respect to the proposed plan of development is Chapter 4 – Urban Subdivision Design Guidelines and Development Standards. Within this chapter are listed physical constraints that need to be addressed in respect to development, such as threatened species, coastal wetlands and Koala habitat. These relevant issues in respect to the proposed development are addressed individually below.

- **Threatened species, populations, ecological communities or their habitat** – this issue has been previously addressed in Section 7.3 and 7.4 herein;
- **Coastal wetlands** – this issue has been previously addressed in Section 7.5 herein; and
- **Koala Habitat** - this issue has been previously addressed in Section 7.6 herein.

As it relates to the above matters, the proposed plan of development appears to be consistent with the requirements of DCP 16.

8. SUMMARY

This assessment of the ecological values of the site for the proposed development has been carried out for a number of purposes including:

- to confirm the nature of the site's ecological values and functions; and
- to assess the degree of compliance that the proposed plan of development achieves with the requirements of the local planning scheme and relevant Commonwealth, State and local government legislation having a biodiversity conservation focus.

In summary the results of this assessment are as follows.

- a. The majority of the site has had a history of vegetation clearance and land use that has substantially altered its ecological character.
- b. The majority of the site has an urban land use designation pursuant to the Tweed Shire Planning Scheme.
- c. The northern sector of the site contains part of a SEPP 14 Wetland that contains significant ecological values including:
 - i. habitat resources for several species of fauna that are of conservation significance at the State and/or Commonwealth levels;
 - ii. habitat for and specimens of at least one State listed flora species; and
 - iii. vegetation communities that are analogous to State listed Endangered Ecological Communities.
- d. The proposed plan of development for the site makes provision for the preservation, buffering and appropriate management of that part of the site that possess ecological values that warrant conservation.
- e. The proposed plan of development is compliant with the requirement of relevant Commonwealth, State and Local government legislation having, at least in part, a biodiversity conservation and management focus, including:
 - the *Environment Protection and Biodiversity Conservation Act 1999*;
 - the *Native Vegetation Act 2003*;
 - the *Threatened Species Conservation Act 1995*;
 - the *Environmental Planning and Assessment Act 1979*;
 - State Environmental Planning Policy No. 14 – Coastal Wetlands;
 - State Environmental Planning Policy No. 44 – Koala Habitat Protection;
 - Tweed LEP;
 - Development Control Plan No 3 - Banora Point West – Tweed Heads South; and
 - Development Control Plan No 16 – Subdivision Manual.

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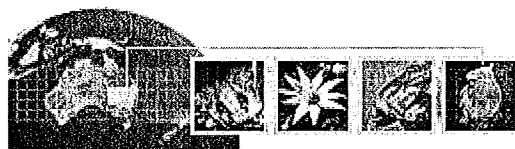
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FIGURES

- Figure 1** **Locality Plan**
- Figure 2** **Aerial Photograph**
- Figure 3** **Vegetation Communities**
- Figure 4** **Proposed Plan of Development**

APPENDIX A

Atlas of NSW Wildlife



NSW National Parks & Wildlife Service

atlas of nsw wild

[NPWS home](#)

Search Results

Your selection: Fauna, all species, recorded since 1980, Selected Area - 153.46000,-28.25000,153.56000,-28.15000 returned a total of 9290 records of 290 species.

Report generated on 06/12/2006 - 16:27 (Data valid to 19/11/2006)

[view map](#)
[search again](#)
[clear selection](#)
[search again](#)

Choose up to 3 species to map.

[clear selection](#)

	Map	Scientific Name	Common Name	Legal Status	Count	Info
Amphibia						
Bufonidae						
	☐	Bufo marinus	Cane Toad	U	37	
Hylidae						
	☐	Litoria caerulea	Green Tree Frog	P	6	
	☐	Litoria fallax	Eastern Dwarf Tree Frog	P	9	
	☐	Litoria nasuta	Rocket Frog	P	4	
	☐	Litoria peronii	Peron's Tree Frog	P	2	
	☐	Litoria tyleri	Tyler's Tree Frog	P	1	
Myobatrachidae						
	☐	Crinia signifera	Common Eastern Froglet	P	3	
	☐	Crinia tinnula	Wallum Froglet	V	4	
	☐	Limnodynastes ornatus	Ornate Burrowing Frog	P	7	
	☐	Limnodynastes peronii	Striped Marsh Frog	P	15	
	☐	Limnodynastes terraereginae	Northern Banjo Frog	P	13	
	☐	Pseudophryne coriacea	Red-backed Toadlet	P	1	
	☐	Pseudophryne sp.		P	1	
Aves						
Acanthizidae						
	☐	Acanthiza nana	Yellow Thornbill	P	1	
	☐	Acanthiza pusilla	Brown Thornbill	P	16	
	☐	Gerygone levigaster	Mangrove Gerygone	P	39	
	☐	Gerygone olivacea	White-throated Gerygone	P	7	
	☐	Sericornis frontalis	White-browed Scrubwren	P	11	

