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Environmental Study

Eurobodalla Shire Biodiversity Survey

(Project No. 171-001)

Report prepared for:
Eurobodalla Shire Council

October 2007

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Executive Summary

Eco Logical Australia was engaged by Eurobodalla Shire Council (ESC) to undertake a biodiversity assessment of lands zoned as urban expansion in the Eurobodalla Shire. ESC is working in consultation with the Department of Conservation and Climate Change (DECC) to investigate the possiblilty of biocertification of specified lands with urban expansion zoning.

The biodiversity study aimed to assess the conservation values of selected lands and included identification of threatened species matters and habitat values. Knowledge of these vaules will enable ESC to identify areas that are unsuitable/suitable for development given consideration of regional conservation values and possible offset areas.

On the basis of information collected from desktop and field studies, including vegetation validation and condition assessment, habitat identification and threatened species likelihood assessments and flora and fauna observations a number of findings were made in regard to conservation values.

There are substantial areas of native vegetation, primarily in moderate to good condition, within most of the study sites including the occurrence of four endangered ecological communities (approximately 200 hectares) listed under the NSW *Threatened Species Conservaiton Act 1995*. Two threatened species listed under the Act were observed during site assessments, yellow-bellied glider (*Petaurus australis*) and glossy black-cockatoo (*Calypthorhychos lathami*) and there were a number of hollow bearing trees and other habitat that may represent foraging areas or habitat for a suite of threatened species.

On the basis of the surveys undertaken for this report it would appear that much of the study area is potentially suitable for residential development, with identified endangered ecological communities providing the major constraint to development. Given the extent of non EEC native vegetation in moderate to good condition that is potentially developable within the bulk of the sites, it is likely that offsets will need to be provided beyond the site in most instances and identification of appropriate areas within regional biolinks should continue.

The precise extent of Protected and Retained Areas relative to Developable Areas will need to be determined in the context of other constraints to development (*i.e.* geotechnical, flooding, bushfire, etc), the impacts on threatened species, impacts on biolinks, and the potential to provide offsets to the losses associated with the Developable Areas. Further recommendations including site specific considerations are outlined below.

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1. Introduction

1.1 Project Background

Eco Logical Australia was engaged by Eurobodalla Shire Council (ESC) to undertake a biodiversity assessment of lands zoned as urban expansion in the Eurobodalla Shire. These lands have been identified as potential growth areas in the Eurobodalla Rural LEP 1987 and include lands at Long Beach, Malua Bay, Rosedale, West and South Moruya, Moruya Heads, Dalmeny, West Kianga and South Narooma.

The biodiversity assessment has been fully funded by grant funding from the NSW Department of Environment, Conservation and Climate Change (DECC). ESC will seek to gain biocertification for certain lands identified under the assessment. Biocertification can be granted for environmental planning instruments (such as LEP's) or associated planning packages by the Minister, under the *Threatened Species Conservation Act 1995,* where it is acknowledged that the instrument will faciliate 'improve or maintain' outcomes for biodiversity.

1.2 Project Objectives

Eurobodalla Shire Council and DECC have identified the following objectives of the assessment:

- Identify areas of high conservation value (HCV) including the distribution of endangered ecological communities (EECs), significant threatened species habitat, or old growth forest where urban development is inappropriate; and
- Determine the extent and condition of vegetation that can be cleared and thus enable the determination of the offsets required to match associated biodiversity losses.

The assessment will enable Eurobodalla Shire Council and DECC to;

- Determine those areas that are unsuitable for urban development.
- Determine those areas that may be suitable for urban development.
- Determine how well areas identified as unsuitable for urban development meet offset requirements.
- Advise on offset mechanisms or offset areas that would help protect areas of key biodiversity values.

1.3 Study Area: Urban Expansion Sites

The study area originally included nine urban expansion sites (hereafter referred to as sites) as identified in Section 1.1 and Maps 1a-c. Two of the sites, Malua Bay and Rosedale, were subsequently abandoned due to an insufficient interest from landholders.

The size of each expansion area and the area where access was permitted is detailed in Table 1.

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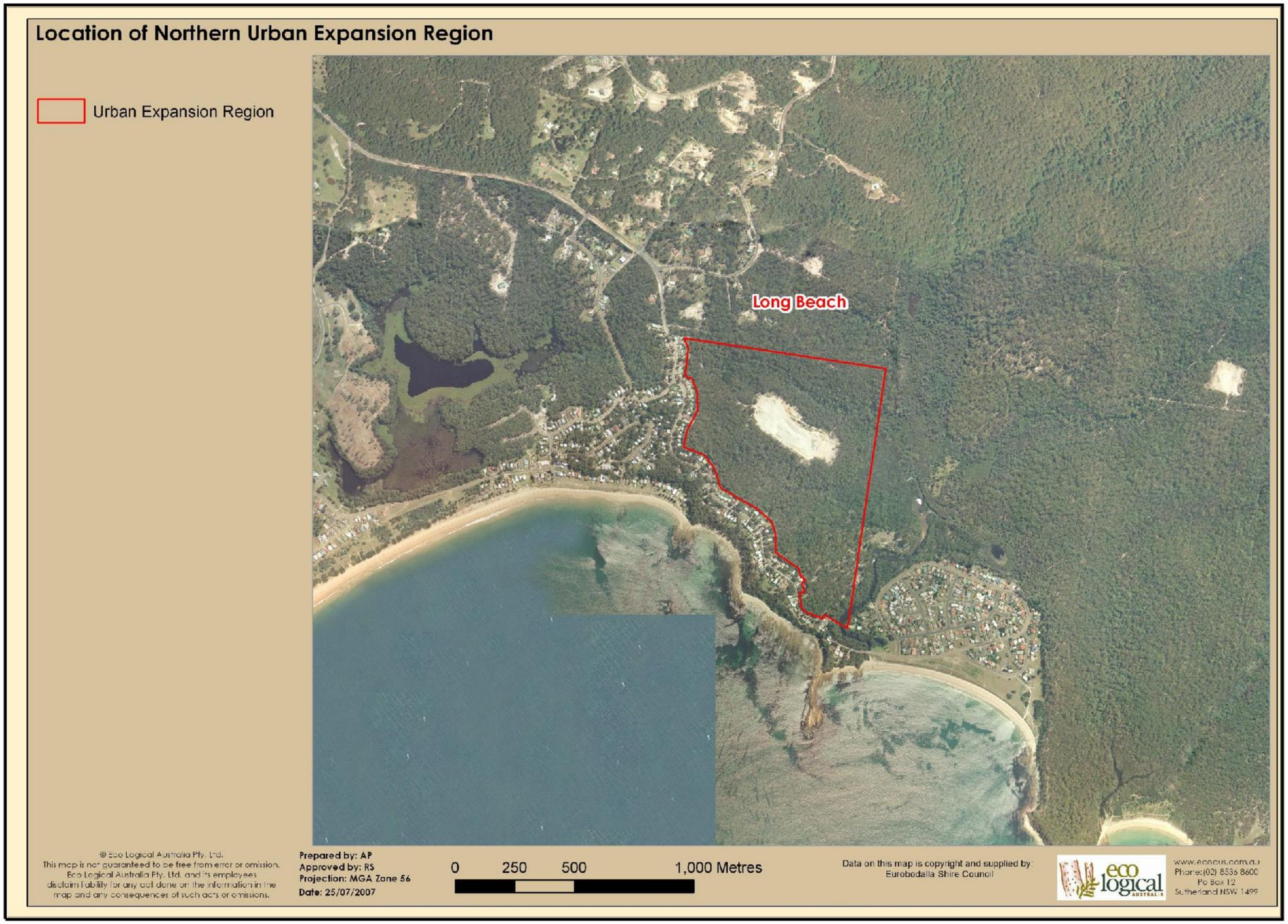
Map 1a Study Area: Long Beach Urban Expansion Site



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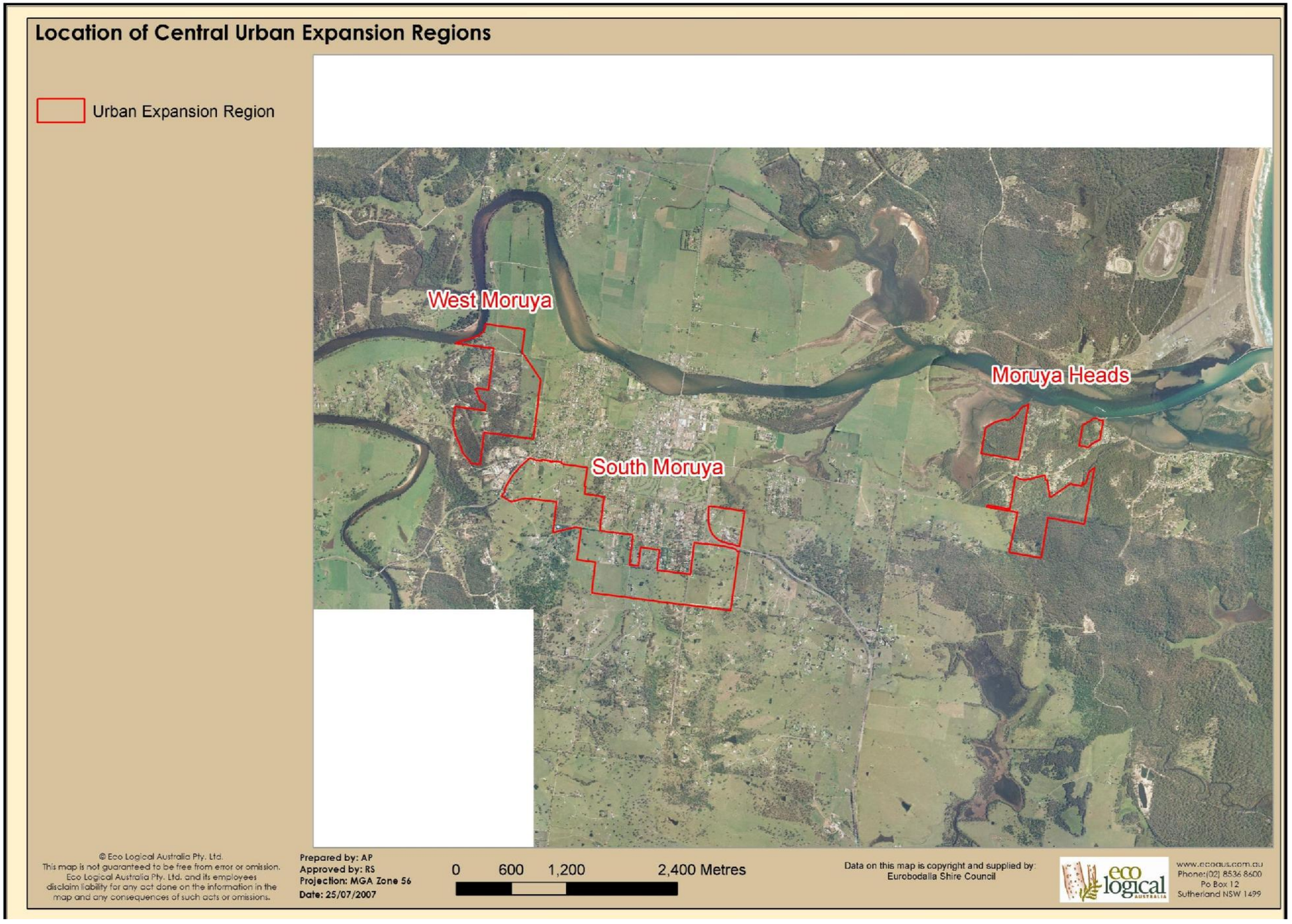
Map 1b Study Area: West Moruya, South Moruya and Moruya Heads Urban Expansion Sites



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Map 1c Study Area: Dalmeny, West Kianga and South Narooma Urban Expansion Sites

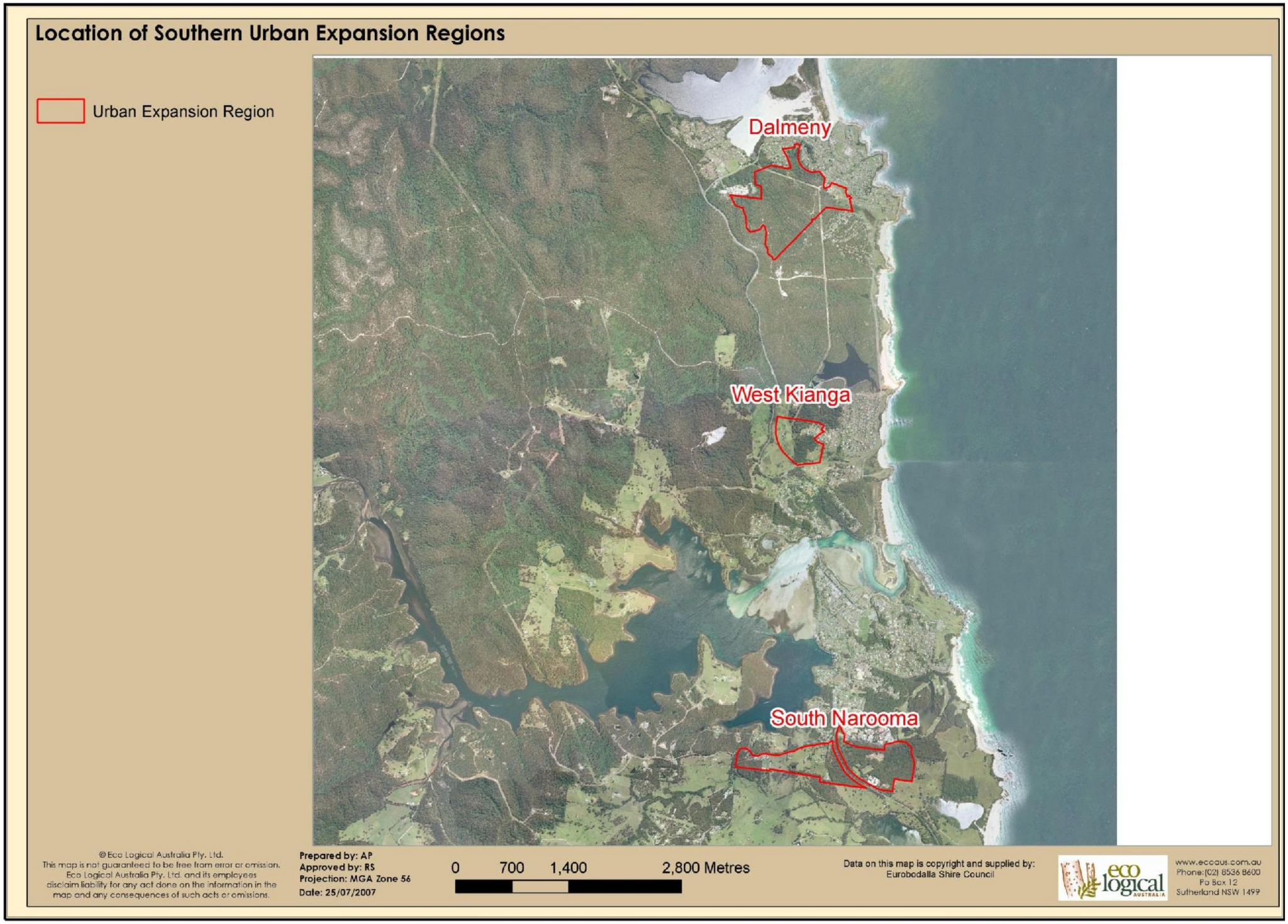

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Table 1: Size of each site and area where access was permitted.

Site	Size (Ha)	Area where access permitted (Ha)	% of Site
Long Beach	60.9	11.9	19.5
West Moruya	77.8	37.3	48
South Moruya	155.2	29.8	19.2
Moruya Heads	70.5	11.1	15.7
Dalmeny	89.5	78.2	87.4
West Kianga	27.2	9.5	35
South Narooma	81	23.3	28.8

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2. Methods

2.1 Literature Review

Desktop evaluation of previous biodiversity datasets within the LGA was undertaken prior to commencing fieldwork and included reviews of reports and vegetation mapping by NSW National Parks and Wildlife Service (now DECC) and the EEC validation project recently undertaken for ESC (NGH Environmental 2007). These reviews informed the design and planning of the field survey.

2.2 Data Audit

An audit of digital data was undertaken to assist in locating survey sites and targeting threatened species habitat for the study. Key datasets reviewed included:

- Atlas of NSW Wildlife (flora and fauna locations),
- EPBC Act Protected Matters Report,
- Existing vegetation mapping by DECC and ESC (P5Ma, SCIVI and EEC Validation Mapping),
- Digital aerial photography provided by ESC.

2.3 Field Survey

Field surveys methods employed included flora, fauna and habitat surveys consistent with the Biometric Tool field methodology (Gibbons *et al*. 2005) and also included random meander vegetation and habitat surveys. No targeted flora or fauna surveys were undertaken during the survey period, however, records of fauna detected opportunistically during the survey were made. Habitat quality and resources for fauna were assessed using a rapid assessment methodology.

The location of survey quadrats undertaken within the various sites is identified in Map 2a-g.

2.4 Flora Survey

Flora surveys were undertaken between 21 May 2007 and 20 July 2007. The survey methodology involved a mixture of:

- random meander surveys to validate vegetation community and condition boundaries and thus enable the boundaries of vegetation assessment zones to be determined; and
- quadrat surveys undertaken using the Biometric Tool field methodology for measuring condition variables (Gibbons *et al*. 2005).

Where access was not available to properties, attempts were made to undertake a visual assessment of vegetation type and condition with reference to similar areas elsewhere within the sites. Unfortunately, there were sites that were unable to be assessed directly or remotely.

A list of all flora species detected opportunistically within each site was also made. Species were identified to the lowest taxonomic level possible.

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Threatened flora species were targeted opportunistically during the random meander and quadrat surveys. However the likelihood of detecting most of the targeted threatened flora species was low during the survey period as;

- the target orchid species would not have had above ground biomass during the survey period; and
- the other threatened flora species were likely to be restricted primarily to habitats that are unlikely to be suitable for development, such as wetlands and riparian areas. As these habitats were unsuitable for development relatively less time was spent surveying these areas.

2.5 Fauna Surveys

Opportunistic fauna surveys were conducted in conjunction with the flora surveys.

Quantitative fauna habitat data was also collected, utilising the Biometric methodology and through habitat assessments. The habitat assessments were conducted using a rapid assessment methodology capturing data on the presence or absence of key faunal resources such as of hollow-bearing trees, feed trees, water or rock habitats, shelter provided by the understorey and groundcover, and presence of keystone flora species and nectar producing plants.

The location of any hollow-bearing trees that were encountered, or any evidence of glossy black cockatoo (*Calyptorhychus lathami*) or yellow-bellied glider (*Petaurus australis*) feeding activity were recorded with the aid of handheld GPS.

2.6 Summary of Survey Effort

Details of the survey effort are provided in Table 2.

Table 2: Summary of Survey Effort.

Date	Site	Survey Techniques	Survey Effort
21 May 2007	Long Beach	Random Meander and Quadrat surveys	14 person hours
22 May 2007	West Moruya	Random Meander and Quadrat surveys	16 person hours
23 May 2007	Moruya Heads	Random Meander and Quadrat surveys	8.5 person hours
	West Moruya	Random Meander and Quadrat surveys	6 person hours
24 May 2007	Dalmeny	Random Meander and Quadrat surveys	15 person hours
25 May 2007	South Narooma	Random Meander and Quadrat surveys	13 person hours
29 May 2007	Long Beach	Random Meander and Quadrat surveys	7 person hours
	South Moruya	Random Meander and Quadrat surveys	4 person hours
30 May 2007	South Moruya	Random Meander and Quadrat surveys	2 person hours
	West Moruya	Random Meander and Quadrat surveys	4 person hours
	Moruya Heads	Random Meander and Quadrat surveys	3 person hours

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Date	Site	Survey Techniques	Survey Effort
	West Kianga	Random Meander and Quadrat surveys	3 person hours
31 May 2007	West Kianga	Random Meander and Quadrat surveys	6 person hours
	Dalmeny	Random Meander and Quadrat surveys	8 person hours
1 June 2007	West Kianga	Random Meander and Quadrat surveys	3 person hours
	Dalmeny	Random Meander and Quadrat surveys	3 person hours
	West Moruya	Random Meander and Quadrat surveys	2 person hours

2.7 Survey Considerations and limitations

As mentioned above, access was not available to large areas of private property within the majority of sites. Where possible, areas where access was not available were assessed visually, with reference to similar sites where access was available. However, this was not always possible as the topography or density of vegetation at some sites prevented a visual assessment being made. Notwithstanding the value of the visual assessments, they obviously have limitations, particularly where it is difficult to assess the cover of native and exotic groundcovers, which are a primary determinant of condition class. Where it was not clear from a visual assessment a precautionary approach was taken and the condition class considered to be the higher of two possible options.

The efficacy of the surveys was also limited by the season within which the surveys were undertaken. The surveys were undertaken in late autumn and winter which was outside the period when the target threatened orchid species are detectable. Similarly, the survey period was outside the ideal survey period for other target threatened flora species such as *Persicaria elatior* and *Correa baeuerlenii*. In addition, the abundance of annual species, particularly in the grassy ecosystems, is likely to have been underestimated given the late autumn – winter survey period.

2.8 Consultation

Consultation was undertaken with Eurobodalla Shire Council and, to a lesser extent, DECC prior to the commencement of the field work component of the project. Further consultation occurred at later stages of the project which led to substantial modification to the initial brief.

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3. Assessment of Vegetation

The assessment of vegetation in subsequent sections is based upon the methodology proposed by DECC which is drawn from the Biometric – A terrestrial biodiversity assessment tool for the NSW Property Vegetation Plan developer.

3.1 Extent of Native Vegetation

The extent of native vegetation, as defined by the *Native Vegetation Act 2003*, within the respective sites was mapped with the results identified in Maps 2a-g.

3.2 Vegetation Types within the study area

The vegetation communities within the study area were classified into the most appropriate Southern Rivers Catchment Management Authority (SRCMA) vegetation type on the basis of the quadrat and random meander surveys. The extent of each vegetation type within each site was mapped on the basis of the random meander surveys and through aerial photo interpretation. Where access was not available a visual validation of the extent and condition of vegetation was made where possible as described in Section 2.4.

Table 3 identifies the extent of each vegetation type within each site and the degree to which each vegetation type has been cleared from its pre-European extent. The location and extent of each vegetation type within each site is shown in Map 2a-g. The flora species observed within each site and within each quadrat are identified in Appendix A.

In general the vegetation communities observed within the study area correlated with the SRCMA vegetation types. However there were a few communities observed within the study area that were difficult to attribute to any SRCMA vegetation type as discussed below.

Clyde Gully Forest - At Dalmeny the community is probably better described by the South Coast Hinterland Wet Forest or Clyde Tuross Hinterland Forest communities of SCIVI (Tozer 2006). However, these communities are not included in the SRCMA communities and the closest SRCMA community to either of these communities is the Clyde Gully Forest.

Southern Lowland Wet Forest – This community has been used to describe the vegetation that occurs in the lower parts of drainage lines associated with coastal floodplains of varying sizes at West Moruya, Moruya Heads and Dalmeny. Parts of the community, where *Eucalyptus botryoides* or *Eucalyptus saligna/botryoides* are dominant and where the understorey and groundcover are suitable have been classified as the Swamp Sclerophyll Forest EEC (SSF).

The description of Southern Lowland Wet Forest in the SRCMA, SCIVI, and P5MA (Tindall *et al*. 2005) datasets suggest that it does not extend further south than Batemans Bay. However, these datasets do not describe a community further south which better describes the vegetation observed at the abovementioned locations.

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The only other potentially suitable SRCMA community that is associated with similar habitats is the Murramarang Lowlands Forest, which apparently extends to Congo. However, Murramarang Lowlands Forest does not correlate as well floristically with the vegetation observed on the study sites as does the Southern Lowland Wet Forest. Under these circumstances these communities have been classified as Southern Lowland Wet Forest.