	☐	Sericornis magnirostris	Large-billed Scrubwren	P	2	
Accipitridae						
	☐	Accipiter cirrocephalus	Collared Sparrowhawk	P	2	
	☐	Accipiter fasciatus	Brown Goshawk	P	5	
	☐	Accipiter novaehollandiae	Grey Goshawk	P	1	
	☐	Aquila audax	Wedge-tailed Eagle	P	2	
	☐	Aviceda subcristata	Pacific Baza	P	10	
	☐	Circus approximans	Swamp Harrier	P	4	
	☐	Elanus axillaris	Black-shouldered Kite	P	6	
	☐	Haliaeetus leucogaster	White-bellied Sea-Eagle	P	81	
	☐	Haliastur indus	Brahminy Kite	P	189	
	☐	Haliastur sphenurus	Whistling Kite	P	187	
	☐	Hieraaetus morphnoides	Little Eagle	P	2	
	☐	Lophoictinia isura	Square-tailed Kite	V	1	
	☐	Pandion haliaetus	Osprey	V	272	
Aegothelidae						
	☐	Aegotheles cristatus	Australian Owlet-nightjar	P	7	
Alcedinidae						
	☐	Alcedo azurea	Azure Kingfisher	P	7	
Anatidae						
	☐	Anas castanea	Chestnut Teal	P	56	
	☐	Anas gracilis	Grey Teal	P	47	
	☐	Anas platyrhynchos	Mallard	U	6	
	☐	Anas rhynchotis	Australasian Shoveler	P	1	
	☐	Anas superciliosa	Pacific Black Duck	P	130	
	☐	Aythya australis	Hardhead	P	26	
	☐	Biziura lobata	Musk Duck	P	1	
	☐	Chenonetta jubata	Australian Wood Duck	P	90	
	☐	Cygnus atratus	Black Swan	P	3	
	☐	Dendrocygna arcuata	Wandering Whistling-Duck	P	15	
Anhingidae						
	☐	Anhinga melanogaster	Darter	P	329	
Anseranatidae						
	☐	Anseranas semipalmata	Magpie Goose	V	4	
Apodidae						
	☐	Apus pacificus	Fork-tailed Swift	P	2	

	☐	<i>Hirundapus caudacutus</i>	White-throated Needletail	P	9	
Ardeidae						
	☐	<i>Ardea alba</i>	Great Egret	P	336	
	☐	<i>Ardea ibis</i>	Cattle Egret	P	42	
	☐	<i>Ardea intermedia</i>	Intermediate Egret	P	15	
	☐	<i>Ardea pacifica</i>	White-necked Heron	P	4	
	☐	<i>Butorides striatus</i>	Striated Heron	P	158	
	☐	<i>Egretta garzetta</i>	Little Egret	P	239	
	☐	<i>Egretta novaehollandiae</i>	White-faced Heron	P	378	
	☐	<i>Egretta sacra</i>	Eastern Reef Egret	P	27	
	☐	<i>Ixobrychus minutus</i>	Little Bittern	P	2	
	☐	<i>Nycticorax caledonicus</i>	Nankeen Night Heron	P	31	
Artamidae						
	☐	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	P	21	
	☐	<i>Cracticus nigrogularis</i>	Pied Butcherbird	P	17	
	☐	<i>Cracticus torquatus</i>	Grey Butcherbird	P	22	
	☐	<i>Gymnorhina tibicen</i>	Australian Magpie	P	10	
	☐	<i>Strepera graculina</i>	Pied Currawong	P	28	
Burhinidae						
	☐	<i>Esacus neglectus</i>	Beach Stone-curlew	E1	5	
Cacatuidae						
	☐	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	P	8	
	☐	<i>Cacatua sanguinea</i>	Little Corella	P	5	
	☐	<i>Calyptrorhynchus funereus</i>	Yellow-tailed Black-Cockatoo	P	1	
	☐	<i>Calyptrorhynchus lathami</i>	Glossy Black-Cockatoo	V	1	
	☐	<i>Eolophus roseicapillus</i>	Galah	P	9	
Campephagidae						
	☐	<i>Coracina lineata</i>	Barred Cuckoo-shrike	V	1	
	☐	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	P	22	
	☐	<i>Coracina tenuirostris</i>	Cicadabird	P	13	
	☐	<i>Lalage leucomela</i>	Varied Triller	P	18	
	☐	<i>Lalage tricolor</i>	White-winged Triller	P	1	
Caprimulgidae						
	☐	<i>Eurostopodus mystacalis</i>	White-throated Nightjar	P	1	
Centropodidae						
	☐	<i>Centropus phasianinus</i>	Pheasant Coucal	P	7	

Charadriidae

☐	Charadrius bicinctus	Double-banded Plover	P	5	
☐	Charadrius leschenaultii	Greater Sand-plover	V	12	
☐	Charadrius mongolus	Lesser Sand-plover	V	6	
☐	Charadrius ruficapillus	Red-capped Plover	P	2	
☐	Elseya melanops	Black-fronted Dotterel	P	27	
☐	Erythronyx cinctus	Red-kneed Dotterel	P	6	
☐	Pluvialis dominica	Lesser Golden Plover	P	33	
☐	Pluvialis fulva	Pacific Golden Plover	P	51	
☐	Vanellus miles	Masked Lapwing	P	162	

Ciconiidae

☐	Ephippiorhynchus asiaticus	Black-necked Stork	E1	37	
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Climacteridae

☐	Cormobates leucophaeus	White-throated Treecreeper	P	9	
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Columbidae

☐	Chalcophaps indica	Emerald Dove	P	3	
☐	Columba leucomela	White-headed Pigeon	P	1	
☐	Columba livia	Rock Dove	U	3	
☐	Geopelia humeralis	Bar-shouldered Dove	P	31	
☐	Geopelia placida	Peaceful Dove	P	17	
☐	Macropygia amboinensis	Brown Cuckoo-Dove	P	3	
☐	Ocyphaps lophotes	Crested Pigeon	P	7	
☐	Ptilinopus regina	Rose-crowned Fruit-Dove	V	5	
☐	Streptopelia chinensis	Spotted Turtle-Dove	U	10	

Coraciidae

☐	Eurystomus orientalis	Dollarbird	P	27	
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Corvidae

☐	Corvus orru	Torresian Crow	P	47	
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Cuculidae

☐	Cacomantis flabelliformis	Fan-tailed Cuckoo	P	9	
☐	Cacomantis variolosus	Brush Cuckoo	P	8	
☐	Chalcites basalis	Horsfield's Bronze-Cuckoo	P	2	
☐	Chalcites lucidus	Shining Bronze-Cuckoo	P	2	
☐	Chalcites minutillus	Little Bronze-Cuckoo	P	4	
☐	Cuculus pallidus	Pallid Cuckoo	P	3	

	☐	<i>Eudynamys orientalis</i>	Pacific Koel	P	14	
	☐	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo	P	4	
Dicaeidae						
	☐	<i>Dicaeum hirundinaceum</i>	Mistletoebird	P	20	
Dicruridae						
	☐	<i>Dicrurus bracteatus</i>	Spangled Drongo	P	13	
	☐	<i>Grallina cyanoleuca</i>	Magpie-lark	P	16	
	☐	<i>Monarcha leucotis</i>	White-eared Monarch	V	2	
	☐	<i>Monarcha melanopsis</i>	Black-faced Monarch	P	7	
	☐	<i>Monarcha trivirgatus</i>	Spectacled Monarch	P	1	
	☐	<i>Myiagra alecto</i>	Shining Flycatcher	P	5	
	☐	<i>Myiagra rubecula</i>	Leaden Flycatcher	P	26	
	☐	<i>Rhipidura albiscapa</i>	Grey Fantail	P	17	
	☐	<i>Rhipidura leucophrys</i>	Willie Wagtail	P	14	
	☐	<i>Rhipidura rufifrons</i>	Rufous Fantail	P	2	
Estrildidae						
	☐	<i>Neochmia temporalis</i>	Red-browed Finch	P	9	
	☐	<i>Taeniopygia bichenovii</i>	Double-barred Finch	P	1	
Eupetidae						
	☐	<i>Psophodes olivaceus</i>	Eastern Whipbird	P	25	
Falconidae						
	☐	<i>Falco berigora</i>	Brown Falcon	P	4	
	☐	<i>Falco cenchroides</i>	Nankeen Kestrel	P	3	
	☐	<i>Falco longipennis</i>	Australian Hobby	P	3	
	☐	<i>Falco peregrinus</i>	Peregrine Falcon	P	1	
Haematopodidae						
	☐	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V	24	
	☐	<i>Haematopus longirostris</i>	Pied Oystercatcher	V	150	
Halcyonidae						
	☐	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	P	18	
	☐	<i>Todiramphus chloris</i>	Collared Kingfisher	V	52	
	☐	<i>Todiramphus macleayi</i>	Forest Kingfisher	P	7	
	☐	<i>Todiramphus sanctus</i>	Sacred Kingfisher	P	32	
Hirundinidae						
	☐	<i>Hirundo neoxena</i>	Welcome Swallow	P	18	
	☐	<i>Petrochelidon ariel</i>	Fairy Martin	P	5	
	☐	<i>Petrochelidon nigricans</i>	Tree Martin	P	3	
Jacaniidae						

	☐	Irediparra gallinacea	Comb-crested Jacana	V	16	
Laridae						
	☐	Anous stolidus	Common Noddy	P	1	
	☐	Chlidonias hybridus	Whiskered Tern	P	6	
	☐	Larus novaehollandiae	Silver Gull	P	344	
	☐	Stercorarius parasiticus	Arctic Jaeger	P	1	
	☐	Sterna albifrons	Little Tern	E1	11	
	☐	Sterna bergii	Crested Tern	P	284	
	☐	Sterna caspia	Caspian Tern	P	36	
	☐	Sterna hirundo	Common Tern	P	16	
	☐	Sterna nilotica	Gull-billed Tern	P	60	
Maluridae						
	☐	Malurus cyaneus	Superb Fairy-wren	P	16	
	☐	Malurus lamberti	Variegated Fairy-wren	P	18	
	☐	Malurus melanocephalus	Red-backed Fairy-wren	P	19	
Megapodiidae						
	☐	Alectura lathamii	Australian Brush-turkey	P	2	
Meliphagidae						
	☐	Acanthorhynchus tenuirostris	Eastern Spinebill	P	4	
	☐	Anthochaera chrysoptera	Little Wattlebird	P	16	
	☐	Entomyzon cyanotis	Blue-faced Honeyeater	P	3	
	☐	Lichenostomus chrysops	Yellow-faced Honeyeater	P	2	
	☐	Lichenostomus fasciocularis	Mangrove Honeyeater	V	17	
	☐	Lichmera indistincta	Brown Honeyeater	P	26	
	☐	Manorina melanocephala	Noisy Miner	P	20	
	☐	Meliphaga lewinii	Lewin's Honeyeater	P	47	
	☐	Melithreptus albogularis	White-throated Honeyeater	P	6	
	☐	Melithreptus lunatus	White-naped Honeyeater	P	1	
	☐	Myzomela sanguinolenta	Scarlet Honeyeater	P	12	
	☐	Philemon corniculatus	Noisy Friarbird	P	8	
	☐	Phylidonyris nigra	White-cheeked Honeyeater	P	14	
	☐	Plectorhyncha lanceolata	Striped Honeyeater	P	13	
Meropidae						

	☐ <i>Merops ornatus</i>	Rainbow Bee-eater	P	44
Motacillidae				
	☐ <i>Anthus australis</i>	Australian Pipit	P	3
Neosittidae				
	☐ <i>Daphoenositta chrysoptera</i>	Varied Sittella	P	2
Oriolidae				
	☐ <i>Oriolus sagittatus</i>	Olive-backed Oriole	P	34
	☐ <i>Sphecotheres vieilloti</i>	Australasian Figbird	P	26
Pachycephalidae				
	☐ <i>Colluricincla harmonica</i>	Grey Shrike-thrush	P	25
	☐ <i>Colluricincla megarhyncha</i>	Little Shrike-thrush	P	8
	☐ <i>Pachycephala pectoralis</i>	Golden Whistler	P	5
	☐ <i>Pachycephala rufiventris</i>	Rufous Whistler	P	27
Pardalotidae				
	☐ <i>Pardalotus punctatus</i>	Spotted Pardalote	P	5
	☐ <i>Pardalotus striatus</i>	Striated Pardalote	P	11
Pelecanidae				
	☐ <i>Pelecanus conspicillatus</i>	Australian Pelican	P	351
Petroicidae				
	☐ <i>Eopsaltria australis</i>	Eastern Yellow Robin	P	7
	☐ <i>Microeca fascians</i>	Jacky Winter	P	1
	☐ <i>Petroica rosea</i>	Rose Robin	P	1
Phaethontidae				
	☐ <i>Phaethon lepturus</i>	White-tailed Tropicbird	P	1
Phalacrocoracidae				
	☐ <i>Phalacrocorax carbo</i>	Great Cormorant	P	69
	☐ <i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant	P	349
	☐ <i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	P	273
	☐ <i>Phalacrocorax varius</i>	Pied Cormorant	P	267
Phasianidae				
	☐ <i>Coturnix ypsilophora</i>	Brown Quail	P	4
Pittidae				
	☐ <i>Pitta versicolor</i>	Noisy Pitta	P	1
Podargidae				
	☐ <i>Podargus strigoides</i>	Tawny Frogmouth	P	6
Podicipedidae				
	☐ <i>Tachybaptus novaehollandiae</i>	Australasian Grebe	P	54