South Coast River Flat Forest - The vegetation that occurs in places on alluvial soils in the lower part of two drainage lines at Dalmeny, and has been classified as South Coast River Flat Forest (SCRFF), is not described particularly well by any of the communities identified by SCIVI or SRCMA. The canopy always includes *Eucalyptus saligna/botryoides* and often *Eucalyptus baueriana* and *Eucalyptus longifolia.* The groundcover typically contains a very broad mix of grasses, sedges, forbs and ferns but also includes a mix of sclerophyll and mesic understorey species. The community appears to have affinities with both the Bega Wet Shrub Forest (BWSF) and the SCRFF of SRCMA but does not include any *Eucalyptus elata* which is usually the dominate canopy tree of both communities. The understorey of the community, whilst supporting some of the characteristic species of the both the BWSF and SCRFF, generally does not correlate well with the descriptions of the dominant understorey species of the either community. The community also has some affinities with the Coastal Shrub/Grass Dry Forest of SRCMA although it does not typically include *Eucalyptus globoidea*. The Coastal Shrub/Grass Dry Forest community is not particularly well described either in SRCMA or in the reference dataset (Thomas *et a*l. 2000).

Given that the community is considered to comprise the EEC River Flat Eucalypt Forest, the community has been classified as South Coast River Flat Forest for the purposes of this report in the absence of a SRCMA community that better describes it.

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Table 3: Extent of vegetation type within each site and the degree to which it has been cleared.

Vegetation Type (after SRCMA)	Degree of clearance %	Area within site (ha)	% of site[1]
Long Beach			
Estuarine Fringe Forest	85	0.24	0.4
Estuarine Creek Flat Scrub	45	1.07	1.75
Southern Lowlands Wet Forest	10	8.4	13.8
Batemans Bay Foothills Dry Forest	5	1.4	2.3
Clyde Gully Wet Forest	5	0.8	1.3
West Moruya			
South Coast Grassy Woodland	60	42.8	55
Batemans Bay Cycad Forest	10	16.6	21.3
Southern Lowlands Wet Forest	10	1	1.3
South Moruya			
South Coast Grassy Woodland	60	145	93.4
Estuarine Creek Flat Scrub	45	0.7	0.45
Moruya Heads			
Estuarine Fringe Forest	85	0.3	0.43
Coastal Sand Forest	45	0.5	0.7
Batemans Bay Cycad Forest	10	18.1	25.7
South Coast Grassy Woodland	60	8.9	12.6
Estuarine Creek Flat Scrub	45	0.1	0.1
Southern Lowlands Wet Forest	10	0.3	0.4
Dalmeny			
Clyde Gully Wet Forest	5	0.6	0.7
South Coast River Flat Forest	30	0.5	0.6
Estuarine Creek Flat Scrub	45	0.6	0.7
Batemans Bay Cycad Forest	10	80.2	89.6
Southern Lowlands Wet Forest	10	1.7	1.9
West Kianga			
Batemans Bay Cycad Forest	10	13.4	49.3
Southeast Coastal Gully Shrub Forest	15	8.8	32.4
South Narooma			
Batemans Bay Cycad Forest	10	69.6	85.9

[1] As a percentage of the whole site even where vegetation could only be mapped in a portion of the site as a result of access limitations.

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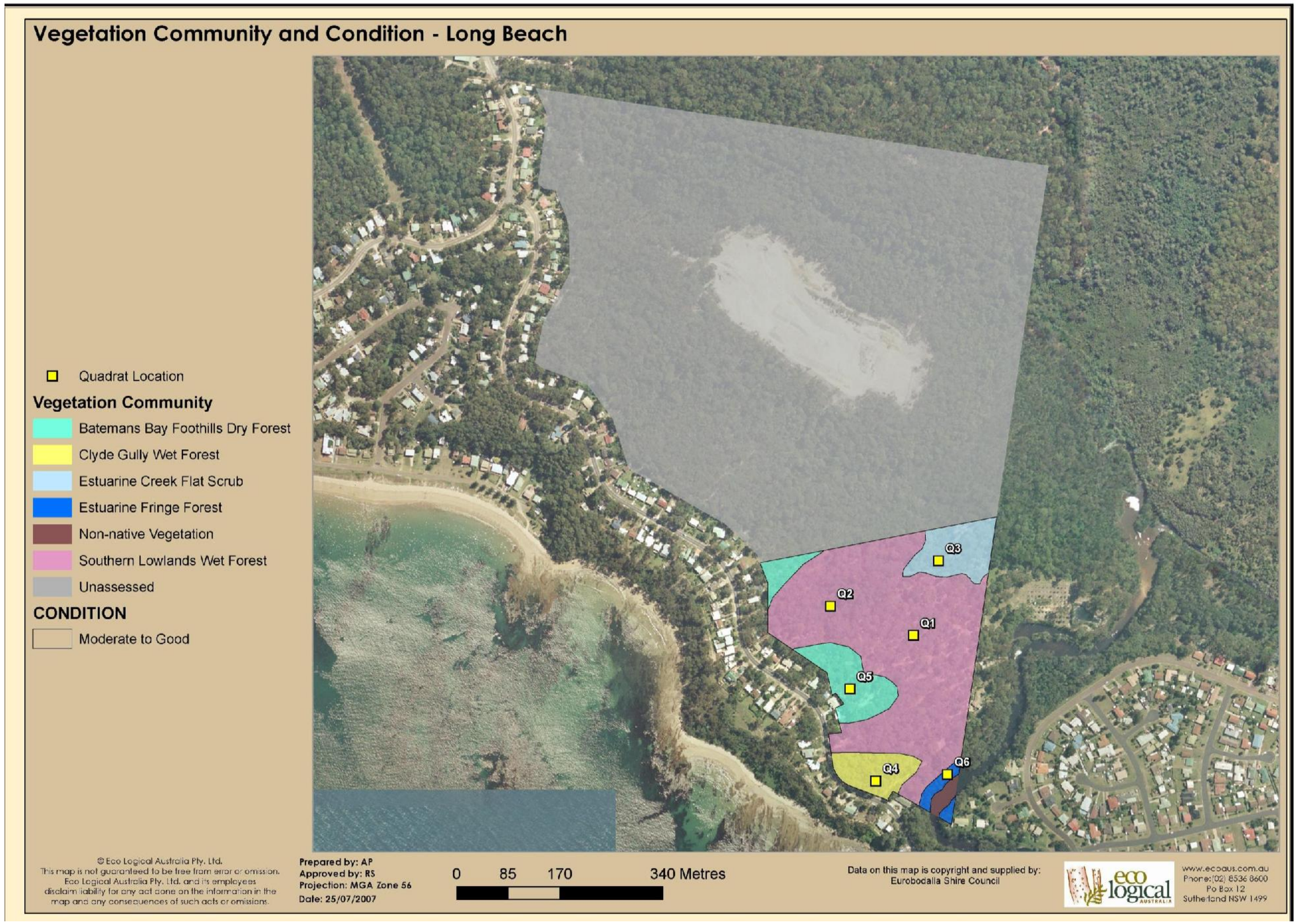
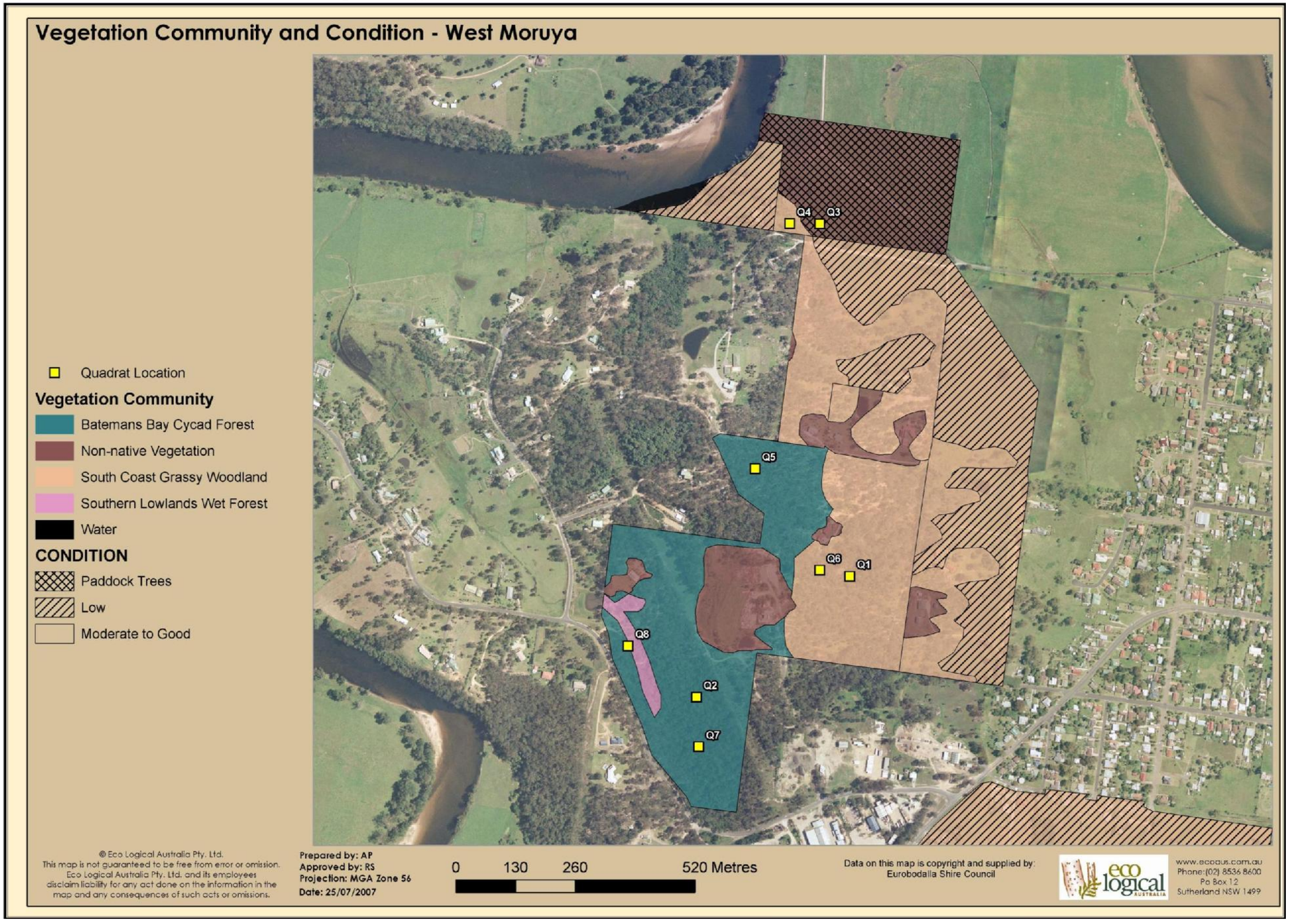
Map 2a: Location of quadrats and extent of vegetation types and condition within the Long Beach site.



Map 2b: Location of quadrats and extent of vegetation types and condition within the West Moruya site.



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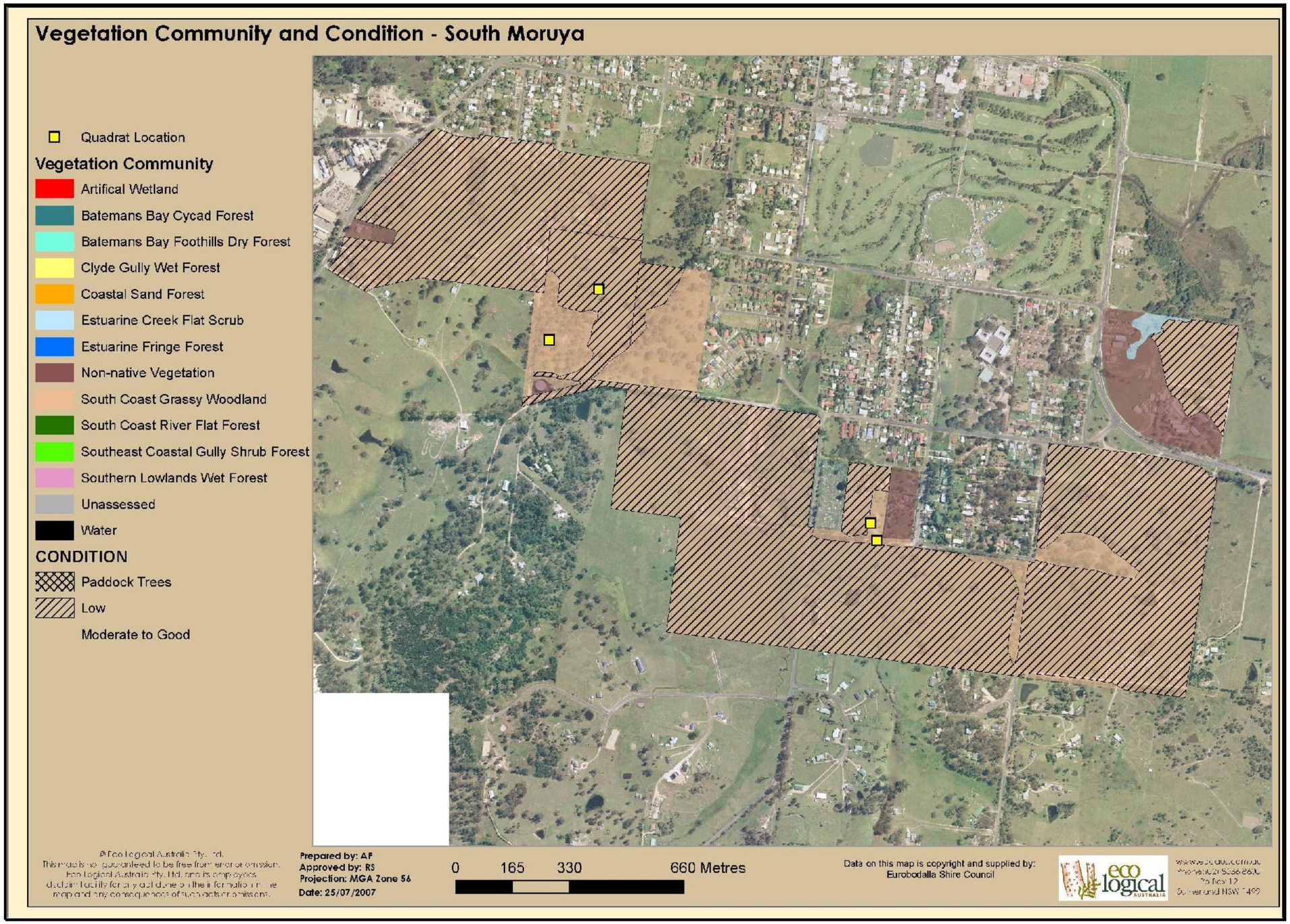
Map 2c: Location of quadrats and extent of vegetation types and condition within the South Moruya site.



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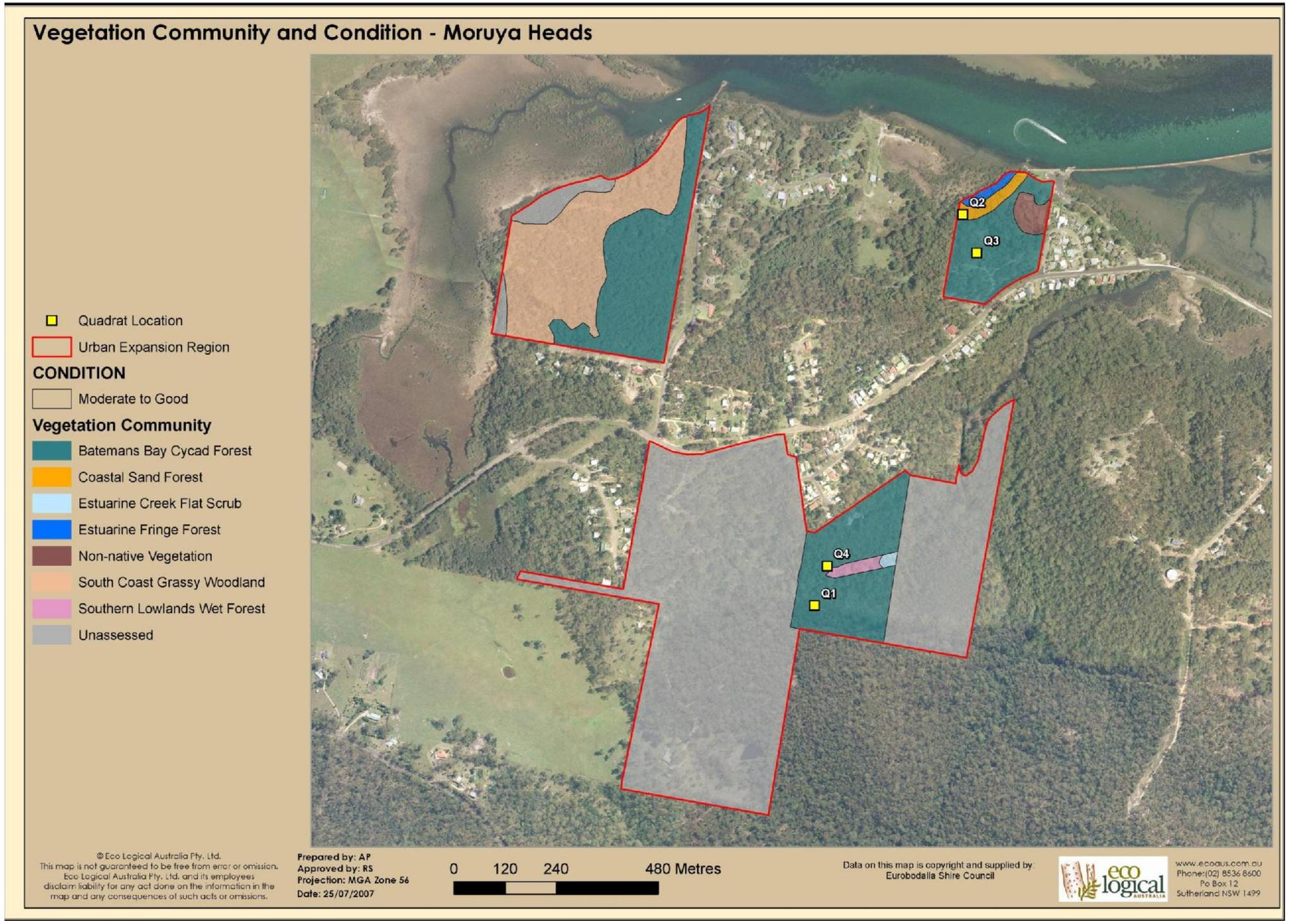
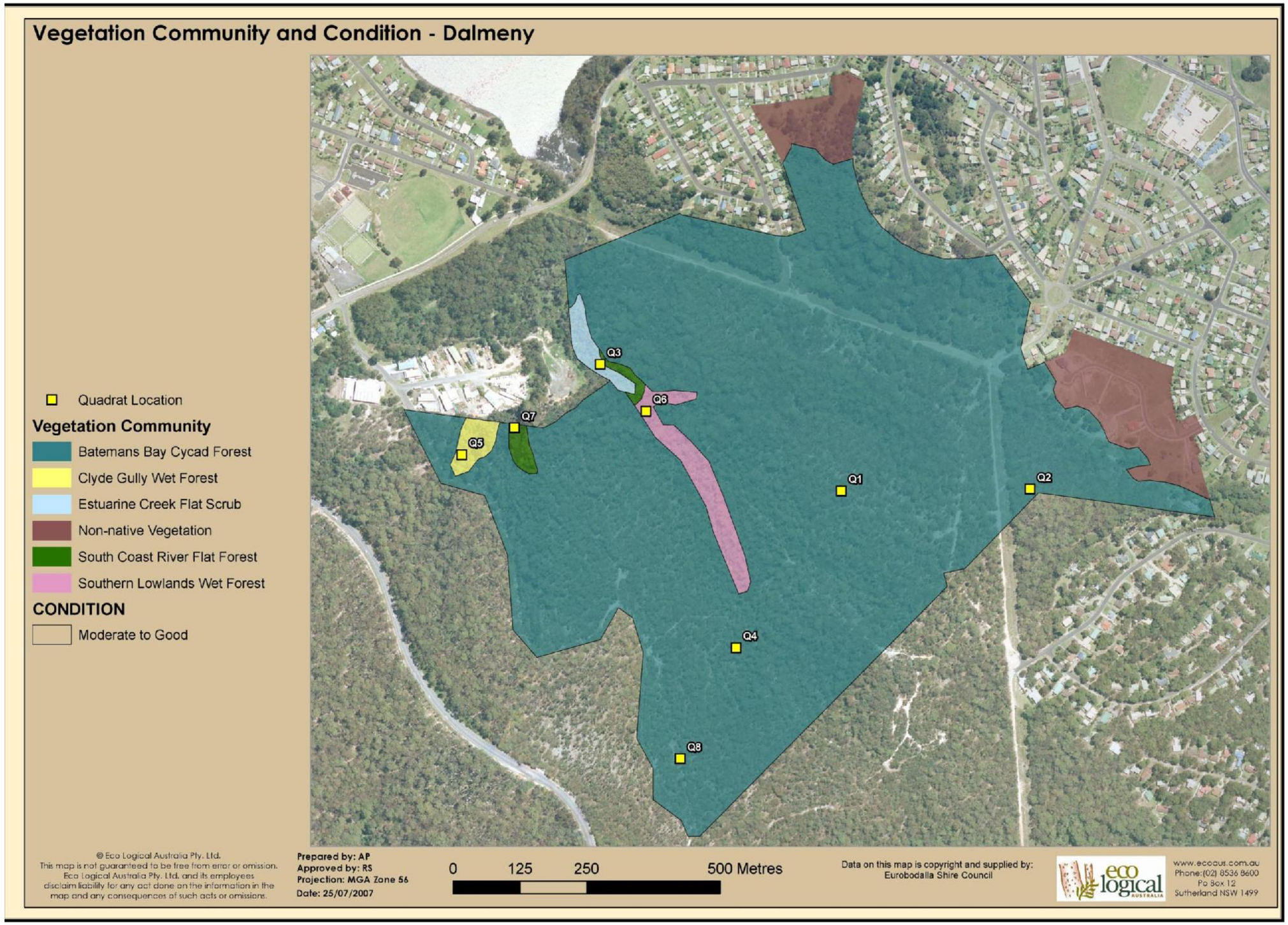
Map 2d: Location of quadrats and extent of vegetation types and condition within the Moruya Heads site.



Map 2e: Location of quadrats and extent of vegetation types and condition within the Dalmeny site.



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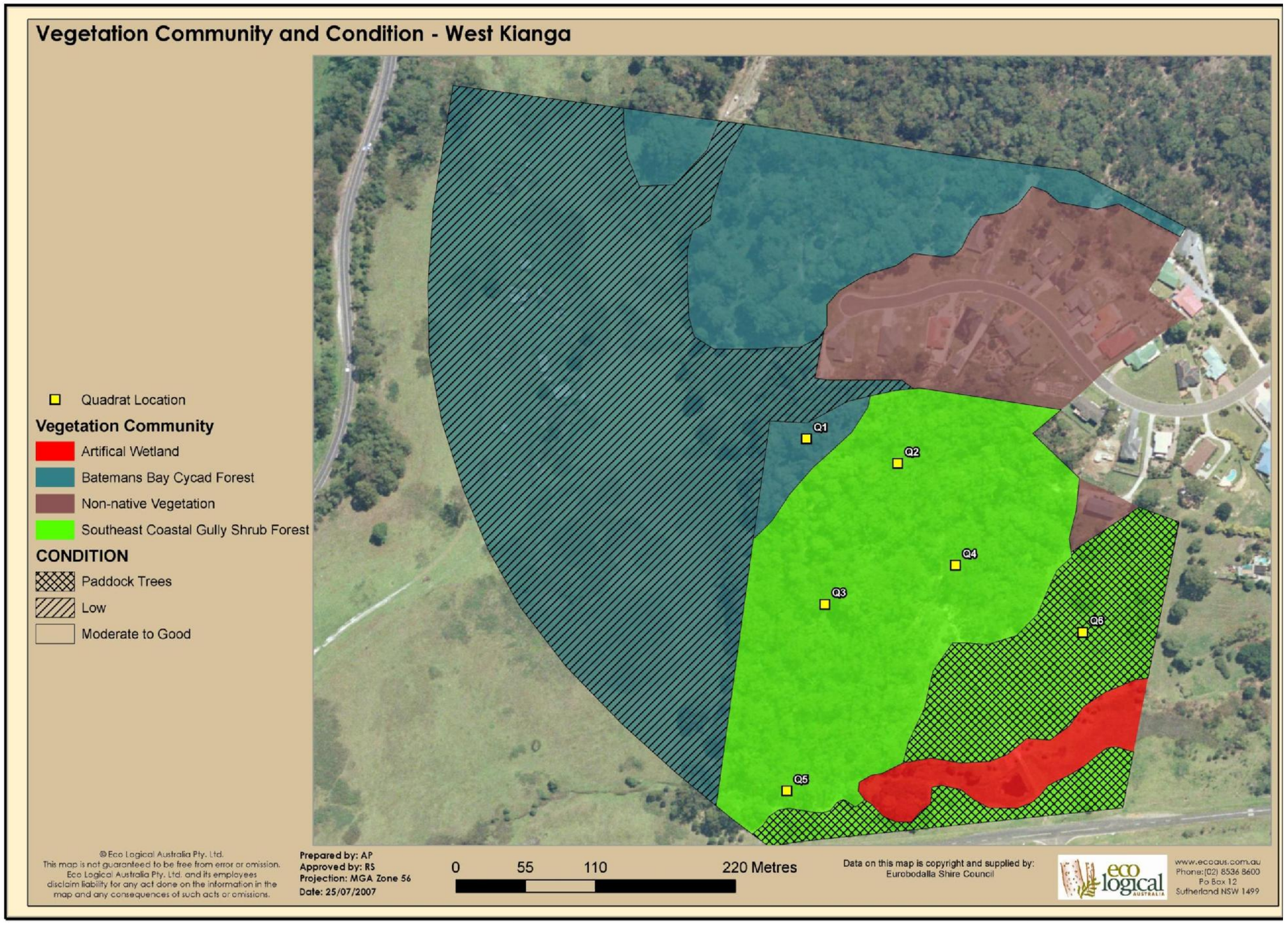
Map 2f: Location of quadrats and extent of vegetation types and condition within the West Kianga site.