Procellariidae

☐	Calonectris leucomelas	Streaked Shearwater	P	1	
☐	Puffinus bulleri	Buller's Shearwater	P	1	
☐	Puffinus carneipes	Flesh-footed Shearwater	V	1	
☐	Puffinus gavia	Fluttering Shearwater	P	1	
☐	Puffinus pacificus	Wedge-tailed Shearwater	P	1	
☐	Puffinus tenuirostris	Short-tailed Shearwater	P	1	

Psittacidae

☐	Alisterus scapularis	Australian King-Parrot	P	2	
☐	Glossopsitta concinna	Musk Lorikeet	P	1	
☐	Glossopsitta pusilla	Little Lorikeet	P	2	
☐	Platycercus adscitus	White Cheeked Rosella	P	4	
☐	Platycercus adscitus adscitus x eximius	Eastern/Pale-headed Rosella	P	1	
☐	Platycercus adscitus eximius	Eastern Rosella	P	10	
☐	Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet	P	11	
☐	Trichoglossus haematodus	Rainbow Lorikeet	P	19	

Rallidae

☐	Amaurornis olivaceus	Bush-hen	V	2	
☐	Fulica atra	Eurasian Coot	P	33	
☐	Gallinula tenebrosa	Dusky Moorhen	P	58	
☐	Gallirallus philippensis	Buff-banded Rail	P	8	
☐	Porphyrio porphyrio	Purple Swamphen	P	51	
☐	Rallus pectoralis	Lewin's Rail	P	4	

Recurvirostridae

☐	Himantopus himantopus	Black-winged Stilt	P	162	
☐	Recurvirostra novaehollandiae	Red-necked Avocet	P	17	

Scolopacidae

☐	Actitis hypoleucos	Common Sandpiper	P	16	
☐	Arenaria interpres	Ruddy Turnstone	P	17	
☐	Calidris acuminata	Sharp-tailed Sandpiper	P	8	
☐	Calidris ferruginea	Curlew Sandpiper	P	39	
☐	Calidris ruficollis	Red-necked Stint	P	2	
☐	Calidris tenuirostris	Great Knot	V	2	
☐	Gallinago hardwickii	Latham's Snipe	P	26	

	☐	Heteroscelus brevipes	Grey-tailed Tattler	P	139	
	☐	Heteroscelus incanus	Wandering Tattler	P	1	
	☐	Limosa lapponica	Bar-tailed Godwit	P	232	
	☐	Numenius madagascariensis	Eastern Curlew	P	298	
	☐	Numenius phaeopus	Whimbrel	P	341	
	☐	Tringa nebularia	Common Greenshank	P	97	
	☐	Tringa stagnatilis	Marsh Sandpiper	P	16	
	☐	Xenus cinereus	Terek Sandpiper	V	28	
Strigidae						
	☐	Ninox boobook	Southern Boobook	P	2	
	☐	Ninox connivens	Barking Owl	V	1	
Sturnidae						
	☐	Acridotheres tristis	Common Myna	U	1	
	☐	Sturnus vulgaris	Common Starling	U	2	
Sulidae						
	☐	Morus serrator	Australasian Gannet	P	2	
Sylviidae						
	☐	Acrocephalus australis	Australian Reed-Warbler	P	2	
	☐	Cisticola exilis	Golden-headed Cisticola	P	5	
	☐	Megalurus timoriensis	Tawny Grassbird	P	8	
Threskiornithidae						
	☐	Platalea regia	Royal Spoonbill	P	220	
	☐	Plegadis falcinellus	Glossy Ibis	P	1	
	☐	Threskiornis molucca	Australian White Ibis	P	398	
	☐	Threskiornis spinicollis	Straw-necked Ibis	P	21	
Tytonidae						
	☐	Tyto alba	Barn Owl	P	2	
	☐	Tyto capensis	Grass Owl	V	2	
	☐	Tyto novaehollandiae	Masked Owl	V	2	
Zosteropidae						
	☐	Zosterops lateralis	Silvereye	P	18	
Gastropoda	Map	Scientific Name	Common Name	<u>Legal Status</u>	Count	Info
Camaenidae						
	☐	Thersites mitchellae	Mitchell's Rainforest Snail	E1	1	
Mammalia	Map	Scientific Name	Common Name	<u>Legal Status</u>	Count	Info
Canidae						
		Canidae sp.	unidentified canid	U	2	