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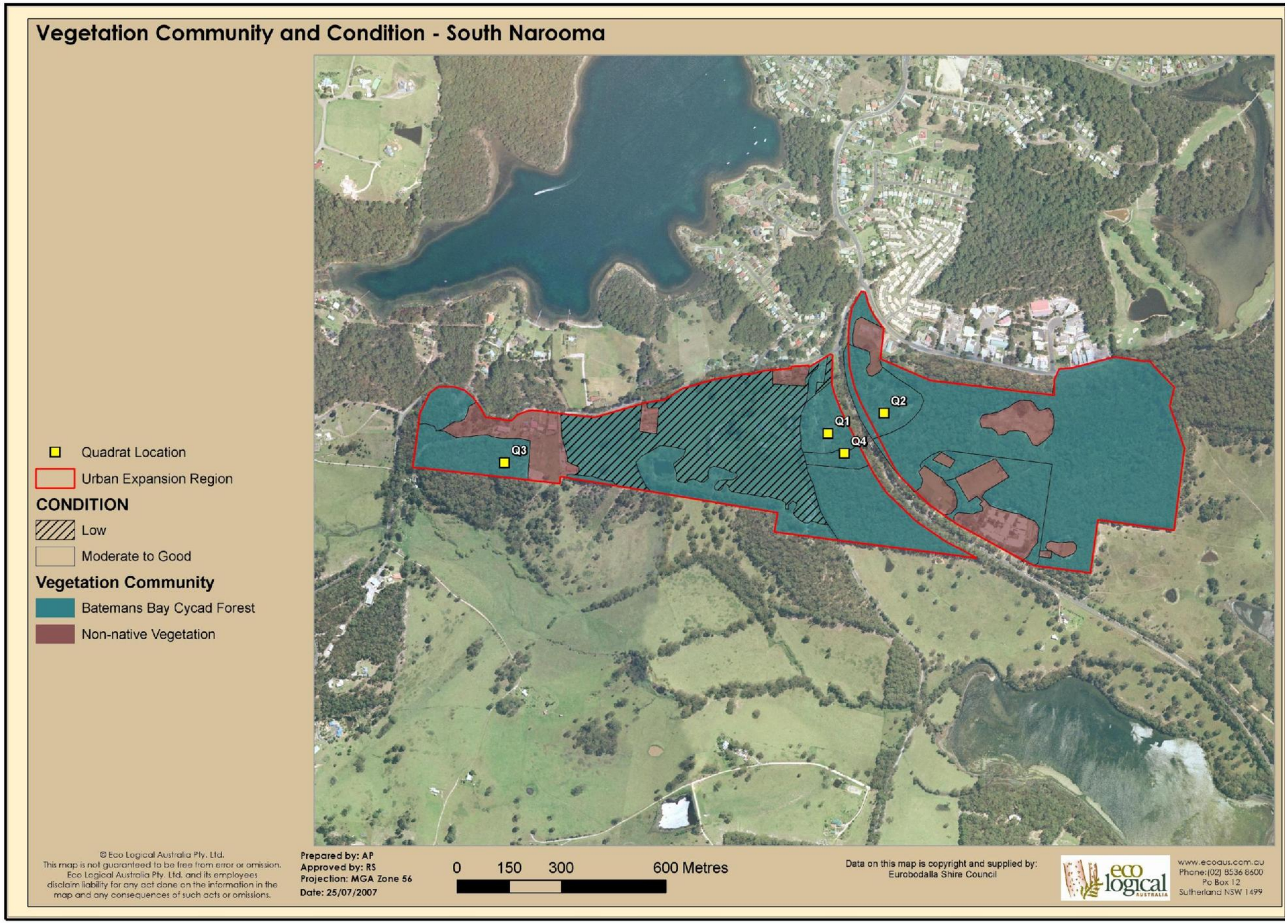
Map 2g: Location of quadrats and extent of vegetation types and condition within the South Narooma site.



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3.3 Landscape Value and Connectivity

A specific landscape value assessment for the assessment zones identified within each site was not undertaken as strategic corridors and biolinks have already been identified within the Eurobodalla (DECC 2007). At the scale of the individual sites, all sites support vegetation that constitutes local biolinks. However, in some instances, such as Long Beach, South Moruya and Dalmeny, the sites are located at the interface with existing urban areas or agricultural lands such that the development of the sites will generally not result in the disruption of connectivity to adjacent areas supporting substantial areas of remnant vegetation and associated habitats. Notwithstanding this, at each site there are areas of vegetation that should be considered for retention so as to support existing biolinks and generally to protect connectivity between remnant vegetation in the locality. These areas at each site are discussed below;

Long Beach

- Retention of vegetation in the north-western extremities of the site would support connectivity between vegetation to the north and east of the site and vegetation to the west of Cullendulla Drive associated with Long Beach wetland.
- Retention of vegetation along the eastern margins of the site in association with the creek there will support connectivity between vegetation to the north of the sites and habitats in the lower parts of this coastal estuary.

West Moruya

- The remnant vegetation surrounding the waste disposal facility provides connectivity to the remnant vegetation to the north-west of the site. This vegetation is the least constrained remnant vegetation within the site as it is not an EEC. However, its loss would disrupt connectivity to the remnant vegetation to the north-west.

South Moruya

- The remnant vegetation to east of Hawden Street and north of Turnbulls Lane provides limited connectivity to the small patch of remnant vegetation to the west of Lagoon Street. Protection and recovery of this vegetation would enhance this local biolink.
- Sympathetic planning and development of road linkages and subdivision layouts could potentially protect and enhance the remnant EEC that occurs in association with the Spencer Street and Francis Street road reserves and areas immediately adjacent.

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Moruya Heads

- Retention of remnant vegetation in the western and south-western parts of the site will be critical to maintaining existing biolinks to the remnant vegetation to the north of South Head Road and west of The Anchorage.
- The development of those parts of the site to the south of South Head Road has the potential to further disrupt connectivity to the remnant vegetation to the north of South Head Road and east of The Anchorage. Further consideration should be given to the significance of this disruption and options explored to mitigate any adverse impacts.

Dalmeny

- Given the location of the site predominantly at the interface with existing urban areas, the development of the site is only likely to result in further minor disruptions to the existing biolinks connecting remnant vegetation within the site with vegetation along the foreshoes of Mummuga Lake. Notwithstanding this, retention of EECs and vegetation within riparian corridors provides opportunities to retain biolinks between vegetation to the west of the site and both remnant vegetation associated with Mummuga Lake and any remnant vegetation that is retained within the site.

West Kianga

- Generally the remnant vegetation within the site does not provide substantial local biolinks to other remnant vegetation and associated habitats. However, the remnant vegetation along the watercourse in the southern extremities of the site is part of the riparian corridor that extends to the small coastal wetland to the east of the site.

South Narooma

- The remnant vegetation within the site and immediate surrounds is generally highly fragmented as a result of existing urban and agricultural development. Notwithstanding this, there is potential to retain and enhance the existing local biolinks that provide a somewhat tenuous and disrupted linkage of remnant vegetation to the west and east of the site. For example, retention of vegetation along the southern and western margins of the site west of the Princess Highway and retention of vegetation along riparian corridors to the east of the Princess Highway could retain a local biolink between vegetation to the east and west of the site.

3.4 Old Growth Forest

The spatial data provided by DECC identifies old growth forest only at Dalmeny. The DECC data suggests that two small areas of old growth forest occur in the eastern extremities of the Dalmeny site, abutting the existing urban area. The paucity of old growth elements observed in these areas during fieldwork did not support the classification of these areas as old growth.

No areas of old growth forest were identified elsewhere within the study area which is consistent with the DECC old growth forest mapping.

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3.5 Site Scale Assessment

3.5.1 Assessment Zones

Vegetation assessment zones, those areas where vegetation was relatively uniform (*i.e*. same condition and vegetation type), were identified within each site. The identification of vegetation zones enables the assessment of biodiversity values at a patch or paddock scale. Deliniation between zones is also necessary to run the Biometric tool used to calculate biodiversity credits for losses and gains in biodiversity, enabling appropriate offsets to be calculated during the creation of *Property Vegetation Plans under the NSW Vegetation Act 2003*. The location of vegetation assessment zones is shown in Map 3a-g as is the extent of any EECs identified within each site.

The condition of the vegetation within each zone was assessed against the vegetation condition categories identified in the Biometric. These are:

- "Native Vegetation in Moderate to Good condition" for forests and woodlands is where the over-storey percentage foliage cover is >25% of the lower over-storey per cent foliage cover benchmark for that vegetation type or >50% of vegetation in the ground layer is indigenous species.

- 'Native Vegetation in Low condition' for forests and woodlands is defined as where the over-storey per cent foliage cover is <25% of the lower over-storey per cent foliage cover benchmark for that vegetation type and <50% of vegetation in the ground layer is indigenous species or >90% of the site is ploughed or fallow.

- 'Paddock trees' are native vegetation with an over-storey projected foliage cover is <25% of the lower benchmark for the vegetation type, and the ground-layer is either exotic crop, ploughed fallow or almost exclusively perennial or annual exotic pasture (>90% of the cover is exotic species).

In addition site attributes were assessed through standardised quadrats completed at representative locations within each vegetation assessment zone, as per the requirements of the Biometric methodology. The results of the zone attributes assessment are included in Appendix B.

At least one quadrat was completed in all zones where access was available. The sole exception was within zone 1 at Moruya Heads. This very small zone (0.3 ha) was in good condition and would have had values within the benchmarks for the vegetation class with the exception of the benchmark for hollow bearing trees. Quadrats were not completed in those zones that were visually assessed only, *i.e*. where access was not available.

A summary of the vegetation assessment within each zone is included in Table 4.

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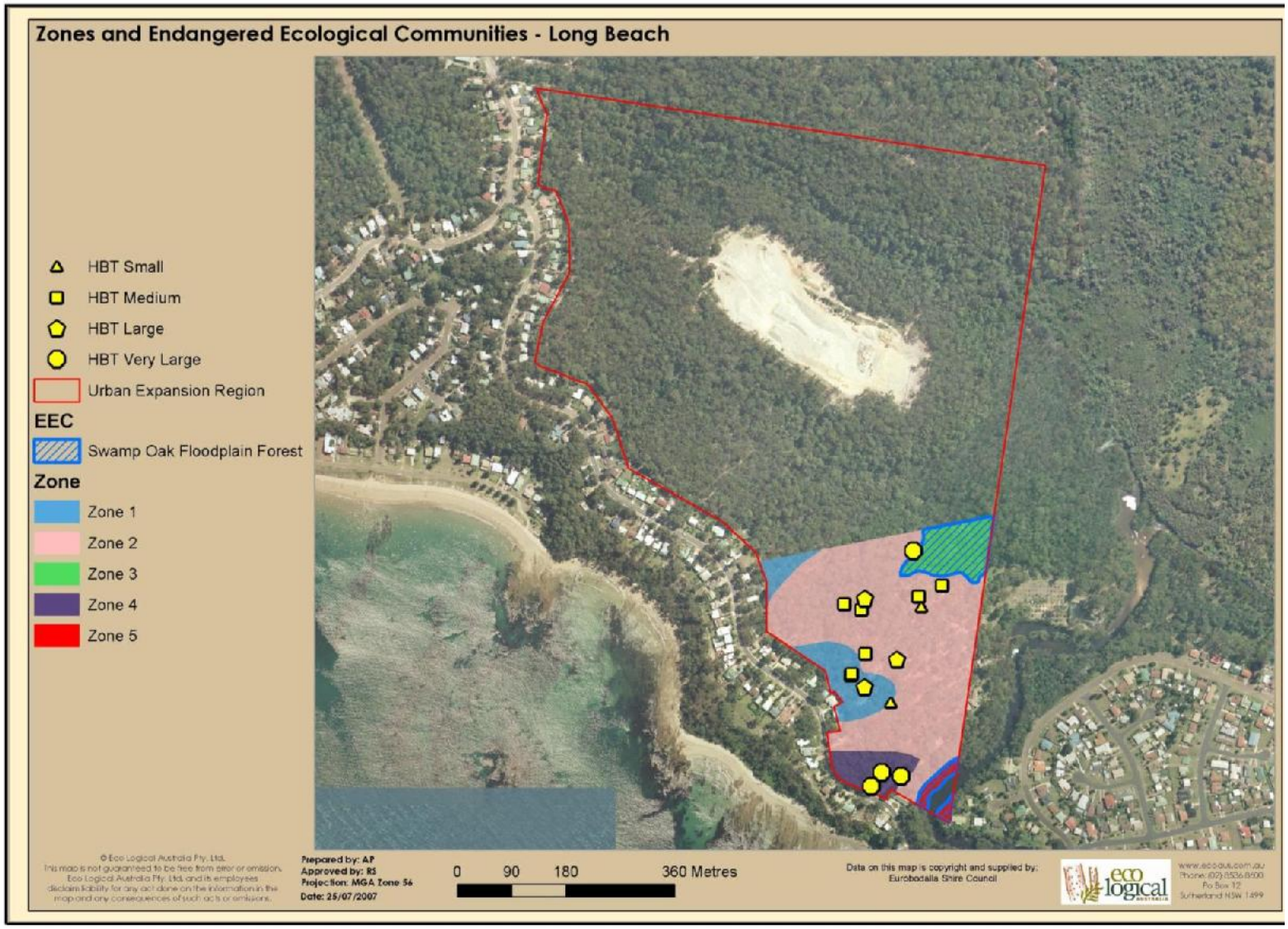
Map 3a: Location vegetation zones, EECs and hollow bearing trees (HBT's) within the Long Beach site.



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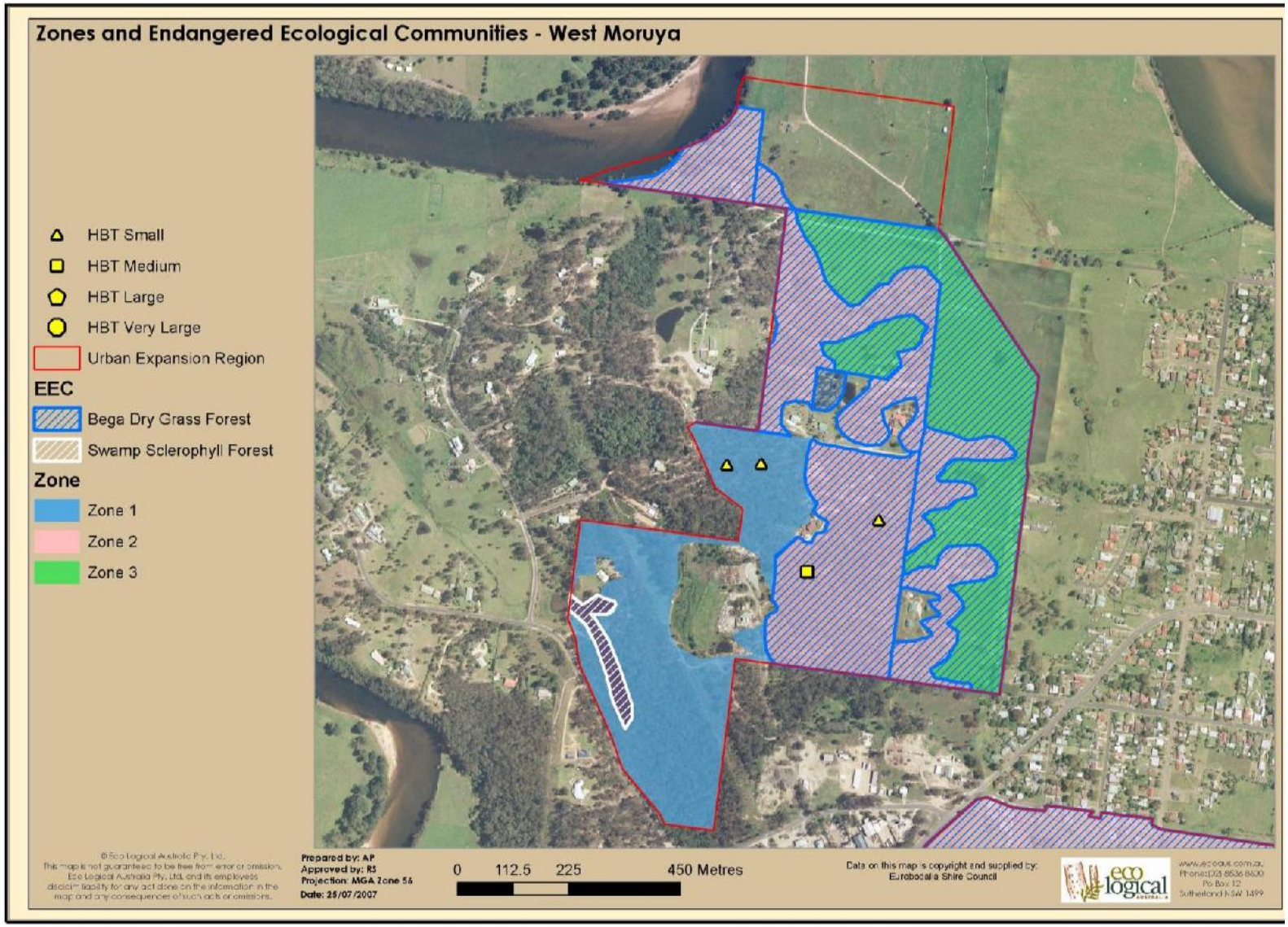
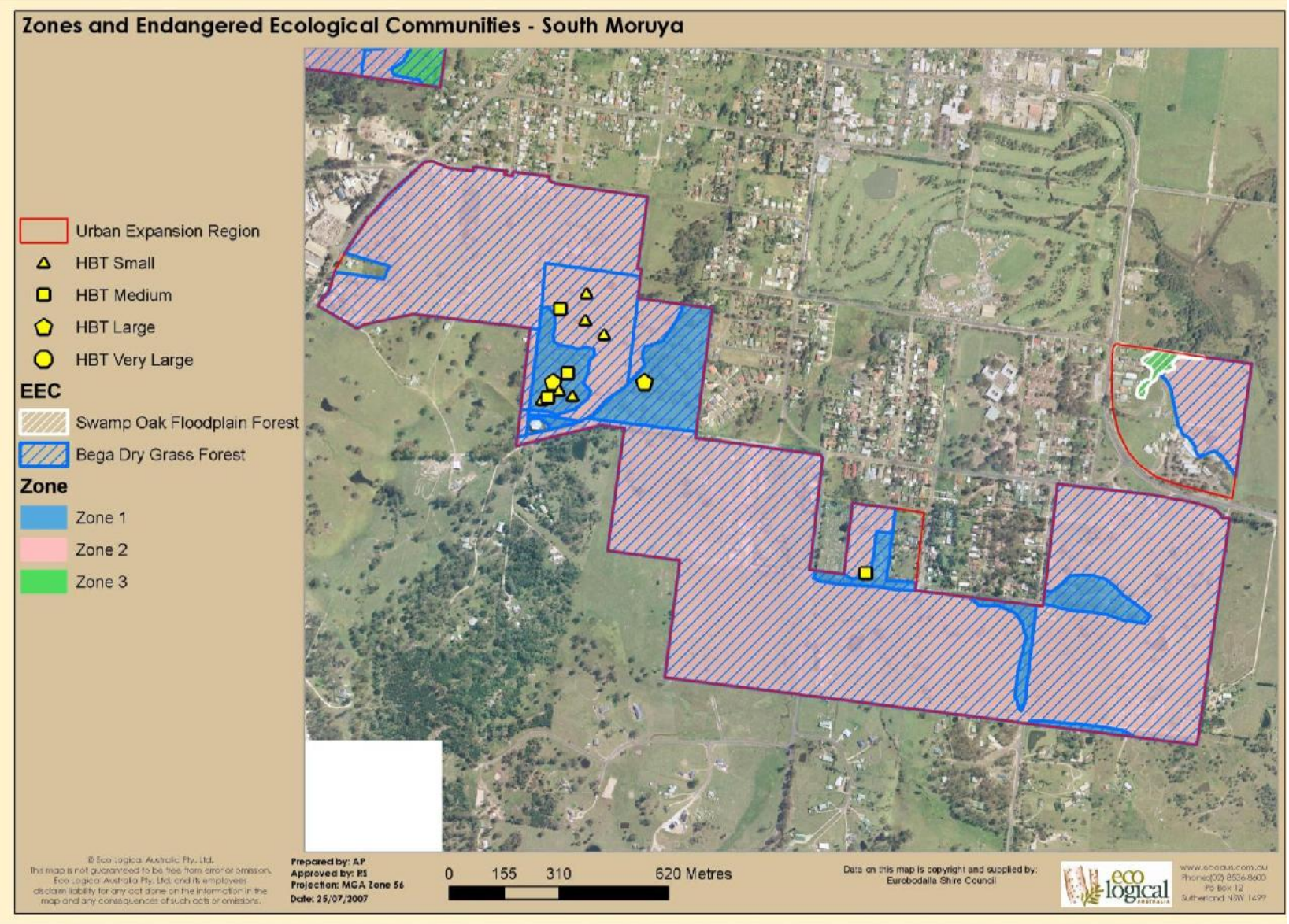
Map 3b: Location vegetation zones, EECs and hollow bearing trees (HBT's) within the West Moruya site.



Map 3c: Location vegetation zones, EECs and hollow bearing trees (HBT's) within the South Moruya site.