☐					
☐	Canis lupus	Dingo, domestic dog	U	12	
☐	Vulpes vulpes	Fox	U	2	
Dasyuridae					
☐	Antechinus flavipes	Yellow-footed Antechinus	P	3	
☐	Planigale maculata	Common Planigale	V	1	
Felidae					
☐	Felis catus	Cat	U	2	
Leporidae					
☐	Lepus capensis	Brown Hare	U	1	
Macropodidae					
☐	Macropus rufogriseus	Red-necked Wallaby	P	2	
☐	Wallabia bicolor	Swamp Wallaby	P	9	
Molossidae					
☐	Mormopterus beccarii	Beccari's Freetail-bat	V	2	
☐	Tadarida australis	White-striped Freetail-bat	P	4	
Muridae					
☐	Hydromys chrysogaster	Water-rat	P	1	
☐	Melomys burtoni	Grassland Melomys	P	1	
☐	Muridae sp.	unidentified murid rodent	P	1	
☐	Mus musculus	House Mouse	U	9	
☐	Rattus fuscipes	Bush Rat	P	11	
☐	Rattus lutreolus	Swamp Rat	P	7	
☐	Rattus rattus	Black Rat	U	7	
☐	Rattus sp.	rat	P	6	
Peramelidae					
☐	Isoodon macrourus	Northern Brown Bandicoot	P	4	
☐	Isoodon/Perameles sp.	unidentified Bandicoot	P	3	
☐	Perameles nasuta	Long-nosed Bandicoot	P	2	
Petauridae					
☐	Petaurus breviceps	Sugar Glider	P	3	
Phalangeridae					
☐	Trichosurus sp.	brush-tail possum	P	3	
Phascolarctidae					
☐	Phascolarctos cinereus	Koala	V	27	
Potoroidae					
☐	Potorous tridactylus	Long-nosed Potoroo	V	3	
		Long-nosed Potoroo,			

	☐ Potorous tridactylus	Cobaki Lakes and Tweed Heads West population	E2	3	
Pteropodidae					
	☐ Pteropus alecto	Black Flying-fox	V	6	
	☐ Pteropus poliocephalus	Grey-headed Flying-fox	V	6	
	☐ Pteropus scapulatus	Little Red Flying-fox	P	2	
Tachyglossidae					
	☐ Tachyglossus aculeatus	Short-beaked Echidna	P	1	
Vespertilionidae					
	☐ Miniopterus australis	Little Bentwing-bat	V	9	
	☐ Nyctophilus bifax	Eastern Long-eared Bat	V	2	
	☐ Nyctophilus gouldi	Gould's Long-eared Bat	P	1	
	☐ Nyctophilus sp.	long-eared bat	P	1	
	☐ Scotorepens sp.	Unidentified broad-nosed bat	P	2	
Reptilia					
	Map Scientific Name	Common Name	<u>Legal Status</u>	Count	Info
Agamidae					
	☐ Physignathus lesueurii	Eastern Water Dragon	P	6	
	☐ Pogona barbata	Eastern Bearded Dragon	P	5	
Boidae					
	☐ Morelia spilota	Carpet / Diamond Python	P	1	
Cheloniidae					
	☐ Chelonia mydas	Green Turtle	V	1	
Colubridae					
	☐ Tropidonophis mairii	Keelback Snake	P	2	
Elapidae					
	☐ Cacophis krefftii	Dwarf Crowned Snake	P	1	
	☐ Hemiaspis signata	Marsh Snake	P	2	
	☐ Rhinoplocephalus nigrescens	Small-eyed Snake	P	2	
Scincidae					
	☐ Carlia vivax	Tussock Rainbow-skink	P	1	
	☐ Cryptoblepharus virgatus	Cream-striped Shinning-skink	P	3	
	☐ Ctenotus robustus	Robust Ctenotus	P	2	
	☐ Lampropholis delicata	Dark-flecked Garden Sunskink	P	22	
		Yellow-bellied Three-			

	☐ Saiphos equalis	toed Skink	P	11
Typhlopidae				
	☐ Ramphotyphlops nigrescens	Blackish Blind Snake	P	1
Varanidae				
	☐ Varanus varius	Lace Monitor	P	11

Choose up to 3 species to map.

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Search Results

Your selection: Flora, all species, recorded since 1980, Selected Area - 153.46000,-28.25000,153.56000,-28.15000 returned a total of 726 records of 273 species.

Report generated on 06/12/2006 - 16:29 (Data valid to 19/11/2006)

Choose up to 3 species to map.

Plants	Map	Scientific Name	Common Name	Legal Status	Count	Info
Adiantaceae						
☐		Adiantum formosum	Giant Maidenhair	P13	1	
Amaranthaceae						
☐		Alternanthera denticulata	Lesser Joyweed	U	3	
Amaryllidaceae						
☐		Crinum pedunculatum	Swamp Lily	U	3	
Anacardiaceae						
☐		Euroschinus falcata var. falcata	Ribbonwood	U	2	
Apiaceae						
☐		Apium prostratum	Sea Celery	U	1	
☐		Apium prostratum var. prostratum		U	1	
☐		Hydrocotyle verticillata	Shield Pennywort	U	1	
Apocynaceae						
☐		Parsonsia straminea	Common Silkpod	U	8	
Araceae						
☐		Alocasia brisbanensis	Cunjevoi	U	2	
☐		Pothos longipes		U	1	
Araliaceae						
☐		Astrotricha latifolia		U	3	
☐		Polyscias elegans	Celery Wood	U	1	
☐		Schefflera actinophylla	Umbrella Tree	U	2	
Arecaceae						
☐		Archontophoenix cunninghamiana	Bangalow Palm	P13	4	
☐		Livistona australis	Cabbage Palm	P13	1	
Asclepiadaceae						
☐		Cynanchum carnosum		U	1	
		Marsdenia hemiptera		U	1	

☐				
☐	Marsdenia lloydii	Corky Marsdenia	U	1
Aspleniaceae				
☐	Asplenium australasicum forma australasicum	Bird's Nest Fern	P13	1
Asteliaceae				
☐	Cordyline congesta		P13	19
☐	Cordyline rubra	Palm-Lily	P13	1
☐	Cordyline stricta	Narrow-leaved Palm Lily	P13	2
Asteraceae				
☐	Ageratina adenophora	Crofton Weed	U	2
☐	Ageratina riparia	Mistflower	U	2
☐	Aster subulatus	Wild Aster	U	4
☐	Baccharis halimifolia	Groundsel Bush	U	6
☐	Bidens pilosa	Cobbler's Pegs	U	1
☐	Chrysanthemoides monilifera subsp. rotundata	Bitou Bush	U	1
☐	Conyza parva		U	2
☐	Conyza sumatrensis	Tall fleabane	U	2
☐	Crassocephalum crepidioides	Thickhead	U	1
☐	Eclipta platyglossa		U	1
☐	Eclipta prostrata		U	1
☐	Enydra fluctuans		U	3
☐	Erechtites valerianifolia	Brazilian Fireweed	U	1
☐	Leptinella longipes		U	1
☐	Senecio madagascariensis	Fireweed	U	1
☐	Vernonia cinerea		U	2
Avicenniaceae				
☐	Avicennia marina subsp. australasica	Grey Mangrove	U	2
Blechnaceae				
☐	Blechnum cartilagineum	Gristle Fern	U	3
☐	Blechnum indicum	Swamp Water Fern	U	5
Capparaceae				
☐	Capparis arborea		U	1
Casuarinaceae				
☐	Allocasuarina littoralis	Black Sheoak	U	1
☐	Casuarina glauca	Swamp Oak	U	6
Celastraceae				

☐	Denhamia celastroides	Denhamia	U	1
Chenopodiaceae				
☐	Sarcocornia			
☐	quinqueflora subsp. quinqueflora		U	1
☐	Suaeda australis		U	2
Commelinaceae				
☐	Commelina cyanea	Native Wandering Jew	U	3
Convolvulaceae				
☐	Ipomoea cairica		U	5
☐	Polymeria calycina		U	1
Cucurbitaceae				
☐	Trichosanthes subvelutina		U	1
Cyatheaceae				
☐	Cyathea cooperi	Straw Treefern	P13	1
Cyperaceae				
☐	Baumea articulata	Jointed Twig-rush	U	1
☐	Baumea juncea		U	2
☐	Baumea muelleri		U	1
☐	Carex declinata		U	1
☐	Carex maculata		U	1
☐	Caustis recurvata		P13	1
☐	Cyperus enervis		U	1
☐	Cyperus lucidus		U	1
☐	Cyperus polystachyos		U	2
☐	Fimbristylis ferruginea		U	5
☐	Gahnia clarkei	Tall Saw-sedge	U	4
☐	Gahnia sieberiana	Red-fruit Saw-sedge	P13	1
☐	Lepidosperma laterale		U	1
Dennstaedtiaceae				
☐	Histiopteris incisa	Bat's Wing Fern	U	1
☐	Hypolepis muelleri	Harsh Ground Fern	U	6
☐	Pteridium esculentum	Bracken	P13	10
Dicksoniaceae				
☐	Calochlaena dubia	Common Ground Fern	P13	3
Dilleniaceae				
☐	Adrastaea salicifolia		U	1
☐	Hibbertia linearis		U	2
☐	Hibbertia scandens	Climbing Guinea Flower	U	6
Dioscoreaceae				
☐	Dioscorea transversa	Native Yam	U	2
Droseraceae				

☐	Drosera spatulata		U	1	
Elaeocarpaceae					
☐	Elaeocarpus obovatus	Hard Quandong	U	1	
☐	Elaeocarpus reticulatus	Blueberry Ash	U	8	
Epacridaceae					
☐	Brachyloma scortechinii		U	1	
☐	Epacris obtusifolia	Blunt-leaf Heath	U	1	
☐	Leucopogon lanceolatus var. gracilis		U	3	
☐	Leucopogon lanceolatus var. lanceolatus		U	1	
☐	Leucopogon leptospermoides		U	3	
☐	Leucopogon margarodes		U	3	
☐	Monotoca elliptica	Tree Broom-heath	U	3	
☐	Monotoca scoparia		U	1	
☐	Sprengelia sprengelioides		U	1	
☐	Trochocarpa laurina	Tree Heath	U	1	
Euphorbiaceae					
☐	Breynia oblongifolia	Coffee Bush	U	4	
☐	Drypetes deplanchei subsp. deplanchei	Yellow Tulipwood	U	1	
☐	Excoecaria agallocha	Milky Mangrove	U	1	
☐	Glochidion ferdinandi	Cheese Tree	U	6	
☐	Glochidion sumatranum	Umbrella Cheese Tree	U	10	
☐	Macaranga tanarius		U	6	
☐	Mallotus philippensis	Red Kamala	U	1	
☐	Omalanthus populifolius	Bleeding Heart, Native Poplar	U	4	
Eupomatiaceae					
☐	Eupomatia laurina	Bolwarra	U	1	
Fabaceae (Caesalpinioideae)					
☐	Cassia brewsteri var. marksiana	Brush Cassia	E1	5	
Fabaceae (Faboideae)					
☐	Aotus ericoides		U	1	
☐	Austrosteenisia blackii var. blackii	Blood Vine	U	1	
☐	Callerya megasperma	Native Wistaria	U	1	
☐	Daviesia arborea		U	1	
	Desmodium				