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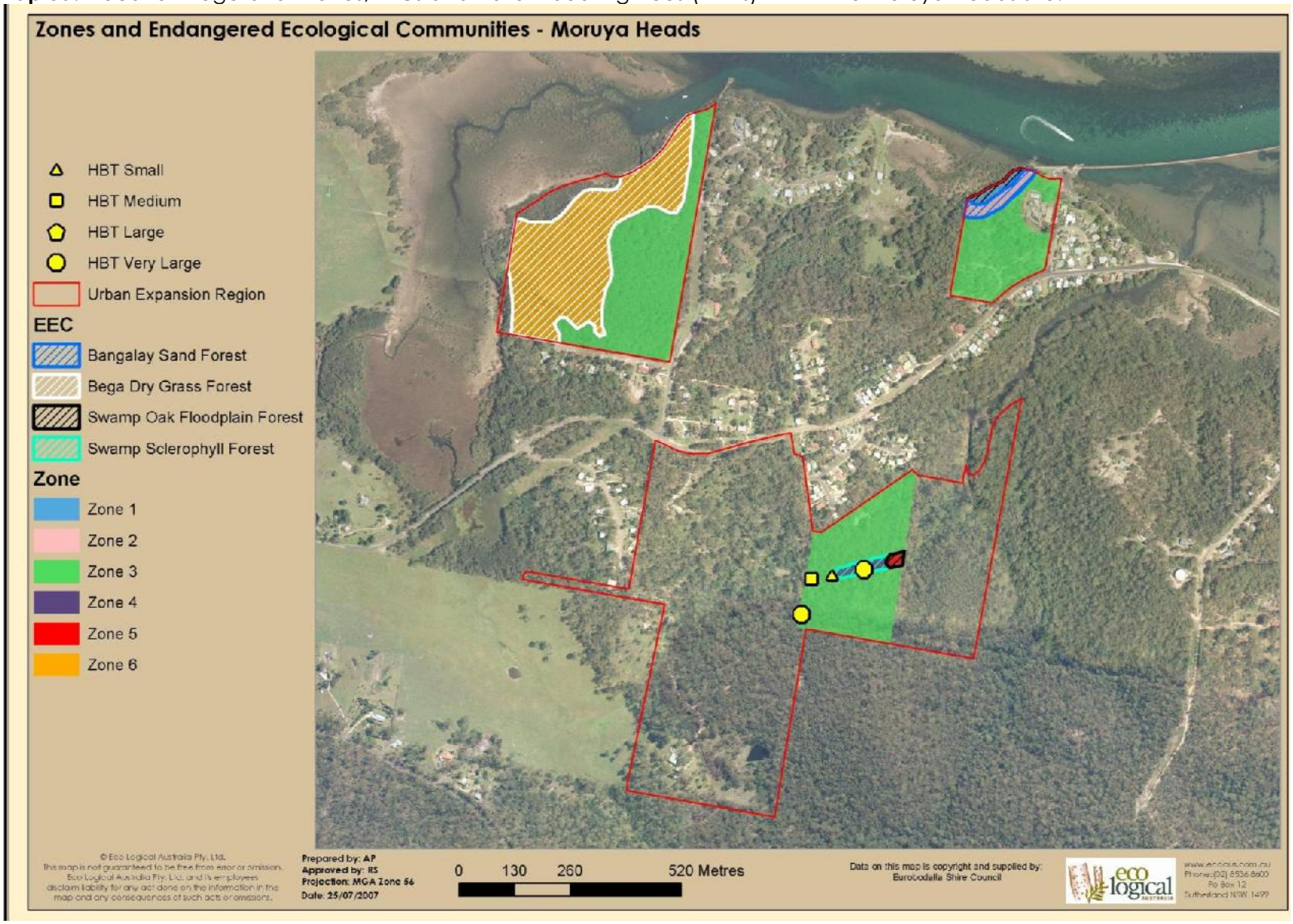
Map 3d: Location vegetation zones, EECs and hollow bearing trees (HBT's) within the Moruya Heads site.



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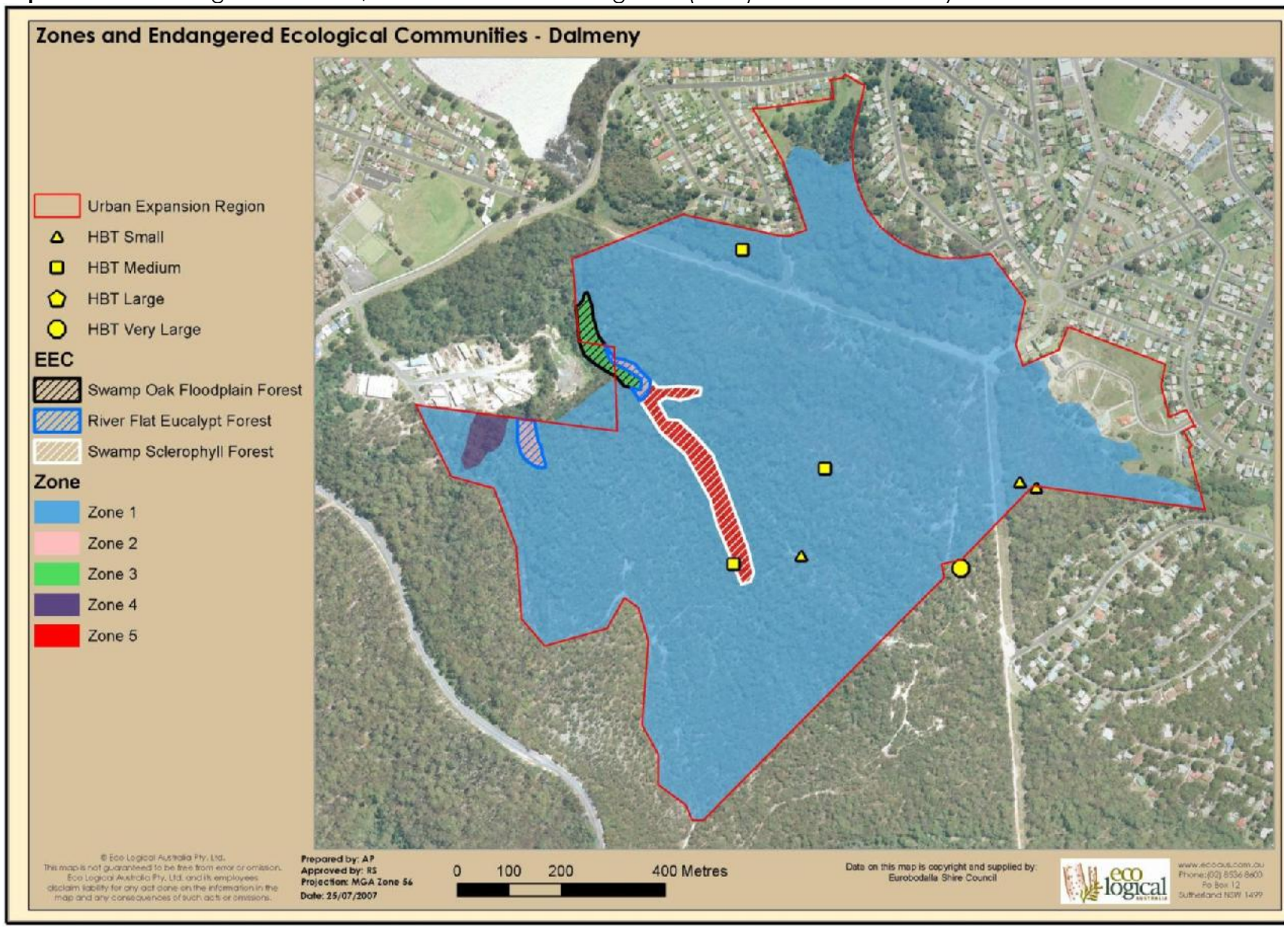
Map 3e: Location vegetation zones, EECs and hollow bearing trees (HBT's) within the Dalmney site.



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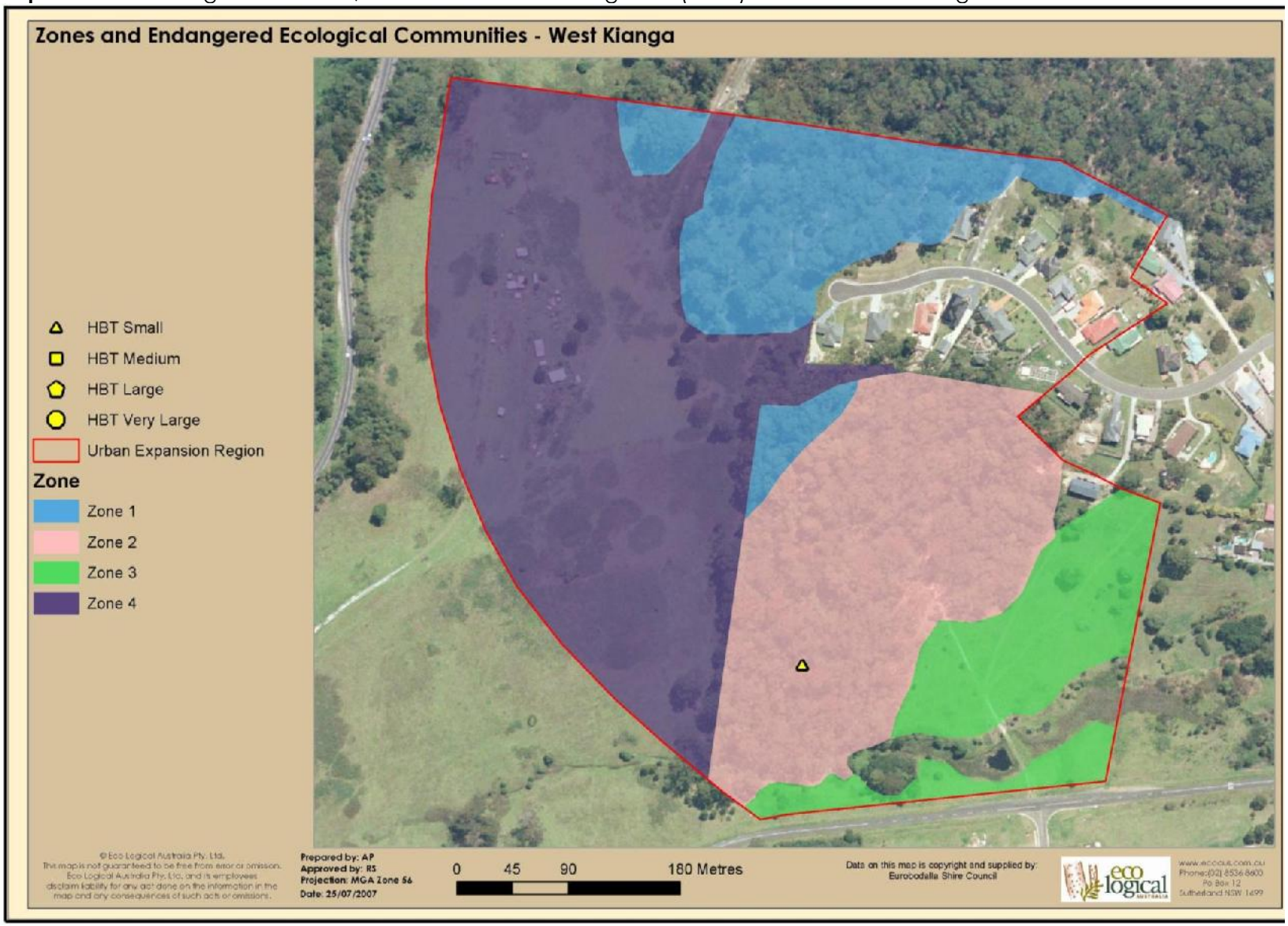
Map 3f: Location vegetation zones, EECs and hollow bearing trees (HBT's) within the West Kianga site.



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Map 3g: Location vegetation zones, EECs and hollow bearing trees (HBT's) within the South Narooma site.

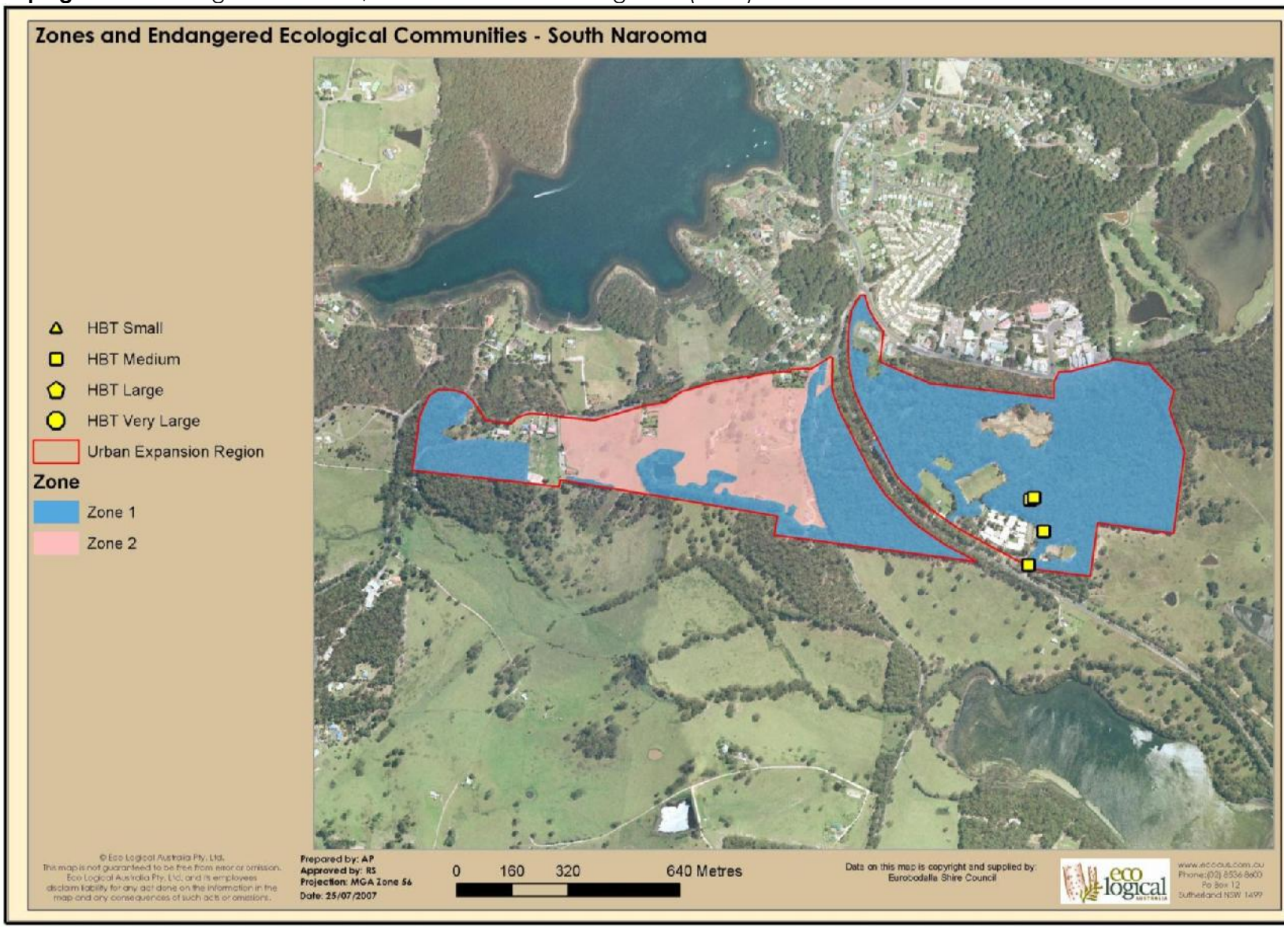

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Table 4: Summary of vegetation assessment for each site.

Assessment Zone (No.)	Area (ha)	Vegetation type		Vegetation condition	Landscape Value*1	Biometric score (_/100)*1	No. of large hollows
		Name	% cleared				
Long Beach							
Zone 1	1.4	Batemans Bay Foothills Dry Forest	5	Moderate to Good			1
Zone 2	8.4	Southern Lowlands Wet Forest	10	Moderate to Good			2
Zone 3	1.07	Estuarine Creek Flat Scrub	45	Moderate to Good			1
Zone 4	0.24	Estuarine Fringe Forest	85	Moderate to Good			0
Zone 5	0.8	Clyde Gully Forest	5	Moderate to Good			3
West Moruya							
Zone 1	16.6	Batemans Bay Cycad Forest	10	Moderate to Good			0
Zone 2	25.4	South Coast Grassy Woodland	60	Moderate to Good			0
Zone 3	16.7	South Coast Grassy Woodland	60	Low			0
Zone 4	1	Southern Lowlands Wet Forest	10	Moderate to Good			0
South Moruya							
Zone 1	15.7	South Coast Grassy Woodland	60	Moderate to Good			2
Zone 2	129.3	South Coast Grassy Woodland	60	Low			0
Zone 3	0.7	Estuarine Creek Flat Scrub	45	Moderate to Good			0
Moruya Heads							
Zone 1	0.3	Estuarine Fringe Forest	85	Moderate to Good			0
Zone 2	0.5	Coastal Sand Forest	45	Moderate to Good			0
Zone 3	18.1	Batemans Bay Cycad Forest	10	Moderate to Good			1
Zone 4	0.3	Southern Lowlands Wet Forest	10	Moderate to Good			1
Zone 5	0.1	Estuarine Creek Flat Scrub	45	Moderate to Good			0
Zone 6	8.9	South Coast Grassy Woodland	60	Moderate to Good			0
Dalmeny							

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Zone 1	80.2	Batemans Bay Cycad Forest	10	Moderate to Good			1
Zone 2	0.5	South Coast River Flat Forest	30	Moderate to Good			0
Zone 3	0.6	Estuarine Creek Flat Scrub	45	Moderate to Good			0
Zone 4	0.6	Clyde Gully Forest	5	Moderate to Good			0
Zone 5	1.7	Southern Lowlands Wet Forest	10	Moderate to Good			0
West Kianga							
Zone 1	3.8	Batemans Bay Cycad Forest	10	Moderate to Good			0
Zone 2	6	Southeast Coastal Gully Shrub Forest	15	Moderate to Good			0
Zone 3	2.8	Southeast Coastal Gully Shrub Forest	15	Paddock Trees			0
Zone 4	10.4	Batemans Bay Cycad Forest	10	Low			0
South Narooma							
Zone 1	51.9	Batemans Bay Cycad Forest	10	Moderate to Good			2*2
Zone 2	17.7	Batemans Bay Cycad Forest	10	Low			0

*1 These columns to be completed by DECC *2 Hollow bearing trees. *2 These hollows were in an area where access was restricted in the east of the site and subsequently their location has not been determined precisely.

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4. Threatened Species Assessment

4.1 Threatened Species

DECC provided a list of threatened species which were considered likely to occur within the study area. As discussed in Section 2.7, the survey methodology and survey period limited the extent to which the likely presence or absence of threatened species could be assessed. Under these circumstances, the suitability of the potential habitat for threatened species was assessed on the basis of surrogates such as the presence of vegetation with which the species is associated and the presence of critical habitat resources, *i.e*. suitable breeding or foraging habitat. These surrogates were assessed and mapped in the field as described in Section 2 and were reviewed with DECC officers Micheal Mulvaney and Amanda Sullivan.

All of the sites appeared to have a history of logging and consequently, in general, only the occasional hollow bearing tree was observed. In addition, most of the hollows that were observed were small to medium size hollows. Some larger hollows were observed in the south-eastern extremities of the Long Beach site and in the eastern parts of the South Narooma site.

Given the history of logging, many trees were observed within the study area that appeared to be in the latter stages of hollow development, but which did not at present have obvious hollows that could be confirmed. As such, the study area generally supports a paucity of breeding, denning, and roosting habitat for hollow dependent threatened fauna. The distribution of hollow bearing trees of various sizes across the sites is shown in Maps 3a-g.

Similarly, the study area did not support significant rock habitats that may provide shelter or roosting habitat for threatened fauna. Permanent or semi-permanent streams or other freshwater bodies that could provide potential breeding or sheltering habitats for threatened amphibians were only present as artificial dams at West Moruya and West Kianga. Long Beach, South Moruya, Moruya Heads and Dalmeny support or abut small parts of estuaries and associated estuarine vegetation. These areas provide potential habitat for a range of threatened and migratory water birds. All other sites included ephemeral drainage lines that could provide potential water habitats for threatened amphibians from time to time.

Given the size of the sites and that, with the exception of South Moruya, they all retain substantial areas of remnant native vegetation, they support a diverse range of foraging substrates including, nectar, blossom, seed, sap, and fleshy fruit which would provide potential foraging opportunities for a range of threatened fauna from time to time.

Those fauna species detected within the various study sites are identified in Appendix A.

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Two threatened species were confirmed as occurring within the study area;

- the yellow-bellied glider (*Petaurus australis*) was detected at Long Beach on the basis of old sap feeding incisions characteristic of the species;
- the glossy black-cockatoo (*Calyptorhynchus lathami*) was heard calling at Dalmeny and observed flying over the site. Signs of the species foraging within the site, as evidenced by crushed black she-oak cones, were also observed at one location within the site; and

It is likely that a range of other threatened fauna occur within the study area at least on an irregular basis when foraging. The potential for specific threatened species to occur within the study area is assessed further in Table 6.

4.2 Endangered Ecological Communities

Four EECs were detected within the study area. These communities and the vegetation types they correspond to are;

- Coastal Sand Forest – Bangalay Sand Forest on the Coastal Floodplains of the NSW North Coast Sydney Basin and South East Corner bioregions (SSF).
- South Coast Grassy Woodland – Bega Dry Grass Forest in the South East Corner bioregion (BDGF) and the Lowland Grassy Woodland in the South East Corner bioregion (LGW) proposed EEC.
- South Coast River-Flat Forest - River Flat Eucalypt Forest on coastal floodplains of the NSW North Coast Sydney Basin and South East Corner bioregions (RFEF).
- Estuarine Creek Flat Scrub and Estuarine Fringe Forest – Swamp Oak Floodplain Forest of the NSW North Coast Sydney Basin and South East Corner bioregions (SOFF).
- Parts of the Southern Lowland Wet Forest – Swamp Sclerophyll Forest on coastal floodplains of the NSW North Coast Sydney Basin and South East Corner bioregions (RFEF).

The vegetation communities identified within the study area were compared with the final determinations for EECs listed under the *Threatened Species Conservation Act 1995* (TSC Act) and *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and also with reference to NGH Environmental (2007) and Miles (2006).

None of the EECs that occur in the South East Corner bioregion have been listed to date under the EPBC Act.

According to Miles (2006) the SSF does not extend beyond Ulladulla given the absence of swamp mahogany (*Eucalyptus robusta*). However, the final determination to list the community as an EEC (NSW Scientific Committee 2005) states in point 4 that the dominant canopy trees south of Sydney include bangalay (*E. botryoides*) and woollybutt (*E. longifolia*). As such, ELA believes that the community does occur in the Eurobodalla LGA in suitable parts of the landscape where the characteristic understorey and groundcovers occur below a canopy dominated by bangalay or woollybutt.

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The extent of EECs within the study area has been mapped and is shown in Map 4. Table 5 identifies the total area of EEC across the study area and the areas in each of the various condition categories.

Table 5: Endangered ecological communities within the study area, extent and condition.

EEC name	Area of EEC (Ha)		
	Moderate to good condition	Low condition	Total
Bangalay Sand Forest (SSF)	0.54	-	0.54
Bega Dry Grass Forest (BDGF)	47.6	145.1	192.7
River Flat Eucalypt Forest (RFEF)	0.5	-	0.5
Swamp Oak Floodplain Forest (SOFF)	3.6	-	3.6
Swamp Sclerophyll Forest (RFEF)	9.5	-	9.5
Total	61.74	145.1	206.84

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Table 6: Threatened species with potential habitat within the study area, and DECC prescribed limits on impacts and indicative offset ratios.