☐	rhytidophyllum		U	1	
☐	Desmodium uncinatum	Silver-leaved Desmodium	U	1	
☐	Dillwynia floribunda		U	1	
☐	Dillwynia retorta species complex		U	1	
☐	Glycine clandestina		U	1	
☐	Gompholobium virgatum var. virgatum		U	1	
☐	Hovea acutifolia		U	4	
☐	Indigofera australis	Australian Indigo	U	1	
☐	Kennedia rubicunda	Red Kennedy Pea	U	5	
☐	Oxylobium robustum	Tree Shaggy Pea	U	2	
☐	Phyllota phyllicoides	Heath Phyllota	U	1	
☐	Pultenaea villosa		U	1	
Fabaceae (Mimosoideae)					
☐	Acacia bakeri	Marblewood	V	7	
☐	Acacia disparrima subsp. disparrima	Brush Ironbark Wattle	U	1	
☐	Acacia longissima	Narrow-leaved Wattle	U	1	
☐	Acacia melanoxylon	Blackwood	U	4	
☐	Acacia obtusifolia		U	2	
☐	Acacia ulicifolia	Prickly Moses	U	2	
Flagellariaceae					
☐	Flagellaria indica	Whip Vine	U	4	
Haloragaceae					
☐	Gonocarpus tetragynus		U	1	
Juncaceae					
☐	Juncus kraussii subsp. australiensis	Sea Rush	U	2	
Juncaginaceae					
☐	Triglochin striatum	Streaked Arrowgrass	U	3	
Lamiaceae					
☐	Plectranthus parviflorus		U	1	
Lauraceae					
☐	Cassytha glabella		U	1	
☐	Cassytha pubescens		U	2	
☐	Cinnamomum camphora	Camphor Laurel	U	7	
☐	Cryptocarya foetida	Stinking Cryptocarya	V	11	
☐	Cryptocarya triplinervis	Three-veined Cryptocarya	U	2	
☐	Endiandra discolor	Rose Walnut	U	3	

☐	Endiandra globosa	Black Walnut	U	13	
☐	Endiandra muelleri	Green-leaved Rose Walnut	U	2	
☐	Endiandra muelleri subsp. bracteata	Green-leaved Rose Walnut	E1	2	
☐	Endiandra sieberi	Hard Corkwood	U	5	
☐	Litsea australis	Brown Bolly Gum	U	2	
Lobeliaceae					
☐	Lobelia alata	Angled Lobelia	U	3	
☐	Pratia purpurascens	Whiteroot	U	1	
Lomandraceae					
☐	Lomandra longifolia	Spiny-headed Mat-rush	U	10	
Luzuriagaceae					
☐	Eustrephus latifolius	Wombat Berry	U	4	
☐	Geitonoplesium cymosum	Scrambling Lily	U	9	
Malvaceae					
☐	Hibiscus diversifolius	Swamp Hibiscus	U	2	
☐	Hibiscus tiliaceus	Cottonwood Hibiscus	U	1	
☐	Sida rhombifolia	Paddy's Lucerne	U	1	
Melastomataceae					
☐	Melastoma affine		U	3	
Menispermaceae					
☐	Stephania japonica		U	7	
Menyanthaceae					
☐	Villarsia exaltata	Yellow Marsh Flower	U	1	
Moraceae					
☐	Ficus coronata	Creek Sandpaper Fig	U	4	
☐	Ficus watkinsiana	Strangling Fig	U	2	
☐	Maclura cochinchinensis	Cockspur Thorn	U	2	
Myrsinaceae					
☐	Rapanea howittiana	Brush Muttonwood	U	1	
☐	Rapanea variabilis	Muttonwood	U	2	
Myrtaceae					
☐	Acmena smithii	Lilly Pilly	U	10	
☐	Austromyrtus dulcis	Midgen Berry	U	5	
☐	Baeckea frutescens		U	1	
☐	Callistemon salignus	Willow Bottlebrush	P13	8	
☐	Corymbia gummifera	Red Bloodwood	U	2	
☐	Corymbia intermedia	Pink Bloodwood	U	7	
☐	Corymbia maculata	Spotted Gum	U	1	
☐	Eucalyptus pilularis	Blackbutt	U	4	

☐	<i>Eucalyptus robusta</i>	Swamp Mahogany	P13	6	
☐	<i>Eucalyptus siderophloia</i>	Grey Ironbark	U	1	
☐	<i>Eucalyptus signata</i>	Scribbly Gum	U	2	
☐	<i>Eucalyptus tereticornis</i>	Forest Red Gum	U	3	
☐	<i>Gossia fragrantissima</i>	Sweet Myrtle	E1	2	
☐	<i>Leptospermum liversidgei</i>		U	1	
☐	<i>Leptospermum polygalifolium</i>		U	4	
☐	<i>Leptospermum trinervium</i>	Slender Tea-tree	U	1	
☐	<i>Leptospermum whitei</i>		U	4	
☐	<i>Lophostemon confertus</i>	Brush Box	U	7	
☐	<i>Lophostemon suaveolens</i>	Swamp Mahogany	U	3	
☐	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	U	10	
☐	<i>Rhodamnia maideniana</i>		U	5	
☐	<i>Syzygium francisii</i>	Giant Water Gum	U	2	
☐	<i>Syzygium moorei</i>	Durobby	V	2	
☐	<i>Syzygium oleosum</i>	Blue Lilly Pilly	U	2	
Ochnaceae					
☐	<i>Ochna serrulata</i>	Mickey Mouse Plant	U	1	
Oleaceae					
☐	<i>Notelaea longifolia</i>	Large Mock-olive	U	1	
☐	<i>Notelaea longifolia</i> forma glabra		U	1	
Orchidaceae					
☐	<i>Acianthus fornicatus</i>	Pixie Caps	P13	1	
☐	<i>Geodorum densiflorum</i>	Pink Nodding Orchid	E1	3	
☐	<i>Phaius australis</i>	Southern Swamp Orchid	E1	1	
Osmundaceae					
☐	<i>Todea barbara</i>	King Fern	P13	1	
Passifloraceae					
☐	<i>Passiflora edulis</i>	Common Passionfruit	U	2	
☐	<i>Passiflora herbertiana</i>		U	1	
☐	<i>Passiflora suberosa</i>	Cork Passionfruit	U	1	
☐	<i>Passiflora subpeltata</i>	White Passionflower	U	5	
Phormiaceae					
☐	<i>Dianella caerulea</i>	Blue Flax-lily	P13	5	
☐	<i>Dianella caerulea</i> var. caerulea		P13	2	
☐	<i>Dianella revoluta</i>		U	2	