Species	Ability to sustain a temporary reduction in the population/habitat on this property	Offset Ration required	Presence of suitable habitat within areas affected by clearing
Australasian Bittern *Botaurus poiciloptilus*	No loss of breeding habitat or wetland foraging habitat	N/A	No – Potential habitat associated with EECs.
Bush Stone-curlew *Burhinus grallarius*	Yes - loss of 10% of habitat,	1:3	Yes - Potential habitat present at Dalmeny, South Narooma, Long Beach, Moruya Heads and South Moruya.
Tessellated Spider Orchid *Caladenia tessellata*	**No loss acceptable**	**N/A**	**Unlikely (predicted vegetated communities not present).**
Striated Fieldwren *Calamanthus fuliginosus*	Yes - 5% of habitat	1:5	Small amount of potential habitat present at Long Beach, Moruya Heads and Dalmeny in association with swamp margins.
Glossy Black-cockatoo *Calyptorhynchus lathami*	No loss of breeding habitat (Tree hollows with a minimum diameter of 15 cm). Up to 5% loss of foraging habitat (Allocasuarina or Casuarina) providing management of offset includes replanting/supplementary planting of 10 times as many of same spp. of Allocasuarina/Casuarina trees as are to be cleared	1:4	Yes - All sites provide potential foraging habitat with known foraging habitat at Dalmeny. Small amount of potential breeding habitat present at all sites with more available at. Birds detected at Dalmeny.
Eastern Pygmy-possum *Cercartetus nanus*	Yes - up to 10% of foraging habitat (heaths, woodland, open forest with understorey containing Banksias or other proteaceous or myrtaceous shrubs incl. Melaleucas, Tea-trees & Callistemons)	1:2	Unlikely – None of the sites support particularly heathy understorey.
Large-eared Pied Bat *Chalinolobus dwyeri*	No loss of breeding habitat (sandstone caves). No loss of foraging habitat within 500m of breeding habitat (suitable vegetation). Up to 10% loss of foraging habitat greater than 500m from breeding habitat.	1:6	No potential breeding habitat. Potential foraging habitat present at all sites with the exception of South Moruya.
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	No loss of breeding habitat (live trees, dead standing or fallen timber, stumps or posts with hollows greater than 6 cm diameter). Up to 10% loss of foraging habitat (suitable vegetation) but no loss of connectivity between patches	1:5.5	Foraging and potential breeding habitat at West and South Moruya.
Chef's Cap Correa *Correa baeuerlenii*	**No**	**N/A**	**Possible. Potential habitat at Kianga, Dalmeny, South Narooma, Long Beach, West Moruya and Moruya Heads. However species not detected at any site.**
Leafless Tongue Orchid *Cryptostylis hunteriana*	**No loss acceptable**	**N/A**	**Potential but marginal habitat at Kianga, Dalmeny, South Narooma, Long Beach, and West Moruya, and Moruya Heads.**

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Species	Ability to sustain a temporary reduction in the population/habitat on this property	Offset Ration required	Presence of suitable habitat within areas affected by clearing
Spotted-tailed Quoll *Dasyurus maculatus*	Yes - up to 10% foraging habitat (vegetation types that it occurs in), protect known latrine sites	1:3	Potential foraging habitat present at all sites with the probable exception of South Moruya. No potential latrine sites.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Up to 10% loss of foraging habitat (vegetation that it occurs in). Up to 10% loss of hollow bearing trees.	1:3	Foraging habitat present at all sites with the exception of South Moruya. Small amount of potential roosting/breeding habitat present at all sites.
Tangled Bedstraw *Galium australe*	**No**	**N/A**	**Potential habitat at all sites however species not detected at any site.**
East Lynne Midge Orchid *Genoplesium vernale*	**No loss acceptable**	**N/A**	**Potential but marginal habitat present at all sites except South Moruya.**
Giant Burrowing Frog *Heleioporus australiacus*	Yes, up to 10% loss of foraging habitat (vegetation types it occurs in). No loss of breeding habitat (First or second order creeks, ponded sections of unmarked drainage lines, culverts and other ridge top structures containing water).	1:8	Potential marginal foraging habitat present at all sites with the exception of South Moruya. Potential breeding habitat unlikely to present at any sites.
Southern Brown Bandicoot (easter *Isoodon obesulus obesulus*	Yes	1:2	Unlikely.
Black Bittern *Ixobrychus flavicollis*	No	N/A	No – Potential habitat associated with EECs.
Golden-tipped Bat *Kerivoula papuensis*	No loss of shelter/roosting habitat (tree hollows, and/or under bark, tree fissures and/or rock fissures and caves). Up to 10% loss of foraging habitat (vegetation that it occurs in).	1:5	Potential foraging habitat present at all sites within the likely exception of West and South Moruya. Potential roosting habitat only potentially present at West Kianga where a rainforest sub-canopy is present in places.
Swift Parrot *Lathamus discolor*	Yes - 5% loss of foraging habitat except for mature E. *albens, E. sideroxylon* and *C. robusta*	1:10	Potential foraging Habitat present at all sites.
Green and Golden Bell Frog *Litoria aurea*	No loss to natural breeding habitat (still or slow flowing natural waterbodies with some aquatic emergent vegetation), no loss of foraging habitat within 250m of natural waterbodies, up to 10% loss of foraging habitat greater than 250m from natural waterbodies.	1:3	Small amount of potential breeding and foraging habitat present at Long Beach, Moruya Heads, Dalmeny and West Kianga.
Square-tailed Kite *Lophoictinia isura*	Yes - 10% loss of foraging. No loss of breeding habitat (mature living trees, often within 100 m of watercourse)	1:25	Potential foraging habitat at all sites. Better quality potential breeding habitat available at Long Beach, Moruya Heads, and Dalmeny.

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Species	Ability to sustain a temporary reduction in the population/habitat on this property	Offset Ration required	Presence of suitable habitat within areas affected by clearing
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	No loss of breeding (caves) or roosting habitat. Up to 10% loss of foraging habitat greater than 500m from breeding or roosting habitat.	1:10	Foraging habitat present at all sites. No potential breeding habitat at any site.
Stuttering Barred Frog *Mixophyes balbus*	No loss of breeding habitat (streams in rainforest or tall open wet forest in foothills and escarpment). No loss of foraging habitat within 250m of breeding habitat. Up to 10% loss of foraging habitat greater than 250m from breeding habitat.	1:4	Unlikely.
Eastern Freetail-bat *Mormopterus norfolkensis*	Up to 10% loss of foraging habitat (vegetation that it occurs in). Up to 10% loss of hollow bearing trees.	1:6	Foraging and small amount of potential roosting/breeding habitat present at all sites.
Large-footed Myotis *Myotis adversus*	No loss of foraging habitat (waterbodies and vegetation within 20m of waterbody). Up to 10% loss elsewhere.	1:5.5	Potential roosting and foraging habitat present at Long Beach, Moruya Heads, Dalmeny, and West Kianga.
Orange-bellied Parrot *Neophema chrysogaster*	Yes - up to 10% loss of foraging habitat (low samphire herblands, open grassy or heathland areas within 3 km of coast)	1:50	No.
Barking Owl *Ninox connivens*	No loss of breeding habitat (living or dead trees with hollows >20 cm diameter). Up to 10% loss of foraging habitat except in riparian zone	1:12	Small amount of potential breeding habitat present at Moruya Heads, Long Beach, West Moruya, South Narooma and Dalmeny. Foraging habitat available at all sites.
Powerful Owl *Ninox strenua*	No loss of breeding habitat (living or dead trees with hollows >45 cm diameter), up to 10% loss of foraging habitat	1:33	Small amount of marginal potential breeding habitat present at Long Beach, South Narooma and Dalmeny. Foraging habitat available at all sites.
Olive Whistler *Pachycephala olivacea*	Yes - up to 5% habitat but no loss of rainforest or riparian habitat	1:7	Potential foraging habitat available at all sites except South Moruya
Osprey *Pandion haliaetus*	Yes	1:100	Unlikely
Tall Knotweed *Persicaria elatior*	**No**	**N/A**	**Potential habitat at all sites. Species not detected at any site.**
Yellow-bellied Glider *Petaurus australis*	Yes - up to 10% of foraging habitat (Tall eucalypt forest in areas with high rainfall and nutrient rich soils & moist gullies or creek flats to montane forests) and 5% of breeding habitat (trees with hollows >10 cm diameter in eucalypt forests) provided that clearing does not create treeless barriers to dispersal greater than 50m wide. Sap feeding trees within 50m of retained habitat to be protected.	1:3	Known foraging habitat present at Long Beach. Potential foraging habitat present at Moruya Heads, Dalmeny, West Kianga and South Narooma although no evidence of sap feeding detected other than at Long Beach. Small amount of potential breeding habitat present at Long Beach, Dalmeny and South Narooma.

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Species	Ability to sustain a temporary reduction in the population/habitat on this property	Offset Ration required	Presence of suitable habitat within areas affected by clearing
Squirrel Glider *Petaurus norfolcensis*	Yes - up to 10% of foraging habitat (mature or mixed-age euc., esp. flowering shrubs and wattles understorey; will occur where no understorey if there is > one species of Euc.; dry forests ironbarks, box & bloodwoods; can use patch <1 ha & isolated trees if within 75 m of other patches) and 5% of breeding habitat (trees with hollows > 5 cm diameter in eucalypt forests and woodlands) provided that clearing does not create treeless barriers to dispersal greater than 30 - 50 m wide. Sap feeding trees within 50 m of retained habitat to be protected	1:3	Potential foraging and breeding habitat available at all sites except South Moruya.
Eastern Ground Parrot *Pezoporus wallicus wallicus*	No	N/A	No.
Brush-tailed Phascogale *Phascogale tapoatafa*	Yes - up to 10% of foraging habitat (vegetation types that it occurs in) and 5% of hollow-bearing trees > 60cm DBH, provided that clearing does not create treeless barriers to dispersal greater than 50 m wide	1:2.5	Marginal potential foraging and breeding habitat available at all sites with the exception of South Moruya.
Koala *Phascolarctos cinereus*	Yes	1:4	Unlikely.
Long-nosed Potoroo *Potorous tridactylus*	Yes - up to 10%	1:2	Marginal potential habitat present at all sites except South Moruya.
Grey-headed Flying-fox *Pteropus poliocephalus*	No loss of vegetation within 200m of roosting camps.	1:50	No camps detected. Potential foraging habitat present at all sites.
Superb Fruit-dove *Ptilinopus superbus*	Yes - up to 5% loss of breeding (in northern NSW) and foraging habitat (trees with fruits with a diameter of 5-25mm) but no loss of rainforest habitat	1:50	Potential foraging habitat present at all sites except South Moruya. Better quality potential foraging habitat available at Long Beach, Dalmeny and West Kianga.
Speckled Warbler *Pyrrholaemus sagittatus*	Yes - up to 5% loss of habitat but no loss of connectivity	1:12	Potential habitat available at all sites except South Moruya.
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	Up to 10% loss of foraging habitat (vegetation type that it occurs in). Up to 10% loss of hollow bearing trees.	1:4	Potential foraging and roosting habitat available at all sites.
Greater Broad-nosed Bat *Scoteanax rueppellii*	Up to 10% loss of foraging habitat (vegetation type that it occurs in). Up to 10% loss of hollow bearing trees.	1:5	Potential foraging and roosting habitat available at all sites.
White-footed Dunnart *Sminthopsis leucopus*	Yes	1:3	Potential habitat present at all sites except South Moruya.
Diamond Firetail *Stagonopleura guttata*	Yes - up to 10% loss but no loss of riparian habitats	1:8	Potential habitat at West and South Moruya

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Species	Ability to sustain a temporary reduction in the population/habitat on this property	Offset Ration required	Presence of suitable habitat within areas affected by clearing
Masked Owl *Tyto novaehollandiae*	No loss of breeding habitat (living or dead trees with hollows >40 cm diameter, cliffs or caves). Up to 10% loss of foraging habitat (vegetation type that it occurs in).	1:12.5	Small amount of marginal potential breeding habitat present at Long Beach, South Moruya, South Narooma and Dalmeny. Foraging habitat available at all sites.
Sooty Owl *Tyto tenebricosa*	No loss of breeding habitat (live or dead trees with hollows >30 cm diameter or caves). Up to 5% loss of foraging habitat (vegetation type that it occurs in), but no loss of rainforest or riparian vegetation types	1:25	Unlikely
Narrow-leafed Wilsonia ***Wilsonia backhousei***	**No**	**N/A**	No – Potential habitat associated with EECs
Round-leafed Wilsonia ***Wilsonia rotundifolia***	**No**	**N/A**	No – Potential habitat associated with EECs
Regent Honeyeater *Xanthomyza phrygia*	Yes - up to 5% loss of habitat	1:5.5	Potential foraging habitat available at all sites.

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5. Structure Plan

On the basis of the surveys undertaken for this report it would appear that much of the study area is potentially suitable for residential development. Only the West Moruya and Moruya Heads sites are substantially constrained by EECs, although EECs are present at all but the West Kianga and South Narooma sites. These ECCs, and appropriate buffers to them, comprise Protected Areas, as would buffers to riparian areas.

Given the extent of non EEC native vegetation in moderate to good condition that is potentially developable within the bulk of the sites, it is likely that offsets will need to be provided beyond the site in most instances.

DECC in the process of identifying strategic regional Biolinks that will provide priorities for offsets. An initial assessment suggests that there are likely to be sufficient potential offsets within the Eurobodalla LGA. Regional biolinks are primary landscape connections between large important areas of habitat. They are generally substantial in width (> 500m) and provide for dispersal of individual species and habitat for a range of species. Utilising these areas for offsets will help to achieve an 'improve or maintain' outcome under the biocertification assessment (see section 1.1).

In some instances, such as providing offsets to the loss of EECs in low condition in the South Moruya site, sufficient offsets are likely to be available within the site. However, the precise extent of Protected and Retained Areas relative to Developable Areas will need to be determined in the context of other constraints to development (*i.e.* geotechnical, flooding, bushfire, etc), the impacts on threatened species, impacts on biolinks, and the potential to provide offsets to the losses associated with the Developable Areas. The determination of the appropriate mix of Protected, Retained Areas and Developable Areas is an iterative process that will require further liaison between DECC and ESC. As part of this process, the quantum of offsets associated with each potential mix of Protected, Retained Areas and Developable Areas will need to be calculated. The data that has been collected for this report provides a basis for these calculations.

Notwithstanding the uncertainty with regard to the extent and type of potential offsets associated with each site, potential offsets within each site, particularly where they might enhance local biolinks, are discussed in general terms in Section 3.3. and below.

Recommendations

In addition to the EECs, riparian areas and buffers, the following parts of the expansion sites should be considered as Protected or Retained Areas as part of biodiversity certification;

Long Beach

- Zone 4, which supports moist gully vegetation and several large hollow bearing trees.
- Those areas identified as local biolinks as discussed in Section 3.3.

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West Moruya

- The site is generally highly constrained by EECs and developable areas should be limited to those parts of the site that support non-native vegetation or EECs in low condition.
- Those areas identified as local biolinks as discussed in Section 3.3.

South Moruya

- The site predominantly supports EECs in low condition. As such, there are opportunities to offset the potential developable areas within the site and particularly within the moderate to good condition EECs within the site.
- Those areas identified as local biolinks as discussed in Section 3.3.

Moruya Heads

- Developable areas south of South Head Road should consider linkages to any retained or protected areas to the north of South Head Road.
- Those areas identified as local biolinks as discussed in Section 3.3.

Dalmeny

- Consideration should be given to linking the retained and protected areas (along the drainage lines) to remnant vegetation to the west of the study site via strategic vegetated areas, particularly in the north of the site.
- Those areas identified as local biolinks as discussed in Section 3.3.

West Kianga

- Consideration should be given to limiting developable areas primarily to those parts of the study area that support non-native vegetation or vegetation in low or paddock tree condition.
- Those areas identified as local biolinks as discussed in Section 3.3.

South Narooma

- Consideration should be given to locating retained areas such that they retain and enhance connectivity between remnant vegetation to the east and west of the study site.
- Consideration should be given to limiting developable areas primarily to those parts of the study area that support non-native vegetation or vegetation in low or paddock tree condition.
- Those areas identified as local biolinks as discussed in Section 3.3.

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Appendix A: Flora and Fauna Species detected within each study site.

Table 7a: Flora species detected at the Long Beach site.

Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Acacia irrorata	Green Wattle	✓	✓				
Acacia longissima	Narrow-leaved Wattle		✓			✓	
Acacia obtusifolia		✓				✓	
Acacia sophorae	Coastal Wattle						✓
Acacia sp.				✓			
Acacia stricta	Straight Wattle					✓	
Acacia ulicifolia	Prickly Moses					✓	
Acianthus sp.			✓				
Acmena smithii	Lilly Pilly		✓		✓		✓
Adiantum aethiopicum	Common Maidenhair	✓			✓		
Allocasuarina littoralis	Black Sheoak	✓	✓			✓	
Amperea xiphoclada		·	·			·	
Aristida vagans	Threeawn Speargrass	✓				✓	
Arthropodium sp.		✓					
Apium prostratum	Sea Celery				·		✓
Asparagus aethiopicus			✓			✓	
Asplenium australasicum					✓		
Austrodanthonia tenuior		✓			·		
Baumea juncea					·		✓
Billardiera scandens	Appleberry	✓				✓	
Blechnum cartilagineum	Gristle Fern		✓		✓		
Boronia polygalifolia		✓			·		
Bossiaea obcordata						✓	
Bossiaea prostrata		✓					
Breynia oblongifolia	Coffee Bush	✓	✓				
Brunoniella pumilio	Dwarf Blue Trumpet	✓					
Bursaria spinosa	Native Blackthorn	·					
Caladenia carnea	Pink Fingers						

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Calochlaena dubia	Common Ground Fern		✓				
Carex longebrachiata	Bergalia Tussock		✓		✓		
Cassine australis	Red Olive Plum		✓	✓			
Cassinia sp.			·	·			
Cassytha glabella		✓			✓		
Casuarina glauca	Swamp Oak	·		✓	·		✓
Centella asiatica	Pennywort	✓	✓	✓	·	✓	✓
Cheilanthes sieberi							
Chrysanthemoides monilifera						✓	
Cirsium sp.							
Cissus antarctica	Water Vine				✓		
Cissus hypoglauca	Giant Water Vine		✓		✓		
Clematis aristata					✓		✓
Conyza sp.					·		·
Corymbia gummifera	Red Bloodwood					✓	
Corymbia maculata		✓	✓		✓		✓
Cryptostylis sp.							
Cyathea australis	Rough Treefern		✓		✓		
Cymbidium suave	Snake Orchid		·		·		
Cymbopogon refractus	Barbed Wire Grass	✓			·		
Dactylis glomerata	Cocksfoot	✓			·		
Daviesia ulicifolia	Gorse Bitter Pea	·			·		
Desmodium rhytidophyllum		✓			·	✓	
Desmodium gunnii		✓			·	✓	
Desmodium varians	Slender Tick-trefoil	✓	✓		✓		
Deyeuxia parviseta var. parviseta		·	·		·	✓	
Dianella caerulea		·	·	✓	·	✓	
Dianella caerulea var. producta		✓	✓		✓		
Dianella longifolia var. longifolia		✓			·		
Dichelachne micrantha	Shorthair Plumegrass	✓			·	✓	

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Dichelachne rara		✓			·		
Dichondra repens	Kidney Weed	✓	✓		✓	✓	✓
Digitaria parviflora	Small-flowered Finger Grass	✓	·		·	✓	·
Dodonaea triquetra		·			·		·
Doodia aspera	Prickly Rasp Fern	✓			·		✓
Doodia caudata							
Echinopogon caespitosus		✓	✓				
Echinopogon ovatus	Forest Hedgehog Grass	✓	·				
Eleocharis sp.		·	·	✓			
Elaeocarpus reticulatus	Blueberry Ash		✓				
Entolasia marginata	Bordered Panic	✓		✓	·		✓
Entolasia stricta	Wiry Panic	✓	✓		✓	✓	
Eucalyptus saligna / botryoides		·			✓		
Eucalyptus eugenoides	Thin-leaved Stringybark	✓	✓			✓	
Eucalyptus longifolia	Woollybutt	·	·	✓			
Eucalyptus paniculata	Grey Ironbark					✓	
Eucalyptus pilularis	Blackbutt		✓		✓		
Euchiton gymnocephalus	Creeping Cudweed					✓	
Eustrephus latifolius	Wombat Berry	✓	✓		✓	✓	✓
Gahnia clarkei			✓	✓	·		✓
Gahnia melanocarpa		✓	✓		✓		
Galium binifolium		✓			·		
Galium sp.		✓			·		
Geitonoplesium cymosum	Scrambling Lily		✓		✓		✓
Geranium homeanum					✓		
Geranium solanderi	Native Geranium						
Glycine clandestina		✓			✓	✓	
Gonocarpus teucrioides		✓	✓				
Goodenia paniculata				✓	·		✓
Hardenbergia violacea	False Sarsaparilla	✓				✓	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Helichrysum elatum							
Hemarthria uncinata	Matgrass			✓			
Hibbertia aspera		✓				✓	
Hibbertia diffusa		✓				✓	
Hibbertia scandens	Climbing Guinea Flower	✓	✓	✓	✓		
Howittia trilocularis		·	✓		·		
Hydrocotyle laxiflora	Stinking Pennywort	✓	✓		✓		
Hydrocotyle peduncularis				✓	·	✓	✓
Hypericum gramineum	Small St John's Wort	✓				✓	
Hypochaeris radicata	Catsear	✓				✓	
Imperata cylindrica		✓			✓	✓	
Indigofera australis							
Juncus usitatus				✓			
Kennedia rubicunda	Red Kennedy Pea						
Kunzea ambigua	Tick Bush						
Lagenophora stipitata		✓		✓		✓	
Lastreopsis decomposita	Trim Shield Fern						
Lepidosperma filiforme							
Lepidosperma laterale		✓	✓		✓	✓	
Lepidosperma urophorum		✓			·		
Lepyrodia muelleri		·		✓	·		
Leptospermum juniperinum							
Leptospermum polygalifolium							
Leucopogan juniperinus		✓					
Leucopogon lanceolatus			✓			✓	
Lindsaea linearis	Screw Fern		·				
Livistona australis	Cabbage Palm		✓				
Lobelia alata	Angled Lobelia				·		✓
Lomandra longifolia	Spiny-headed Mat-rush	✓	✓		✓		✓
Lomandra multiflora						✓	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Lomandra obliqua						✓	
Lomandra filiformis						✓	
Macrozamia communis		✓	✓			✓	
Marsdenia rostrata	Common Milk Vine						
Marsdenia suaveolens	Scented Marsdenia						
Melaleuca ericifolia				✓	·		✓
Microlaena stipoides		✓	✓		✓	✓	
Morinda jasminoides					✓		
Myoporum acuminatum					·		✓
Notelaea longifolia	Large Mock-olive				✓		
Notelaea venosa	Veined Mock-olive	✓	✓		·	✓	
Olearia canescens		·	✓		·		
Opercularia aspera	Coarse Stinkweed	·	·		·	✓	
Opercularia hispida	Hairy Stinkweed	✓			·		
Oplismenus aemulus		✓	✓		✓		
Oxalis sp.			✓				
Oxalis exicilis		✓				✓	
Ozothamnus argophyllus		·				·	
Ozothamnus diosmifolius	White Dogwood				✓		
Pandorea pandorana	Wonga Wonga Vine				·		✓
Panicum simile	Two-colour Panic	✓				✓	
Paspalidium distans		·				✓	
Paspalum dilatatum	Paspalum	✓					
Parsonsia straminea	Common Silkpod	✓	✓	✓	✓		✓
Patersonia glabrata		·	·		·		·
Persoonia linearis	Narrow-leaved Geebung					✓	
Phragmites australis	Common Reed				·		✓
Phyllanthus hirtellus		✓				✓	
Physalis peruviana	Cape Gooseberry						
Pittosporum revolutum	Rough Fruit Pittosporum		✓				

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Pittosporum undulatum	Sweet Pittosporum				✓	✓	✓
Plantago debilis			✓		·		·
Platycerium bifurcatum	Elkhorn		·		·		·
Plectranthus parviflorus					✓		
Poa labillardierei var. labillardierei	Tussock						
Poa meionectes		✓					
Poa sieberiana		✓					
Polymeria calycina		✓					
Pomax umbellata						✓	
Pratia purpurascens	Whiteroot	✓	✓				
Pseuderanthemum variabile	Pastel Flower		✓		✓		✓
Psychotria loniceroides	Hairy Psychotria				✓		
Pteridium esculentum	Bracken	✓	✓		✓	✓	
Pultenaea daphnoides							
Pultenaea retusa		✓				✓	
Ranunculus sp.			✓				
Rapanea howittiana	Brush Muttonwood				✓	✓	
Rubus fruticosus	Blackberry complex		✓				
Rubus moluccanus var. moluccanus					✓		
Rubus parviflorus	Native Raspberry						
Rubus rosifolius	Rose-leaf Bramble				✓		
Sarcopetalum harveyanum	Pearl Vine				✓		
Schelhammera undulata		✓	✓		✓		
Senna pendula					✓		✓
Sigesbeckia orientalis					·		✓
Smilax australis	Sarsaparilla				✓		✓
Smilax glyciphylla	Sweet Sarsparilla		✓		·	✓	·
Solanum aviculare	Kangaroo Apple				·		✓
Solanum pungetium	Eastern Nightshade						
Sonchus oleraceus	Common Sowthistle				·		✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Sporobolus virginicus					·		✓
Stellaria flaccida							
Stephania japonica					✓		✓
Synoum glandulosum	Scentless Rosewood		✓		✓		
Tetratheca thymifolia	Black-eyed Susan						
Themeda australis	Kangaroo Grass						
Trema aspera	Native Peach		✓				
Tylophora barbata	Bearded Tylophora		✓		✓		
Urtica incisa	Stinging Nettle						
Vernonia cinerea		✓				✓	
Veronica plebeia	Trailing Speedwell	✓					
Viola betonicifolia		✓					
Viola hederacea		✓	✓		✓		✓
Vittadinia cuneata var. cuneata						✓	
Xanthorrhoea concava						✓	
Zieria smithii	Sandfly Zieria		✓				

Table 7b: Fauna species detected at the Long Beach site.

	Species Name	Common Name
Birds	Acanthiza lineata	Striated Thornbill
	Alisterus scapularis	Australian King Parrot
	Anas castanea	Chestnut Teal
	Anas superciliosa	Pacific Black Duck
	Anthochaera carunculata	Red Wattlebird
	Cacatua galerita	Sulphur-crested Cockatoo
	Calyptorhynchus funereus	Yellow-tailed Black Cockatoo
	Chenonetta jubata	Maned Wood Duck
	Cormobates leucophaea	White-throated Tree Creeper
	Eopsaltria australis	Eastern Yellow Robin
	Gallinula tenebrosa	Dusky Moorhen
	Gymnorhina tibicen	Australian Magpie

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	Species Name	Common Name
	Lichenostomus chrysops	Yellow-faced Honeyeater
	Lopholaimus antarcticus	Topknot Pigeon
	Malurus cyaneus	Superb Fairy-wren
	Pachycephala inornata	Golden Whistler
	Pardalotus punctatus	Spotted Pardalote
	Phalacrocorax melanoleucos	Little Pied Comorant
	Platycercus elegans	Crimson Rosella
	Platycercus eximius	Eastern Rosella
	Ptilonorhynchus violaceus	Satin Bowerbird
	Rhipidura fuliginosa	Grey Fantail
	Sericornis frontalis	White-browed Scrubwren
	Strepera graculina	Pied Currawong
	Streptopelia chinensis	Spotted Turtle-Dove
	Trichoglossus haematodus	Rainbow Lorikeet
Mammals	Macropus giganteus	Eastern Grey Kangaroo
	Petaurus australis	Yellow-bellied Glider
Reptiles	Lampropholis sp.	A sun skink
Amphibians	Crinia signifera	
	Littoria verreauxii	Verreaux's Tree Frog
	Pseudophyrne sp.	
	Uperoleia sp.	

Table 8a: Flora species detected at the West Moruya site.

Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Acacia falcata			✓				✓		
Acacia implexa	Hickory Wattle				✓	✓	✓		
Acacia irrorata	Green Wattle				✓	✓	·		
Acacia longifolia						✓	·		
Acacia mearnsii	Black Wattle	✓					✓	✓	✓
Acacia sp.		·			✓		·		·
Acacia terminalis	Sunshine Wattle						·		·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Acacia ulicifolia	Prickly Moses						·		·
Acetosa sagittata	Turkey Rhubarb						✓		·
Acianthus sp.							·		·
Adiantum aethiopicum	Common Maidenhair						·		✓
Allocasuarina littoralis	Black Sheoak		✓				·		·
Amyema congener							·	✓	·
Angophora floribunda	Rough-barked Apple	✓	✓			✓	✓	✓	
Aristida spp.		·	·		✓	·	·		
Aristida vagans	Threeawn Speargrass	✓	✓				·		
Arthropodium spp.		✓	✓				·	✓	
Asparagus aethiopicus							✓		
Asparagus asparagoides							✓		
Asplenium australasicum	Bird's Nest Fern					✓	·		
Asplenium flabellifolium	Necklace Fern	✓					·		
Austrodanthonia racemosa var. racemosa		·			✓		·		
Austrodanthonia tenuior		✓	✓		✓	✓	·		
Austrostipa rudis subsp. rudis		✓	✓				·	✓	
Axonopus fissifolius	Narrow-leafed Carpet Grass	·		✓			·		
Backhousia myrtifolia	Grey Myrtle	·		·			·	✓	
Bidens pilosa	Cobbler's Pegs				✓	✓	✓		✓
Billardiera scandens	Appleberry		✓			✓	·		·
Blechnum cartilagineum	Gristle Fern		·			·	·		·
Bossiaea buxifolia			✓				·	✓	·
Bossiaea obcordata							·		·
Bothriochloa macra					✓		·		·
Brachychiton populneus	Kurrajong						·		·
Breynia oblongifolia	Coffee Bush	✓	✓		✓		✓	✓	✓
Bromus cartharticus	Prairie Grass	·	·		✓		·		·
Brunoniella pumilio	Dwarf Blue Trumpet	✓	✓				·		·
Bursaria spinosa	Native Blackthorn	✓			✓	✓	✓		

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Carex inversa	Knob Sedge	·			✓	·	·		
Carex longebrachiata	Bergalia Tussock		✓				✓		✓
Cassytha glabella		✓	✓				·		✓
Cassytha pubescens							✓		
Centella asiatica	Pennywort						✓		✓
Cerastium sp.					✓		·		·
Cheilanthes sieberi		✓				✓	·		·
Cheilanthes dsitans		·			✓	·	·		·
Cirsium sp.		·				·	·		·
Clematis aristata		·				·	·	✓	·
Clematis glycinoides	Headache Vine	✓			✓	✓	✓		
Commelina cyanea	Native Wandering Jew	·			✓	✓	·		
Conyza sumatrensis		·			✓	·	·		
Cotoneaster sp.							✓		
Cotula australis	Common Cotula				✓		·		
Crassula sieberiana	Australian Stonecrop						·		
Cymbidium suave	Snake Orchid						·		
Cymbopogon refractus	Barbed Wire Grass	✓			✓	✓	·		
Cynodon dactylon	Common Couch			✓	✓		·		
Cyperus gracilis					✓		✓		
Cyperus sp.		✓					·		
Davallia pyxidata	Hare's Foot Fern						✓		
Daviesia ulicifolia	Gorse Bitter Pea		✓				·	✓	
Desmodium brachypodum	Large Tick-trefoil	✓			✓		·		
Desmodium gunnii		·	✓			✓	·	✓	
Desmodium rhytidophyllum		·	✓			✓	·	✓	
Desmodium varians	Slender Tick-trefoil	✓			✓		✓		
Dianella caerulea		·					·	✓	
Dianella caerulea var producta			✓				·		✓
Dianella longifolia		✓	✓				·		·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Dichelachne crinita	Longhair Plumegrass	·		✓			·		·
Dichelachne micrantha	Shorthair Plumegrass	·	✓	·			✓		·
Dichelachne sp.		✓	✓				·		·
Dichondra repens	Kidney Weed	✓			✓		✓		✓
Digitaria ramularis		✓	✓			✓	·		·
Dodonaea triquetra			✓				·	✓	·
Doodia aspera	Prickly Rasp Fern						✓		
Echinopogon caespitosus		✓	✓		✓		✓		✓
Echinopogon ovatus	Forest Hedgehog Grass						·		✓
Ehrharta erecta	Panic Veldtgrass						·		·
Einadia trigonos	Fishweed				✓		·		·
Entolasia marginata	Bordered Panic					✓	✓		✓
Entolasia stricta	Wiry Panic	✓	✓			✓	·	✓	·
Eragrostis leptostachya	Paddock Lovegrass			✓	✓		✓		
Eucalyptus bosistoana	Coast Grey Gum						·		
Eucalyptus botryoides	Bangalay						✓		✓
Eucalyptus cypellocarpa	Monkey Gum						·	✓	·
Eucalyptus elata	River Peppermint						✓		
Eucalyptus eugenoides	Thin-leaved Stringybark	✓	✓				·	✓	
Eucalyptus fibrosa	Red Ironbark					✓	·		
Eucalyptus globoidea	White Stringybark					✓	✓		
Eucalyptus longifolia	Woollybutt					✓	·		
Eucalyptus paniculata	Grey Ironbark		✓			·	·		
Eucalyptus pilularis	Blackbutt		✓				·	✓	
Eucalyptus saligna	Sydney Blue Gum						·		
Eucalyptus tereticornis	Forest Red Gum	✓		✓	✓		·		
Eustrephus latifolius	Wombat Berry		✓		✓	✓	✓	✓	✓
Exocarpus cuppressiformis	Native Cherry		✓				·		·
Galium binifolium			·				·	✓	·
Galium propinquum	Maori Bedstraw	✓					·		✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Gahnia aspera						✓	·		·
Gahnia melanocarpa						·	·	✓	·
Geitonoplesium cymosum	Scrambling Lily	✓	✓		✓	✓	✓	✓	✓
Geranium homeanum							✓		✓
Geranium solanderi	Native Geranium						✓		
Glycine clandestina			✓				✓	✓	✓
Glycine tabacina		✓		✓	✓	✓	✓		
Goodenia ovata							·		✓
Hardenbergia violacea	False Sarsaparilla	✓			✓		·	✓	·
Hibbertia aspera			✓			·	·	✓	✓
Hibbertia diffusa		✓	✓			✓	·	✓	·
Hydrocotyle laxiflora	Stinking Pennywort						✓		✓
Hymenanthera dentata	Tree Violet						✓		✓
Hypericum gramineum	Small St John's Wort		✓				·		·
Hypochaeris radicata	Catsear			✓	✓		·		·
Imperata cylindrica			✓			✓	✓	✓	✓
Indigofera australis		✓					✓		
Juncus usitatus				✓			·		✓
Kennedia rubicunda	Red Kennedy Pea			·			·		·
Lagenophora stipitata	Blue Bottle-daisy	✓				✓	·		·
Lepidium pseudohyssopifolium		·			✓	·	·		·
Lepidosperma elatius		·			·	·	·		✓
Lepidosperma laterale		✓	✓				✓	✓	✓
Lepidosperma urophorum		·	·				·	✓	·
Leucopogon juniperinus		✓	✓			✓	·	✓	✓
Leucopogon lanceolatus			✓				·	✓	·
Ligustrum sinense	Small-leaved Privet						✓		
Lindsaea linearis	Screw Fern						·	✓	
Lomandra filiformis			✓				·		
Lomandra longifolia	Spiny-headed Mat-rush	✓	✓		✓	✓	✓	✓	✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Lomandra multiflora		✓	✓			✓	·		·
Lonicera japonica	Japanese Honeysuckle						✓		✓
Macrozamia communis		✓	✓			✓	✓	✓	✓
Melia azedarach	White Cedar						✓		
Mentha satureioides					✓		·		
Microlaena stipoides		✓	✓	✓	✓	✓	✓	✓	✓
Morinda jasminoides		·	·	·		·	·		·
Notelaea venosa	Veined Mock-olive	·	✓	·		✓	·		·
Ochna serrulata	Mickey Mouse Plant	·	·	·		·	·		·
Olea europea	Common Olive						·		·
Opercularia aspera	Coarse Stinkweed	✓					·	✓	·
Opercularia hispida	Hairy Stinkweed	·			✓	✓	·		·
Oplismenus aemulus		·	✓			✓	✓	✓	✓
Oplismenus imbecillis		✓					·		·
Oplismenus sp.		·					·		·
Oxalis perennans		✓			✓	✓	✓		
Oxalis sp.		·		✓	✓		·		
Oxylobium scandens	Netted Shaggy Pea	·		·			·		
Ozothamnus argophyllus	·	✓					·		
Ozothamnus diosmifolius	White Dogwood	✓				✓	·		
Pandorea pandorana	Wonga Wonga Vine					✓	·	✓	
Panicum simile	Two-colour Panic	✓	✓			✓	·	✓	
Panicum effusum		✓			✓		·		
Parsonsia straminea	Common Silkpod	·					·	✓	
Paspalidium sp.		·					·		
Paspalum dilatatum	Paspalum			✓			·		
Pellaea falcata	Sickle Fern						✓		✓
Pellaea viridis var viridis							·		·
Pennisetum clandestinum	Kikuyu Grass			✓	✓		✓		
Persoonia linearis	Narrow-leaved Geebung		✓			✓	·	✓	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Phyllanthus hirtellus			✓			·	·	✓	
Pimelea linifolia			✓				·	✓	
Pittosporum multiflorum	Orange Thorn	✓					·		
Pittosporum revolutum	Rough Fruit Pittosporum						✓		
Pittosporum undulatum	Sweet Pittosporum	✓				✓	✓	✓	✓
Plantago lanceolata	Lamb's Tongues			✓	✓		✓		✓
Platycerium bifurcatum	Elkhorn	✓					·		·
Plectranthus parviflorus					✓	✓	·		✓
Poa sieberiana			✓				✓		
Polymeria calycina			·				·		
Polyscias sambucifolia	Elderberry Panax						·		
Polyscias sp.							·	✓	
Pomaderris ferrugineum							·	✓	
Pomax umbellata		✓	✓			✓	·		
Portulaca oleracea	Pigweed	·	·		✓	·	·		
Pratia purpurascens	Whiteroot	✓	✓		✓	✓	✓	✓	✓
Pseuderanthemum variabile	Pastel Flower		✓				✓	✓	
Pteridium esculentum	Bracken						✓		✓
Pterostylis sp.							·		✓
Pyracantha angustifolia							·		·
Pyrrosia rupestris			✓			✓			
Rapanea howittiana	Brush Muttonwood		·			·	·	✓	·
Rubus fruiticosus	Blackberry complex		·			·	·		·
Rubus parvifolius	Native Raspberry				✓		✓		✓
Rubus ulmifolius	Blackberry						✓		
Schelhammera undulata			✓		✓		·	✓	✓
Schoenus melanostachys							·		✓
Senecio linearifolius							·		·
Senecio madagascariensis	Fireweed			✓			·		·
Setaria gracilis	Slender Pigeon Grass			✓			✓		

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Sida rhombifolia	Paddy's Lucerne			✓	✓		✓		
Sigesbeckia orientalis		✓			✓		✓		
Solanum pungetium	Eastern Nightshade	·				✓	·	✓	
Solanum chenopodioides							·		✓
Sporobulus africanus		✓		✓			·		·
Stellaria flaccida							✓		✓
Stellaria media	Common Chickweed				✓		·		·
Stylidium graminifolium	Grass Triggerplant						·		·
Stypandra glauca	Nodding Blue Lily		✓				·	✓	·
Tagetes minuta	Stinking Roger			✓	✓		✓		
Themeda australis	Kangaroo Grass		✓		✓	✓	✓		
Trema aspera	Native Peach						✓		
Tylophora barbata	Bearded Tylophora						·		✓
Verbena rigida	Veined Verbena						✓		
Vernonia cinerea			✓				·		
Veronica plebeia	Trailing Speedwell						✓		✓
Vicia sp.							✓		
Viola hederacea							✓		
Wahlenbergia spp.					✓		·		
Wahlenbergia stricta	Tall Bluebell						·		
Xanthorrhoea concava							·		
Zieria smithii	Sandfly Zieria		✓			✓	✓	✓	✓

Table 8b: Fauna species detected at the West Moruya site.

	Species Name	Common Name
Birds	Acanthiza pusilla	Brown Thornbill
	Acanthorhyncus tenuirostris	Eastern Spinebill
	Alisterus scapularis	Australian King Parrot
	Anthochaera carunculata	Red Wattlebird
	Cacatua tenuirostris	Long-billed Corella
	Chenonetta jubata	Maned Wood Duck

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	Coracina novaehollandiae	Black-faced Cuckoo-shrike
	Cormobates leucophaea	White-throated Tree Creeper
	Corvus coronoides	Australian Raven
	Cracticus torquatus	Grey Butcherbird
	Dacelo novaeguineae	Laughing Kookaburra
	Eopsaltria australis	Eastern Yellow Robin
	Gallinula tenebrosa	Dusky Moorhen
	Gymnorhina tibicen	Australian Magpie
	Manorina melanophrys	Bell Minor
	Pardalotus punctatus	Spotted Pardalote
	Phaps chalcoptera	Common Bronzewing
	Platycercus eximius	Eastern Rosella
	Rhipidura fuliginosa	Grey Fantail
	Strepera graculina	Pied Currawong
	Threskiornis aethiopica	Sacred Ibis
	Trichoglossus haematodus	Rainbow Lorikeet
	Zosterops lateralis	Silvereye
Mammals	Oryctolagus cuniculus	Rabbit
	Wallabia bicolor	Swamp Wallaby
Amphibians	Crinia signifera	
	Littoria verreauxii	Verreaux's Tree Frog

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Table 9a: Flora species detected at the South Moruya site.

Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Acacia implexa	Hickory Wattle				✓
Acacia mearnsii	Black Wattle				
Acetosella vulgaris	Sorrel, Sheep Sorrel			✓	
Anagallis arvensis	Scarlet/Blue Pimpernel	✓	✓	✓	✓
Angophora floribunda	Rough-barked Apple			✓	✓
Aptenia cordifolia	Heartleaf Ice Plant			·	✓
Arctotheca calendula			✓	·	
Aristida vagans	Threeawn Speargrass	✓		·	✓
Arthropodium sp.				·	✓
Asparagus aethiopicus	Asparagus Fern	✓		·	✓
Asparagus plumosis	Climbing Asparagus Fern			·	✓
Austrodanthonia tenuior		✓	·	·	✓
Axonopus fissifolius	Narrow-leafed Carpet Grass		✓	✓	
Bidens pilosa	Cobbler's Pegs	✓	✓	·	✓
Bothriochloa macra	Red Grass	✓	✓	·	
Brachychiton populneus	Kurrajong			·	
Brassica sp.			✓	·	
Brunoniella pumilio	Dwarf Blue Trumpet	✓		·	✓
Bursaria spinosa	Native Blackthorn	✓		·	
Carex inversa	Knob Sedge	·	✓	·	✓
Carex longebrachiata	Bergalia Tussock	✓		·	✓
Centella asiatica	Pennywort			✓	
Cerastium glomeratum	Mouse-ear Chickweed		✓	·	
Cirsium vulgare	Spear Thistle	✓		·	
Cheilanthes sieberi				✓	✓
Clematis glycinoides var. glycinoides		✓		·	
Commelina cyanea	Native Wandering Jew	✓		·	
Conyza bonariensis			✓	✓	
Conyza sumatrensis			✓	·	✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Cotoneaster sp.		✓		·	
Cotula australis	Common Cotula	·	✓	·	
Crassula sieberiana	Australian Stonecrop	✓		✓	✓
Crocosmia x crocosmiifolia		·		·	✓
Cymbopogon refractus	Barbed Wire Grass	✓	✓	✓	✓
Cynodon dactylon	Common Couch	✓	✓	✓	✓
Cyperus gracilis		✓		✓	✓
Datura stramonium	Common Thornapple	·		·	
Desmodium brachypodum	Large Tick-trefoil	✓		·	
Desmodium gunnii		✓		·	
Dianella longifolia				✓	✓
Dichelachne micrantha	Shorthair Plumegrass	✓		·	
Dichondra repens	Kidney Weed	✓		✓	✓
Digitaria parviflora		·		·	·
Echinopogon caespitosus		✓		✓	
Ehrharta erecta	Panic Veldtgrass	✓		·	✓
Einadia hastata		✓			✓
Einadia nutans subsp. nutans		✓		·	
Entolasia marginata	Bordered Panic			·	
Eragrostis leptostachya	Paddock Lovegrass	✓	✓	✓	✓
Eucalyptus bosistoana	Coast Grey Gum			✓	
Eucalyptus eugenoides	Thin-leaved Stringybark	✓		·	✓
Eucalyptus tereticornis	Forest Red Gum			✓	✓
Euchiton involucratus	Star Cudweed	✓		·	
Eustrephus latifolius	Wombat Berry	✓		·	✓
Exocarpus cuppressiformis	Native Cherry			·	
Facelis retusa			✓	·	
Fimbristylis cypens			·	·	✓
Gahnia aspera				·	
Galinsoga parviflora			✓	·	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Galium migrans		✓		·	
Galium propinquum	Maori Bedstraw	✓		·	
Gamochaeta sp.			✓	✓	
Geitonoplesium cymosum	Scrambling Lily	✓		·	
Geranium solanderi	Native Geranium	✓	✓	·	
Glycine tabacina		✓		✓	✓
Hardenbergia violacea	False Sarsaparilla	✓		·	✓
Hibbertia diffusa				✓	
Hibbertia scandens	Climbing Guinea Flower			·	
Hymenanthera dentata	Tree Violet	✓		·	
Hypericum gramineum	Small St John's Wort			✓	✓
Hypericum perforatum	St. Johns Wort		✓	·	
Hypochaeris radicata	Catsear	✓	✓	·	✓
Hypolepis muelleri		·	·	·	✓
Juncus usitatus		·	·	·	✓
Kunzea ambigua	Tick Bush			✓	
Lactuca serriola	Prickly Lettuce		✓	·	
Lagenifera stipitata	Blue Bottle-daisy	✓		·	
Laxmannia gracilis				✓	
Leontodon taraxicoides			✓	·	
Lepidium pseudohyssoifolium				·	✓
Lepidosperma laterale		✓		·	✓
Leucopogan juniperina		✓		·	
Ligustrum sinense	Small-leaved Privet			·	✓
Lomandra confertifolia				✓	
Lomandra longifolia	Spiny-headed Mat-rush			·	✓
Lomandra multiflora				✓	
Microlaena stipoides		✓		✓	
Modiola carolina	Red-flowered Mallow			·	
Notodanthonia longifolia				·	✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Olearia viscidula	Wallaby Weed	✓		·	
Opercularia aspera	Coarse Stinkweed	·		·	✓
Opercularia sp.				✓	
Oplismenus imbecillis		✓		·	
Oxalis exilis		·	✓	·	
Oxalis perennans				✓	✓
Paronychia brasiliana	Chilean Whitlow Wort	·	✓	✓	
Paspalum dilatatum	Paspalum	✓	✓	✓	
Paspalum distichum	Water Couch	·	·	·	✓
Pellaea falcata	Sickle Fern	✓		·	✓
Pennisetum clandestinum	Kikuyu Grass		✓	✓	✓
Petrorhogia nanteuilii			·	·	✓
Phytolacca octandra	Inkweed		·	·	✓
Physalis peruviana	Cape Gooseberry		✓	·	
Pittosporum multiflorum	Orange Thorn	✓		·	
Pittosporum undulatum	Sweet Pittosporum			✓	✓
Plantago lanceolata	Lamb's Tongues	✓	✓	✓	✓
Plectranthus parviflorus		✓		·	
Poa meionectes		✓		·	
Pratia purpurascens	Whiteroot	✓		·	✓
Pseuderanthemum variabile	Pastel Flower	✓		·	
Pseudognaphalium luteoalbum	Jersey Cudweed			✓	
Pyracantha angustifolia		✓		·	
Rosa rubiginosa	Sweet Briar			·	
Rubus fruiticosus	Blackberry complex		✓	·	✓
Rubus parvifolius	Native Raspberry	✓		·	
Rubus ulmifolius	Blackberry	✓		✓	
Rumex browneii	Swamp Dock	✓		·	
Schelhammera undulata		·		·	✓
Senecio madagascariensis	Fireweed	✓	✓	·	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Setcreasea sp.		·	·	·	✓
Setaria gracilis	Slender Pigeon Grass	✓	✓	✓	✓
Setaria pumila		·	✓	·	·
Sida rhombifolia	Paddy's Lucerne	·	·	·	✓
Solanum nigrum	Black-berry Nightshade	·	✓	✓	
Solanum prinophyllum	Forest Nightshade	·	✓	·	
Solanum pungetium	Eastern Nightshade	✓		·	
Soliva sp.				✓	
Sonchus oleraceus	Common Sowthistle			·	
Sporobolus africanus	Parramatta Grass		✓	✓	✓
Sporobolus spp.		✓		·	
Stellaria media	Common Chickweed	·	✓	·	
Taraxacum officinale	Dandelion			✓	
Themeda australis	Kangaroo Grass			✓	✓
Tradescantia fluminensis	Wandering Jew			·	✓
Trifolium repens	White Clover	✓	✓	✓	✓
Trifolium subterraneum		·	✓	·	
Verbena bonariensis	Purpletop	·	✓	·	
Verbena rigida	Veined Verbena	✓	✓	✓	
Verbena sp.		·	·	·	✓
Vernonia cinerea		✓			
Veronica plebeia	Trailing Speedwell	✓			
Wahlenbergia communis	Tufted Bluebell	✓			
Wahlenbergia gracilis		·	✓		
Wahlenbergia stricta subsp. stricta				✓	
Yucca aloifolia					✓

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Table 9b: Fauna species detected at the South Moruya site.