Pittosporaceae

☐	Pittosporum revolutum	Rough Fruit Pittosporum	U	5
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Poaceae

☐	Andropogon virginicus	Whisky Grass	U	1
☐	Axonopus fissifolius	Narrow-leafed Carpet Grass	U	3
☐	Cynodon dactylon	Common Couch	U	1
☐	Digitaria parviflora	Small-flowered Finger Grass	U	1
☐	Diplachne fusca		U	1
☐	Entolasia marginata	Bordered Panic	U	2
☐	Entolasia stricta	Wiry Panic	U	1
☐	Eriochloa procera	Spring Grass	U	1
☐	Imperata cylindrica var. major	Blady Grass	U	5
☐	Ischaemum australe		U	2
☐	Leersia hexandra	Swamp Ricegrass	U	2
☐	Melinis minutiflora	Molasses Grass	U	2
☐	Melinis repens	Red Natal Grass	U	1
☐	Microlaena stipoides var. stipoides		U	1
☐	Oplismenus imbecillis		U	1
☐	Ottochloa gracillima		U	1
☐	Paspalidium distans		U	1
☐	Paspalidium gausum		U	1
☐	Paspalum orbiculare	Ditch Millet	U	2
☐	Paspalum vaginatum	Salt-water Couch	U	1
☐	Phragmites australis	Common Reed	U	2
☐	Sacciolepis indica	Indian Cupscale Grass	U	2
☐	Sporobolus africanus	Parramatta Grass	U	1
☐	Sporobolus virginicus		U	4
☐	Themeda australis	Kangaroo Grass	U	3

Polygonaceae

☐	Persicaria strigosa		U	3
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Proteaceae

☐	Banksia aemula	Wallum Banksia	U	1
☐	Banksia integrifolia subsp. integrifolia	Coastal Banksia	U	3
☐	Banksia robur	Swamp Banksia	P13	1
☐	Macadamia tetraphylla	Rough-shelled Bush Nut	V	1
☐	Persoonia cornifolia		P13	3
☐	Persoonia virgata		P13	1



Pteridaceae					
☐	Acrostichum speciosum	Mangrove Fern	U	2	
Restionaceae					
☐	Baloskion pallens		U	1	
☐	Baloskion tetraphyllum subsp. meiotachyum		U	2	
☐	Sporadanthus interruptus		U	1	
Rhamnaceae					
☐	Alphitonia excelsa	Red Ash	U	4	
☐	Pomaderris discolor		U	1	
Rhizophoraceae					
☐	Bruguiera gymnorhiza	Black Mangrove	U	1	
Ripogonaceae					
☐	Ripogonum album	White Supplejack	U	2	
Rosaceae					
☐	Rubus parvifolius	Native Raspberry	U	2	
☐	Rubus rosifolius	Rose-leaf Bramble	U	1	
Rubiaceae					
☐	Pomax umbellata		U	3	
☐	Randia moorei	Spiny Gardenia	E1	8	
Rutaceae					
☐	Acronychia imperforata	Beach Acronychia	U	3	
☐	Boronia falcifolia		P13	1	
☐	Boronia rosmarinifolia		P13	1	
☐	Bosistoa transversa	Yellow Satinheart	V	3	
☐	Melicope elleryana	Pink-flowered Doughwood	U	1	
☐	Zieria laevigata		U	1	
Santalaceae					
☐	Leptomeria acida	Sour Currant Bush	U	1	
Sapindaceae					
☐	Cupaniopsis anacardioides	Tuckeroo	U	8	
☐	Cupaniopsis newmanii		U	3	
☐	Diploglottis campbellii	Small-leaved Tamarind	E1	5	
☐	Dodonaea triquetra	Large-leaf Hop-bush	U	3	
☐	Guioa semiglauc		U	3	
☐	Jagera pseudorhus				
☐	var. pseudorhus forma pseudorhus	Foambark Tree	U	2	
☐	Lepiderema pulchella	Fine-leaved Tuckeroo	V	10	

☐	Mischocarpus pyriformis subsp. pyriformis	Yellow Pear-fruit	U	1	
Sapotaceae					
☐	Amorphospermum whitei	Rusty Plum	V	1	
Schizaeaceae					
☐	Lygodium microphyllum		U	3	
Scrophulariaceae					
☐	Bacopa monnieri		U	3	
Smilacaceae					
☐	Smilax australis	Lawyer Vine, Wait-a- while, Barbwire Vine	U	9	
☐	Smilax glycyphylla	Sweet Sarsparilla	U	5	
Solanaceae					
☐	Duboisia myoporoides	Corkwood	U	1	
☐	Solanum americanum	Glossy Nightshade	U	1	
☐	Solanum capsicoides	Devil's Apple	U	1	
☐	Solanum mauritianum	Wild Tobacco Bush	U	3	
Symplocaceae					
☐	Symplocos stawellii	White Hazelwood	U	1	
Thelypteridaceae					
☐	Christella dentata		U	1	
☐	Cyclosorus interruptus		U	4	
Thymelaeaceae					
☐	Pimelea linifolia		U	2	
☐	Wikstroemia indica		U	1	
Tiliaceae					
☐	Triumfetta rhomboidea		U	4	
Ulmaceae					
☐	Aphananthe philippinensis	Rough-leaved Elm	U	1	
☐	Trema tomentosa var. viridis	Native Peach	U	1	
Verbenaceae					
☐	Clerodendrum floribundum		U	3	
☐	Lantana camara	Lantana	U	9	
Violaceae					
☐	Viola hederacea	Ivy-leaved Violet	U	6	
Vitaceae					
☐	Cissus antarctica	Water Vine	U	1	
☐	Cissus hypoglauca	Giant Water Vine	U	3	
Xanthorrhoeaceae					
☐	Xanthorrhoea fulva		P13	1	

☐	Xanthorrhoea macronema	P13	3
Zingiberaceae			
☐	Alpinia caerulea	Native Ginger	U 4

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