	Species Name	Common Name
Birds	Anthochaera carunculata	Red Wattlebird
	Ardea ibis	Cattle Egret
	Cacatua roseicapilla	Galah
	Coracina novaehollandiae	Black-faced Cuckoo-shrike
	Cracticus torquatus	Grey Butcherbird
	Gymnorhina tibicen	Australian Magipe
	Pardalotus punctatus	Spotted Pardalote
	Platycercus eximius	Eastern Rosella
	Threskiornis aethiopica	Sacred Ibis
	Threskiornis spinicollis	Straw-necked Ibis
	Trichoglossus haematodus	Rainbow Lorikeet
Mammals	Macropus giganteus	Eastern Grey Kangaroo
	Oryctolagus cuniculus	Rabbit

Table 10a: Flora species detected at the Moruya Heads site.

Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Acacia implexa	Hickory Wattle		✓	✓	
Acacia irrorata	Green Wattle	✓	✓		✓
Acacia falcata		·	·	✓	·
Acacia longifolia		·	✓		·
Acacia mabelliae					·
Acacia obtusifolia		✓			·
Acacia stricta	Straight Wattle				·
Acacia ulicifolia	Prickly Moses		✓		·
Acianthus fornicatus	Pixie Caps				·
Adiantum aethiopicum	Common Maidenhair				✓
Agapanthus praecox	Agapanthus		✓		·
Aegiceras corniculatum	River Mangrove		·		·
Allocasuarina littoralis	Black Sheoak	✓	✓	✓	·
Aristida vagans	Threeawn Speargrass				·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Arthropodium sp.		✓			·
Asparagus aethiopicus			✓	✓	·
Asparagus asparagoides			·		·
Asplenium australasicum	Bird's Nest Fern	✓			·
Asplenium flabellifolium	Necklace Fern	✓			·
Austrostipa sp.					·
Avicennia marina					·
Axonopus fissifolius	Narrow-leafed Carpet Grass				·
Backhousia myrtifolia	Grey Myrtle				✓
Banksia integrifolia			✓		·
Baumea juncea			✓		·
Bidens pilosa	Cobbler's Pegs	✓			·
Billardiera scandens	Appleberry	✓			✓
Botrichyium australe		·			·
Breynia oblongifolia	Coffee Bush	✓			·
Brunoniella pumilio	Dwarf Blue Trumpet				·
Bursaria spinosa	Native Blackthorn			✓	·
Carex appressa					✓
Carex longebrachiata	Bergalia Tussock	✓	✓	✓	✓
Cassinia longifolia					·
Cassytha glabella		✓			·
Cassytha pubescens		✓			·
Casuarina glauca	Swamp Oak	·			·
Centella asiatica	Pennywort		✓		✓
Cheilanthes sieberi			·	✓	·
Chrysanthemoides monilifera			✓	✓	·
Cirsium vulgare	Spear Thistle				·
Clematis aristata					✓
Commelina cyanea	Native Wandering Jew	✓			✓
Corymbia maculata		✓	✓	✓	·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Cryptostylis sp.					·
Cymbopogon refractus	Barbed Wire Grass			✓	·
Cynodon dactylon	Common Couch		✓		·
Cyperus gracilis			·	✓	·
Daviesia ulicifolia	Gorse Bitter Pea				·
Delairea odorata	Cape Ivy				·
Desmodium gunnii		✓		✓	·
Desmodium rhytidophyllum		✓			·
Desmodium varians	Slender Tick-trefoil				·
Dianella caerulea				✓	·
Dianella caerulea var producta		✓			✓
Dianella longifolia		✓			·
Dichondra repens	Kidney Weed	✓	✓		✓
Doodia aspera	Prickly Rasp Fern				✓
Echinopogon caespitosus		✓		✓	·
Echinopogon ovatus	Forest Hedgehog Grass				✓
Ehrharta erecta	Panic Veldtgrass				·
Eleocharis equisetina					✓
Elaeocarpus reticulatus	Blueberry Ash		✓		·
Entolasia marginata	Bordered Panic	✓	✓		·
Entolasia stricta	Wiry Panic	✓		✓	·
Eragrostis sp.		·			·
Eucalyptus botryoides	Bangalay		✓		✓
Eucalyptus eugenoides	Thin-leaved Stringybark				·
Eucalyptus fibrosa	Red Ironbark				·
Eucalyptus longifolia	Woollybutt				✓
Eucalyptus maculata	Spotted Gum				✓
Eucalyptus paniculata	Grey Ironbark	✓			·
Eucalyptus pilularis	Blackbutt		✓		·
Eucalyptus saligna / botryoides			✓		·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Eucalyptus tereticornis	Forest Red Gum		·		·
Euchiton gymnocephalus			·		·
Euchiton involucratus	Star Cudweed		·		·
Eustrephus latifolius	Wombat Berry	✓	✓		✓
Exocarpos cupressiformis	Native Cherry	✓	✓	✓	✓
Exocarpus strictus	Dwarf Cherry				·
Gahnia clarkei			✓		✓
Gahnia melanocarpa		✓			✓
Galium binifolium		✓			·
Galium propinquum	Maori Bedstraw				✓
Geitonoplesium cymosum	Scrambling Lily	✓	✓	✓	✓
Geranium homeanum					✓
Geranium solanderi	Native Geranium				·
Glochidion ferdinandi	Cheese Tree				✓
Glycine clandestina		✓	✓	✓	✓
Gonocarpus teucrioides			✓	✓	✓
Goodenia ovata					✓
Hardenbergia violacea	False Sarsaparilla				·
Helichrysum elatum					·
Hemarthria uncinata	Matgrass		✓		·
Hibbertia aspera		✓		✓	·
Hibbertia dentata	Twining Guinea Flower				·
Hibbertia diffusa		✓		✓	·
Hydrocotyle laxiflora	Stinking Pennywort				✓
Hydrocotyle peduncularis					·
Hydrocotyle tripartita	Pennywort				✓
Hypericum gramineum	Small St John's Wort				·
Hypochaeris radicata	Catsear		✓	✓	✓
Imperata cylindrica		✓	✓	✓	✓
Indigofera australis					·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Juncus capillaceus			✓		·
Juncus continuus			✓		·
Juncus kraussii			·		·
Juncus mollis			·		·
Juncus sp.					✓
Kunzea ambigua	Tick Bush		·		·
Lagenifera stipitata	Blue Bottle-daisy				·
Lepidosperma laterale		✓		✓	✓
Lepidosperma sp.					✓
Leucopogon juniperinus		✓	✓	✓	✓
Leucopogon lanceolatus					·
Lindsaea linearis	Screw Fern				·
Lomandra confertifolia					·
Lomandra longifolia	Spiny-headed Mat-rush	✓	✓	✓	✓
Lomandra multiflora		·	·	✓	·
Macrozamia communis		✓			·
Marsdenia rostrata	Common Milk Vine				✓
Melaleuca ericifolia			✓		·
Microlaena stipoides		✓	✓	✓	✓
Notelaea longifolia	Large Mock-olive				·
Notelaea venosa	Veined Mock-olive	✓			✓
Opercularia aspera	Coarse Stinkweed				·
Oplismenus aemulus		✓	✓	✓	✓
Oplismenus imbecillis					·
Ozothamnus argophyllus					✓
Ozothamnus diosmifolius	White Dogwood				·
Pandorea pandorana	Wonga Wonga Vine	✓			·
Panicium simile	Two-colour Panic	✓		✓	·
Parsonsia straminea	Common Silkpod	✓	✓		✓
Paspalidium distans		·	·	✓	·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Paspalum dilatatum	Paspalum			✓	✓
Pellaea falcata	Sickle Fern				·
Persoonia linearis	Narrow-leaved Geebung				·
Pimelea linifolia					·
Pittosporum revolutum	Rough Fruit Pittosporum	✓	✓	✓	✓
Pittosporum undulatum	Sweet Pittosporum	✓	✓	✓	✓
Platycerium bifurcatum	Elkhorn				·
Plectranthus parviflorus		✓			·
Poa labillardieri	Tussock				✓
Poa meionectes		✓			✓
Poa sieberiana		·		✓	·
Poa sp.		✓	✓		·
Pomax umbellata					·
Poranthera microphylla					·
Pratia purpurascens	Whiteroot	✓	✓	✓	✓
Prunella vulgaris	Self-heal				·
Pseuderanthemum variabile	Pastel Flower				✓
Pteridium esculentum	Bracken		✓		·
Pterostylis grandiflora	Cobra Greenhood				✓
Pterostylis sp.					·
Pultenaea daphnoides					·
Pultenaea linophylla					·
Pultenaea retusa					·
Pultenaea villosa					·
Pyrrosia rupestris	Rock Felt Fern				·
Rapanea howittiana	Brush Muttonwood	✓	✓	✓	✓
Rubus fruiticosus	Blackberry complex	·	·		·
Rubus parvifolius	Native Raspberry	✓			✓
Rubus rosifolius	Rose-leaf Bramble				·
Rumex sp.					✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Sarcocornia quinqueflora					·
Sarcopetalum harveyanum	Pearl Vine				·
Schelhammera undulata					·
Selliera radicans					·
Sida rhombifolia	Paddy's Lucerne				·
Sigesbeckia orientalis					·
Sigesbeckia orientalis subsp. orientalis	Indian Weed			✓	·
Solanum prinophyllum	Forest Nightshade				·
Solanum pungetium	Eastern Nightshade	✓			·
Sporobolus africanus	Parramatta Grass	·		✓	·
Sporobolus virginicus		·			·
Stackhousia sp.		·			·
Stellaria flaccida					✓
Stenotaphrum secundatum	Buffalo Grass				·
Suaeda australis					·
Tetragonia tetragonioides	New Zealand Spinach				·
Themeda australis	Kangaroo Grass	✓		✓	·
Tradescantia fluminensis	Wandering Jew				·
Tylophora barbata	Bearded Tylophora				✓
Vernonia cinerea					·
Veronica plebeia	Trailing Speedwell				✓
Viola hederacea				✓	
Wahlenbergia sp.					
Zieria smithii	Sandfly Zieria				

Table 10b: Fauna species detected at the Moruya Heads site.

	Species Name	Common Name
Birds	Acanthiza lineata	Striated Thornbill
	Alisterus scapularis	Australian King Parrot
	Anthochaera carunculata	Red Wattlebird
	Cacatua galerita	Sulpher-crested Cockatoo

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	Species Name	Common Name
	Cormobates leucophaea	White-throated Tree Creeper
	Cracticus torquatus	Grey Butcherbird
	Eopsaltria australis	Eastern Yellow Robin
	Gymnorhina tibicen	Australian Magpie
	Lichenostomus chrysops	Yellow-faced Honeyeater
	Pachycephala pectoralis	Golden Whistler
	Pardalotus punctatus	Spotted Pardalote
	Pelecanus conspicillatus	Australian Pelican
	Petroica rosea	Rose Robin
	Platycercus elegans	Crimson Rosella
	Ptilonorhynchus violaceus	Satin Bowerbird
	Rhipidura fuliginosa	Grey Fantail
	Strepera graculina	Pied Currawong
	Trichoglossus haematodus	Rainbow Lorikeet
Mammals	Macropus giganteus	Eastern Grey Kangaroo
	Oryctolagus cuniculus	Rabbit
Reptiles	Lampropholis sp.	A sun skink
Amphibians	Crinia signifera	
	Littoria verreauxii	Verreaux's Tree Frog

Table 11a: Flora species detected at the Dalmeny site.

Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Acacia covenyi						✓			
Acacia floribunda	White Sally								
Acacia implexa	Hickory Wattle		✓			✓			
Acacia irrorata	Green Wattle				✓		✓	✓	
Acacia mabelliae								·	
Acacia mearnsii	Black Wattle					✓		·	
Acacia obtusifolia		✓			✓			·	✓
Acacia pedina								·	·
Acacia stricta	Straight Wattle							·	·
Acacia spectabilis	Mudgee Wattle				✓			·	·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Acacia terminalis subsp. Angustifolia	Sunshine Wattle	✓						·	✓
Acetosa sagittata	Turkey Rhubarb	·						·	·
Adiantum aethiopicum	Common Maidenhair			✓			✓	✓	✓
Allocasuarina littoralis	Black Sheoak	✓	✓		✓	✓		·	✓
Aotus ericoides								·	·
Aristida vagans	Threeawn Speargrass							·	✓
Arrhenechthites mixta	Purple Fireweed				✓			·	·
Arthropodium sp.								✓	
Asparagus aethiopicus		✓	✓					·	
Asplenium australasicum forma australasicum	Bird's Nest Fern	✓			✓			·	
Asplenium flabellifolium	Necklace Fern							·	✓
Austrodanthonia sp.					✓			·	·
Austrostipa pubescens		✓						·	·
Babingtonia pluriflora								·	✓
Bidens pilosa	Cobbler's Pegs							·	·
Billardiera scandens	Appleberry	✓	✓	✓	✓			·	✓
Breynia oblongifolia	Coffee Bush		✓					✓	
Brunoniella pumilio	Dwarf Blue Trumpet							·	✓
Bursaria spinosa	Native Blackthorn	✓						·	·
Calochlaena dubia	Common Ground Fern			✓		✓		✓	✓
Carex appressa				✓				·	·
Carex longebrachiata	Bergalia Tussock							✓	
Cassinia longifolia								·	
Cassinia trinervia								·	
Cassytha glabella			✓					·	
Casuarina glauca	Swamp Oak			✓			✓	·	
Centaurium sp.				·			✓	·	
Centella asiatica	Pennywort			✓				·	
Cheilanthes sieberi				·				·	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Cirsium sp.				·		✓		·	
Cirsium vulgare	Spear Thistle							✓	
Cissus hypoglauca	Giant Water Vine			✓	✓	✓	✓	✓	
Claoxylon australe	Brittlewood			·		·		·	
Clematis aristata		✓	✓		✓			✓	
Clematis glycinoides var. glycinoides		·				✓		·	
Commersonia fraseri	Brush Kurrajong							·	
Commesperma volubile								·	
Correa lawrenciana var. cordifolia	Native Fuschia				✓			·	
Cortaderia sp.					·			·	
Corymbia maculata		✓	✓		✓	✓		✓	✓
Cymbopogon refractus	Barbed Wire Grass	✓						·	·
Davallia pyxidata	Hare's Foot Fern				✓			·	✓
Davallia solida var. pyxidata	Hare's Foot Fern	✓						·	·
Daviesia ulicifolia	Gorse Bitter Pea	✓						·	·
Daviesia ulicifolia subsp. ulicifolia		·						·	·
Delairea odorata	Cape Ivy							·	·
Desmodium brachypodum	Large Tick-trefoil							·	·
Desmodium gunnii			✓	✓				✓	
Desmodium rhytidophyllum								·	
Desmodium varians	Slender Tick-trefoil	✓						·	
Dianella caerulea		✓			✓		✓	✓	
Dianella longifolia		·	✓					·	
Dichelachne micrantha	Shorthair Plumegrass	·	·					·	
Dichelachne parva		·	✓					·	
Dichondra repens	Kidney Weed	✓	✓	✓			✓	✓	
Dodonaea triquetra		·	·	·			·	·	
Doodia aspera	Prickly Rasp Fern							✓	
Echinopogon caespitosus								·	
Echinopogon ovatus	Forest Hedgehog Grass			✓				✓	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Ehrharta erecta	Panic Veldtgrass			·				·	
Elaeocarpus reticulatus	Blueberry Ash	✓			✓	✓		✓	✓
Entolasia marginata	Bordered Panic			✓		✓	✓	✓	
Entolasia stricta	Wiry Panic	✓	✓		✓			·	✓
Epacris impressa		✓						·	·
Epacris sparsa		·						·	·
Eragrostis leptostachya	Paddock Lovegrass							·	✓
Eucalyptus bauerana	Blue Box					✓		✓	
Eucalyptus botryoides/saligna	Bangalay Blue Gum Hybrid			✓			✓	·	
Eucalyptus cypellocarpa	Monkey Gum			·			·	·	
Eucalyptus fibrosa	Red Ironbark			·				·	
Eucalyptus globoidea	White Stringybark	✓			✓			·	✓
Eucalyptus longifolia	Woollybutt							✓	
Eucalyptus paniculata	Grey Ironbark	✓			✓			·	✓
Eucalyptus pilularis	Blackbutt					✓		·	✓
Euchiton sp.								✓	
Eustrephus latifolius	Wombat Berry		✓	✓			✓	✓	
Exocarpos cupressiformis	Native Cherry	✓	✓					✓	
Gahnia aspera				✓				✓	
Gahnia clarkei				·		✓		·	
Gahnia melanocarpa		✓		✓	✓		✓	✓	
Gahnia radula							✓	✓	
Galium binifolium		✓			✓			·	
Gamochaeta sp.		·			·		✓	·	
Geitonoplesium cymosum	Scrambling Lily	·				✓	✓	✓	
Glycine clandestina			✓	✓	✓		✓	✓	✓
Gonocarpus teucrioides				✓			✓	✓	✓
Goodenia ovata				✓		✓	✓	✓	
Goodenia paniculata				✓				·	
Hardenbergia violacea	False Sarsaparilla	✓	✓		✓			·	✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Helichrysum elatum		·	·		✓			·	·
Hibbertia aspera		✓	✓		✓			✓	✓
Hibbertia dentata	Twining Guinea Flower				✓	✓		·	·
Hibbertia obtusifolia								·	·
Hydrocotyle laxiflora	Stinking Pennywort			✓		✓		·	·
Hydrocotyle peduncularis								✓	
Hymenanthera dentata	Tree Violet							·	
Hypericum gramineum	Small St John's Wort							·	✓
Hypochaeris radicata	Catsear							✓	
Hypolepis muelleri	Harsh Ground Fern						✓	✓	
Imperata cylindrica			✓	✓			✓	✓	✓
Joycea pallida	Silvertop Wallaby Grass				·			·	✓
Juncus usitatus					·			·	·
Kennedia rubicunda	Red Kennedy Pea							·	·
Lagenifera stipitata	Blue Bottle-daisy	✓	✓		✓			·	✓
Lepidosperma laterale		✓	✓		✓			✓	✓
Lepidosperma urophorum		·	·		·			·	·
Leptospermum polygalifolium		·	·		·			·	·
Leptospermum trinervium								·	·
Leucopogon juniperinus			✓					·	·
Leucopogon lanceolatus		✓	✓		✓			·	✓
Lindsaea linearis	Screw Fern		✓		✓			·	·
Lindsaea microphylla	Lacy Wedge Fern							·	✓
Lomandra confertifolia subsp. rubiginosa		✓	✓					·	·
Lomandra confertifolia subsp. similis					✓			·	✓
Lomandra filiformis	Wattle Matt-rush		✓					·	·
Lomandra longifolia	Spiny-headed Mat-rush	✓	✓	✓			✓	✓	✓
Lomandra multiflora		✓	✓		✓			·	✓
Lonicera japonica	Japanese Honeysuckle	·		✓				·	·
Macrozamia communis		✓	✓		✓	✓		·	✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Marsdenia rostrata	Common Milk Vine			✓		✓		✓	
Marsdenia suaveolens	Scented Marsdenia		✓	·	✓	·		·	
Microlaena stipoides		✓	✓		✓	✓	✓	✓	✓
Morinda jasminoides				✓		✓	✓	✓	
Myoporum acuminatum						✓		·	
Notelaea venosa	Veined Mock-olive		✓		✓			✓	
Notodanthonia longifolia			·		✓			·	
Olearia viscidula	Wallaby Weed							·	
Omalanthus populifolius	Bleeding Heart, Native Poplar					✓		·	
Opercularia aspera	Coarse Stinkweed	✓						·	
Oplismenus aemulus		·	✓	✓	✓	✓	✓	✓	
Oplismenus imbecillis		·		✓			✓	✓	
Oxalis exilis		·	✓	·			✓	·	
Oxalis sp.		✓	✓	✓		✓		✓	✓
Ozothamnus argophyllus		·	·	·		·		·	·
Ozothamnus diosmifolius	White Dogwood	✓			✓	✓		✓	
Pandorea pandorana	Wonga Wonga Vine				✓		✓	✓	
Panicum simile	Two-colour Panic	✓	✓					·	✓
Parsonsia straminea	Common Silkpod		✓	✓	✓	✓	✓	✓	
Passiflora herbertiana				✓				·	
Passiflora mollissima	Banana Passionfruit							✓	
Pellaea falcata	Sickle fern							✓	
Pennisetum clandestinum	Kikuyu Grass							·	
Persoonia linearis	Narrow-leaved Geebung	✓	✓		✓			·	✓
Persoonia mollis		·	·		·	✓		·	·
Philotheca trachyphylla		·	·		·			·	·
Phyllanthus hirtellus		✓	✓		✓			·	✓
Physalis peruviana	Cape Gooseberry	·				✓		·	·
Pimelea linifolia		✓						·	·
Pinus radiata		·						·	·

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Pittosporum revolutum	Rough Fruit Pittosporum	✓	✓	✓	✓	✓	✓	✓	
Pittosporum undulatum	Sweet Pittosporum					✓		✓	
Plantago debilis								✓	
Platysace lanceolata			✓		✓			·	✓
Poa labillardieri	Tussock		✓	✓			✓	✓	
Poa meionectes		✓	✓		✓			✓	✓
Poa sp.		·	·		✓		✓	·	·
Podolobium ilicifolium	Prickly Shaggy Pea	✓	✓					·	·
Polyscias elegans	Celery Wood	·				✓		·	·
Pomaderris aspera	Hazel Pomaderris	·				·	✓	·	·
Pomaderris elliptica subsp. elliptica								·	·
Pomaderris ferruginea					✓			·	·
Poranthera microphylla					✓			·	✓
Pratia purpurascens	Whiteroot	✓	✓	✓	✓	✓	✓	✓	✓
Prostanthera lasianthos	Victorian Christmas Bush	·		·		✓	✓	·	·
Pseuderanthemum variabile	Pastel Flower			✓		✓	✓	✓	
Psychotria loniceroides	Hairy Psychotria			·		✓		·	
Pteridium esculentum	Bracken			✓	✓	✓	✓	✓	✓
Pterostylis longifolia complex					✓			✓	
Pultenaea daphnoides					✓			·	✓
Pultenaea scabra		✓	✓					·	✓
Pyrrosia rupestris	Rock Felt Fern							·	✓
Rapanea howittiana	Brush Muttonwood		✓	✓				✓	
Rhytidosporum procumbens		✓						·	✓
Rubus parvifolius	Native Raspberry			✓	✓		✓	✓	
Salvia coccinea				·	·		·	·	
Santalum acuminatum	Sweet Quandong							·	
Santalum obtusifolium	Sandalwood							·	
Schelhammera undulata		✓	✓		✓			·	✓
Senecio linearifolius				✓			✓	✓	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6	Quad 7	Quad 8
Senna pendula		✓		✓				✓	
Sigesbeckia orientalis								✓	
Smilax australis	Sarsaparilla					✓		✓	
Solanum pungetium	Eastern Nightshade		✓		✓		✓	✓	
Solanum sp.			·				✓	·	
Solanum stelligerum	Devil's Needles			✓			✓	✓	
Stellaria flaccida								✓	
Stephania japonica				✓		✓		✓	
Stylidium graminifolium	Grass Triggerplant							·	
Synoum glandulosum	Scentless Rosewood							✓	
Synoum glandulosum subsp. glandulosum	Scentless Rosewood					✓		·	
Syzygium australe								·	
Trachymene pedunculare							✓		
Themeda australis	Kangaroo Grass		✓					·	
Trema aspera	Native Peach				✓	✓		·	
Tylophora barbata	Bearded Tylophora			✓		✓		✓	
Vernonia cinerea		✓	✓					·	✓
Veronica plebeia	Trailing Speedwell			✓		✓		✓	
Viola hederacea				✓	✓			·	
Wahlenbergia gracilis				·	·			·	
Wahlenbergia sp.				·				·	
Xanthorrhoea concava				·				·	
Zantedeschia aethiopica	Arum Lily			✓				·	
Zieria smithii	Sandfly Zieria				✓			✓	✓

Table 11b: Fauna species detected at the Dalmeny site.

	Species Name	Common Name
	Acanthiza lineata	Striated Thornbill
	Acanthiza pusilla	Brown Thornbill
Birds	Acanthorhynchus teniurostris	Eastern Spinebill
	Anthochaera carunculata	Red Wattlebird

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	Species Name	Common Name
	Calyptorhynchus lathami	Glossy Black-Cockatoo
	Cygnus atratus	Black Swan
	Eopsaltria australis	Eastern Yellow Robin
	Glossopsitta concinna	Musk Lorikeet
	Leucosarcia melanoleuca	Wonga Pigeon
	Manorina melanophrys	Bell Minor
	Meliphaga lewinii	Lewin's Honeyeater
	Pachycephala inornata	Golden Whistler
	Pardalotus punctatus	Spotted Pardalote
	Platycercus elegans	Crimson Rosella
	Psophodes olivaceus	Eastern Whipbird
	Rhipidura fuliginosa	Grey Fantail
	Sericornis frontalis	White-browed Scrubwren
	Trichoglossus haematodus	Rainbow Lorikeet
	Vanellus miles	Masked Lapwing
Mammals	Macropus giganteus	Eastern Grey Kangaroo
	Perameles nasuta	Long-nosed Bandicoot
	Wallabia bicolor	Swamp Wallaby
Reptiles	Pseudechis porphyriacus	Red-bellied Black Snake
Amphibians	Crinia signifera	
	Pseudophyrne sp.	
	Uperoleia sp.	

Table 12a: Flora species detected at the West Kianga site.

Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Acacia cognata	Narrow-leaf Bower Wattle						
Acacia implexa	Hickory Wattle						
Acacia irrorata	Green Wattle						
Acacia longifolia							
Acacia maidenii	Maiden's Wattle						
Acacia mearnsii	Black Wattle			✓		✓	
Acacia melanoxylon	Blackwood			·		·	✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Acacia sophorae	Coastal Wattle						
Acacia sp.							
Acaena echinata							
Acaena novae-zelandea							✓
Acmena smithii	Lilly Pilly			✓	✓	✓	
Adiantum formosum	Giant Maidenhair			·	✓	·	
Adiantum hispidulum	Rough Maidenhair				·		
Alphitonia excelsa	Red Ash				·		
Anagallis arvensis	Scarlet/Blue Pimpernel						✓
Aphanopetalum resinosum	Gum Vine						
Arthropodium spp.		✓					
Asparagus aethiopicus			✓				
Asparagus asparagoides		·				✓	
Asparagus scandens		·			✓	·	
Asplenium flabellifolium	Necklace Fern	·				✓	
Austrodanthonia racemosa var. racemosa		✓					
Austrodanthonia moniticola			✓				
Axonopus fissifolius	Narrow-leafed Carpet Grass						✓
Beyeria lasiocarpa				✓			
Bidens pilosa	Cobbler's Pegs	✓					
Blechnum cartilagineum	Gristle Fern	·			✓		
Brachychiton populneus	Kurrajong	·		✓			
Breynia oblongifolia	Coffee Bush	✓		✓		✓	
Briza maxima	Quaking Grass						
Calochlaena dubia	Common Ground Fern		✓				
Carex appressa			✓	✓	✓	✓	
Carex declinata			·	·		·	
Carex longebrachiata	Bergalia Tussock	✓				✓	✓
Cassine australis	Red Olive Plum						
Cassinia trinerva							

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Chloris gayana	Rhodes Grass						
Chrysanthemoides monilifera		✓					
Cirsium vulgare	Spear Thistle					✓	✓
Cissus hypoglauca	Giant Water Vine						
Claoxylon australe	Brittlewood		✓		✓		
Clematis aristata		✓		✓			
Clematis glycinoides	Headache Vine	·	✓	·	✓		
Commelina cyanea	Native Wandering Jew	✓				✓	
Conyza sp.						✓	✓
Coprosma quadrifida	Prickly Currant Bush			✓		✓	
Corymbia maculata		✓	✓	✓			
Cosmos bipinnatus							
Cymbopogon refractus	Barbed Wire Grass	✓					
Cynodon dactylon	Common Couch	·					✓
Cryptocarya microneura	Murrogun						
Cyathea australis	Rough Treefern						
Cyperus brevifolius							✓
Cyperus gracilis		✓					
Dactylis glomerata	Cocksfoot						✓
Daucus glochidiatus							✓
Daucus glochidiatus forma A		✓					
Delairea odorata	Cape Ivy			✓			
Desmodium gunnii		✓	✓	✓	✓	✓	
Desmodium varians	Slender Tick-trefoil	·	·	·	·	·	✓
Dichelachne micrantha	Shorthair Plumegrass						✓
Dichondra repens	Kidney Weed	✓		✓	✓	✓	✓
Doodia aspera	Prickly Rasp Fern	·	✓	✓		✓	
Echinopogon ovatus	Forest Hedgehog Grass	✓					
Ehrharta erecta	Panic Veldtgrass	✓		✓		✓	
Entolasia marginata	Bordered Panic	✓					

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Epilobium billardiereanum		·					✓
Epilobium hirtigerum							
Eragrostis leptostachya	Paddock Lovegrass	✓					✓
Eucalyptus botryoides	Bangalay			✓		✓	
Eucalyptus cypellocarpa	Monkey Gum			✓			
Eucalyptus eugenioides	Thin-leaved Stringybark	✓					
Eucalyptus muelleriana	Yellow Stringybark			✓		✓	
Eucalyptus saligna/botryoides	Sydney Blue Gum/Botyoides		✓	·	✓	·	
Eupomatia laurina	Bolwarra						
Eustrephus latifolius	Wombat Berry	✓	✓	✓	✓	✓	
Exocarpos cupressiformis	Native Cherry					✓	
Ficus ruiginosa	Rusty Fig						
Fumaria sp.							
Gahnia melanocarpa				✓		✓	
Geitonoplesium cymosum	Scrambling Lily		✓	·	✓	·	
Geranium homeanum		✓	✓	✓			✓
Geranium solanderi	Native Geranium	·		·	✓	✓	
Glycine clandestina		✓		✓	✓		✓
Gonocarpus teucrioides		✓					
Goodenia ovata							
Hakea salicifolia	Willow-leaved Hakea						
Hedera helix	English Ivy						
Hibbertia dentata	Twining Guinea Flower	✓	✓	✓			
Hibbertia scandens	Climbing Guinea Flower	✓			✓	✓	✓
Holcus lanatus	Yorkshire Fog						
Hydrocotyle bonariensis						✓	
Hydrocotyle laxiflora	Stinking Pennywort					·	
Hymenanthera dentata	Tree Violet		✓	✓	✓	✓	
Hypericum gramineum	Small St John's Wort		·	·	·	·	✓
Hypochaeris radicata	Catsear					✓	✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Hypolepis muelleri	Harsh Ground Fern						
Indigofera australis		✓					
Juncus usitatus						✓	✓
Kennedia rubicunda	Red Kennedy Pea	✓					
Lantana camara	Lantana	✓	✓	✓	✓	✓	
Lastreopsis decomposita	Trim Shield Fern	·	✓	✓	✓	✓	
Lepidosperma laterale				✓			
Lilium formosanum							✓
Lolium perenne							✓
Lomandra longifolia	Spiny-headed Mat-rush	✓					
Macrozamia communis		✓					
Marsdenia flavescens	Hairy Milk Vine	✓					
Marsdenia rostrata	Common Milk Vine	✓	✓	✓	✓	✓	
Microlaena stipoides		✓	✓	✓	✓	✓	✓
Modiola caroliniana	Red-flowered Mallow	·	·	·	·	·	✓
Morinda jasminoides			✓	✓	✓	✓	
Muellerina sp.							
Muehlenbeckia gracillima					✓		
Muehlenbeckia sp.						✓	
Myoporum acuminatum			✓			·	
Notelaea venosa	Veined Mock-olive	✓	✓	✓	✓	✓	
Omalanthus populifolius	Bleeding Heart, Native Poplar	·	✓	·	✓	·	
Oplismenus aemulus		·	✓	·	✓	·	
Oxalis perrenans		·	✓	✓		✓	✓
Ozothamnus argophyllus		✓					
Pandorea pandorana	Wonga Wonga Vine		✓	✓		✓	
Parsonsia straminea	Common Silkpod		✓	✓			
Paspalum dilatatum	Paspalum						✓
Pellaea falcata	Sickle Fern	✓	✓	✓	✓	✓	
Pennisetum clandestinum	Kikuyu Grass	✓					✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Persicaria decipiens	Slender Knotweed						
Persicaria sp.							
Phalaris aquatica	Phalaris						✓
Physalis peruviana	Cape Gooseberry					✓	
Phytolacca octandra	Inkweed						
Pittosporum multiflorum	Orange Thorn	✓	✓	✓	✓		
Pittosporum revolutum	Rough Fruit Pittosporum	✓	✓				
Pittosporum undulatum	Sweet Pittosporum	✓	✓	✓	✓	✓	
Plantago debilis							
Plantago lanceolata	Lamb's Tongues	✓					✓
Plectranthus parviflorus		✓	✓	✓	✓	✓	
Poa labillardieri	Tussock					✓	✓
Poa meionectes							
Poa sieberiana				✓			
Pomaderris aspera	Hazel Pomaderris					✓	
Pratia purpurascens	Whiteroot	✓	✓				
Pseuderanthemum variabile	Pastel Flower	✓	✓	✓	✓	✓	
Psychotria loniceroides	Hairy Psychotria	·	✓	·		·	
Pteridium esculentum	Bracken		✓	✓		✓	
Pultenaea daphnoides		✓					
Rapanea howittiana	Brush Muttonwood			✓	✓	✓	
Rubus fruiticosus	Blackberry complex			·	·	·	✓
Rubus nebulosus	Green-leaved Bramble			·		·	
Rubus parvifolius	Native Raspberry	✓				✓	✓
Rubus rosifolius	Rose-leaf Bramble	·				·	
Rubus ulmifolius	Blackberry					✓	
Rumex sp.				✓			
Sambucus australasica	Native Elderberry			·			
Santalum obtusifolium	Sandalwood	✓					
Sarcopetalum harveyanum	Pearl Vine	✓	✓	✓	✓	✓	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4	Quad 5	Quad 6
Schelhammera undulata		✓					
Schoenoplectus validus							
Senecio linearifolius				✓			
Senecio madagascariensis	Fireweed	✓					✓
Senna pendula		·			✓		
Sigesbeckia orientalis			✓	✓		✓	
Silene pratensis	White Campion		·	·		·	✓
Smilax australis	Sarsaparilla		✓	✓	✓	✓	
Solanum aviculare	Kangaroo Apple			·		·	
Solanum chenopodinum			✓	·		·	
Solanum mauritianum	Wild Tobacco Bush						
Solanum pseudocapsicum	Madeira Winter Cherry				✓		
Solanum pungetium	Eastern Nightshade	✓	✓				
Solanum sp.		·	·		✓		
Solanum stelligerum	Devil's Needles	·				✓	
Sonchus oleraceus	Common Sowthistle	·				✓	✓
Stellaria flaccida		✓	✓	✓	✓	✓	
Stephania japonica			✓	✓	✓	✓	
Synoum glandulosum	Scentless Rosewood		✓	✓	✓	✓	
Taraxacum officinale	Dandelion						
Trema aspera	Native Peach					✓	
Trifolium repens	White Clover						✓
Tylophora barbata	Bearded Tylophora	✓	✓	✓	✓	✓	
Typha orientalis	Broad-leaved Cumbungi						
Urtica incisa	Stinging Nettle		✓	✓	✓	✓	
Verbena bonariensis	Purpletop					✓	
Veronica plebeia	Trailing Speedwell					✓	
Zieria smithii	Sandfly Zieria						

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Table 12b: Fauna species detected at the West Kianga site.

	Species Name	Common Name
Birds	Acanthiza pusilla	Brown Thornbill
	Anthochaera carunculata	Red Wattlebird
	Corvus coronoides	Australian Raven
	Eopsaltria australis	Eastern Yellow Robin
	Glossopsitta concinna	Musk Lorikeet
	Gymnorhina tibicen	Australian Magpie
	Hirundo neoxena	Welcome Swallow
	Leucosarcia melanoleuca	Wonga Pigeon
	Malurus cyaneus	Superb Fairy-wren
	Manorina melanophrys	Bell Minor
	Meliphaga lewinii	Lewin's Honeyeater
	Neochmia temporalis	Red-browed Firetail
	Phylidonyris novaehollandiae	New Holland Honeyeater
	Platycercus elegans	Crimson Rosella
	Psophodes olivaceus	Eastern Whipbird
	Ptilonorhynchus violaceus	Satin Bowerbird
	Rhipidura fuliginosa	Grey Fantail
	Strepera graculina	Pied Currawong
	Trichoglossus haematodus	Rainbow Lorikeet
	Zosterops lateralis	Silvereye
Mammals	Perameles nasuta	Long-nosed Bandicoot
	Wallabia bicolor	Swamp Wallaby
Amphibians	Crinia signifera	Common Eastern Toadlet

Table 13a: Flora species detected at the South Narooma site.

Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Acacia decurrens	Black Wattle				
Acacia faliciformis					✓
Acacia fimbriata	Fringed Wattle				
Acacia implexa	Hickory Wattle	✓	✓	·	✓
Acacia irrorata	Green Wattle	·	✓	✓	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Acacia mabellae					✓
Acacia mearnsii	Black Wattle				
Acacia obtusata		✓			
Acacia podalyriifolia	Queensland Silver Wattle				
Acacia stricta	Straight Wattle			✓	
Acacia spectabilis	Mudgee Wattle				
Acacia terminalis	Sunshine Wattle				
Allocasuarina littoralis	Black Sheoak		✓	·	
Amyema congener			·	·	
Anagallis arvensis	Scarlet/Blue Pimpernel	✓			
Aristida vagans	Threeawn Speargrass		✓	·	
Arrhenechthites mixta	Purple Fireweed		✓	·	
Arthropodium milleflorum	Vanilla Lily				
Asparagus aethiopicus					
Asparagus asparagoides		✓		✓	
Asparagus officinalis	Asparagus				
Austrodanthonia racemosa var. racemosa		✓		✓	
Austrodanthonia sp.		·		✓	
Backhousia myrtifolia	Grey Myrtle				
Bidens pilosa	Cobbler's Pegs	✓			
Billardiera scandens	Appleberry	✓	✓	·	
Blechnum cartilagineum	Gristle Fern		✓	·	
Botrychium australe			✓	·	
Brachychiton acerifolius	Illawarra Flame Tree		·	·	✓
Breynia oblongifolia	Coffee Bush	✓	✓	✓	✓
Bursaria spinosa	Native Blackthorn				
Calochlaena dubia	Common Ground Fern			✓	
Carex longebrachiata	Bergalia Tussock				
Centella asiatica	Pennywort	✓			
Cirsium vulgare	Spear Thistle	·			

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Cissus antarctica	Water Vine				
Clematis aristata		✓	✓	✓	✓
Clematis glycinoides var. glycinoides					
Conyza sp.					
Correa reflexa	Native Fuschia				
Correa sp.					
Corymbia maculata		✓	✓	✓	✓
Cymbidium suave	Snake Orchid	·	·	·	
Cymbopogon refractus	Barbed Wire Grass				
Daucus glochidiatus forma A					
Davallia pyxidata	Hare's Foot Fern	✓			
Daviesia ulicifolia	Gorse Bitter Pea				
Desmodium gunnii			✓	✓	✓
Desmodium rhytidophyllum			✓	·	✓
Desmodium varians	Slender Tick-trefoil	✓			
Dianella caerulea		✓	✓	✓	✓
Dianella caerulea var. producta		✓			
Dichelachne micrantha	Shorthair Plumegrass	✓			✓
Dichondra repens	Kidney Weed	✓	✓	✓	✓
Doodia aspera	Prickly Rasp Fern			✓	
Echinopogon caespitosus		✓	✓	·	
Echinopogon ovatus	Forest Hedgehog Grass	·	·	·	✓
Ehrharta erecta	Panic Veldtgrass			✓	
Elaeocarpus reticulatus	Blueberry Ash		✓	·	✓
Einadia hastata	Berry Saltbush				
Entolasia marginata	Bordered Panic	✓		✓	
Entolasia stricta	Wiry Panic		✓	✓	✓
Eragrostis leptostachya	Paddock Lovegrass				
Eucalyptus globoidea	White Stringybark				
Eucalyptus longifolia	Woollybutt				

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Eucalyptus paniculata	Grey Ironbark		✓	✓	
Eucalyptus saligna/botryoides	Sydney Blue Gum?botryoides		✓	·	
Eucalyptus sieberi	Silvertop Ash	✓			✓
Euphorbia peplus				✓	
Eustrephus latifolius	Wombat Berry	✓		✓	✓
Exocarpos cupressiformis	Native Cherry	✓			✓
Gahnia melanocarpa				✓	✓
Galium binifolium			✓	✓	✓
Galium propinquum	Maori Bedstraw				
Geitonoplesium cymosum	Scrambling Lily	✓	✓	✓	
Geranium homeanum					
Geranium solanderi	Native Geranium				
Glycine clandestina		✓	✓	✓	
Glycine tabacina		✓			
Gonocarpus teucrioides					
Goodenia ovata				✓	
Hardenbergia violacea	False Sarsaparilla	✓			✓
Helichrysum elatum					
Hibbertia aspera		✓	✓	·	✓
Hibbertia dentata	Twining Guinea Flower				
Hibbertia obtusifolia		✓			
Hibbertia scandens	Climbing Guinea Flower	·	✓	✓	
Hydrocotyle laxiflora	Stinking Pennywort				
Hydrocotyle peduncularis					
Hypericum gramineum	Small St John's Wort	✓			
Hypochaeris radicata	Catsear	✓		✓	
Imperata cylindrica		✓	✓	✓	✓
Indigofera australis		✓			
Kennedia rubicunda	Red Kennedy Pea	✓			
Lagenifera stipitata	Blue Bottle-daisy	✓	✓	·	

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Lantana camara	Lantana	✓	✓	✓	✓
Lepidosperma laterale		✓	✓	✓	
Leucopogon lanceolatus			✓	✓	✓
Lindsaea linearis	Screw Fern		✓	·	
Lindsaea microphylla	Lacy Wedge Fern				
Lomandra longifolia	Spiny-headed Mat-rush		✓	✓	✓
Lomandra multiflora				✓	✓
Macrozamia communis		✓	✓	✓	✓
Marsdenia rostrata	Common Milk Vine	✓		✓	
Microlaena stipoides		✓	✓	✓	✓
Morinda jasminoides		·	·	·	✓
Notelaea venosa	Veined Mock-olive	✓	✓	✓	✓
Opercularia aspera		·	·	✓	·
Opercularia hispida	Hairy Stinkweed	✓			
Opercularia varia	Variable Stinkweed	·			
Oplismenus aemulus		·	✓	✓	✓
Oplismenus imbecillis					
Oxalis exilis		✓	✓	✓	
Ozothamnus argophyllus			✓	·	
Ozothamnus diosmifolius	White Dogwood		✓	·	✓
Pandorea pandorana	Wonga Wonga Vine	✓		✓	✓
Parsonsia straminea	Common Silkpod		✓	✓	✓
Paspalidium distans			·	·	
Paspalum dilatatum	Paspalum	✓			
Passiflora edulis	Common Passionfruit	·			
Pellaea falcata	Sickle Fern	·			
Pennisetum clandestinum	Kikuyu Grass	✓			
Persoonia linearis	Narrow-leaved Geebung			✓	
Phoenix canariensis					
Physalis peruviana	Cape Gooseberry				

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Phytolacca octandra				✓	
Pimelea linifolia		✓			✓
Pittosporum revolutum	Rough Fruit Pittosporum	✓	✓	✓	✓
Pittosporum undulatum	Sweet Pittosporum	✓	✓	✓	✓
Plantago debilis			✓	·	
Plantago lanceolata	Lamb's Tongues	✓			
Platysace linearifolia		·	✓	·	
Plectranthus parviflorus					
Poa meionectes		✓	✓	✓	✓
Polyscias sambucifolia	Elderberry Panax	✓			
Polyscias sambucifolia sp. C		·		✓	✓
Pomaderris ferruginea		·			
Poranthera microphylla				✓	
Pratia purpurascens	Whiteroot	✓		✓	✓
Pseuderanthemum variabile	Pastel Flower			✓	
Pteridium esculentum	Bracken	✓	✓	·	✓
Pterostylis sp.					✓
Pultenaea daphnoides		✓	✓	·	
Pyrrosia rupestris	Rock Felt Fern	·	✓	·	
Rubus parvifolius	Native Raspberry	✓	✓	·	
Salvia sp.		·	·	✓	
Santalum obtusifolium	Sandalwood				
Sarcopetalum harveyanum				✓	
Schelhammera undulata		✓	✓	·	✓
Scutellaria humilis	Dwarf Skullcap	·	·	·	
Scutellaria mollis	Soft Skullcap				
Senecio hispidulus	Hill Fireweed	✓			
Senecio madagascariensis	Fireweed	·			
Sigesbeckia orientalis subsp. orientalis	Indian Weed	✓		✓	
Smilax australis	Sarsaparilla				✓

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Species Name	Common Name	Quad 1	Quad 2	Quad 3	Quad 4
Solanum nigrum	Black-berry Nightshade			✓	
Solanum pungetium	Eastern Nightshade			✓	
Solanum stelligerum					
Sonchus oleraceus				✓	
Stackhousia sp.					
Stellaria media				✓	
Stephania japonica					
Synoum glandulosum	Scentless Rosewood				
Taraxacum officinale	Dandelion				
Themeda australis	Kangaroo Grass	✓	✓	·	
Trema aspera	Native Peach				
Trifolium repens	White Clover				
Tylophora barbata	Bearded Tylophora				
Vernonia cinerea		✓			
Veronica plebeia	Trailing Speedwell			✓	
Viola hederacea			✓	✓	
Vicia sativa					
Wahlenbergia gracilis				✓	
Xanthorrhoea concava					
Zieria smithii	Sandfly Zieria	✓	✓	·	✓

Table 13b: Fauna species detected at the South Narooma site.

	Species Name	Common Name
Birds	Acanthiza lineata	Striated Thornbill
	Alisterus scapularis	Australian King Parrot
	Anthochaera carunculata	Red Wattlebird
	Corcorax melanorhamphos	White-winged Cough
	Cormobates leucophaea	White-throated Tree Creeper
	Corvus coronoides	Australian Raven
	Craticus torquatus	Grey Butcherbird
	Dacelo novaeguineae	Laughing Kookaburra

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	Species Name	Common Name
	Eopsaltria australis	Eastern Yellow Robin
	Glossopsitta concinna	Musk Lorikeet
	Gymnorhina tibicen	Australian Magpie
	Leucosarcia melanoleuca	Wonga Pigeon
	Manorina melanophrys	Bell Minor
	Meliphaga lewinii	Lewin's Honeyeater
	Pachycephala inornata	Golden Whistler
	Pardalotus punctatus	Spotted Pardalote
	Platycercus elegans	Crimson Rosella
	Rhipidura fuliginosa	Grey Fantail
	Strepera graculina	Pied Currawong
	Trichoglossus haematodus	Rainbow Lorikeet
Mammals	Oryctolagus cuniculus	Rabbit
Amphibians	Crinia signifera	

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Appendix B: Biometric values for quadrats within the study area.

Zone	Quadrat	Waypoint	GDA Co-ordinates (Easting-Northing)	Formation	Class	Type	No. native plant sp.	Over-storey Cover (%)	Mid-storey Cover (%)	Ground-cover (%) - grasses	Ground-cover (%) - shrubs	Ground-cover (%) - other	Exotic plant cover (%)	No. Trees with Hollows	Over-storey regen (%)	Length fallen logs (m)
Long Beach																
Zone 2	1	128	E250491 N6045254	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Southern Lowland Wet Forest	63	25	20	10	25	25	5	0	100	12
Zone 2	2	135	E250354 N6045303	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Southern Lowland Wet Forest	57	25	30	10	20	40	0	2	100	34
Zone 3	3	375	E250547 N6045384	Forested Wetlands	Coastal Floodplain Wetlands	Estuarine Creek Flat Scrub	18	10	50	6	4	-	-	0	50	0
Zone 4	4	186	E250429 N6045014	Wet Sclerophyll Forests (Shrubby)	South East Wet Sclerophyll Forests	Clyde Gully Wet Forest	57	30	50	15	5	10	0.1	3	100	34
Zone 1	5	402	E250406 N6045140	Dry Sclerophyll Forests (Shrubby)	South East Dry Sclerophyll Forests	Batemans Bay Foothills Dry Forest	52	25	15	25	10	10	1	0	100	5
Zone 5	6	187	E250547 N6045025	Forested Wetlands	Coastal Floodplain Wetlands	Estuarine Fringe Forest	28	20	60	5	5	20	1	0	100	14
West Moruya																
Zone 2	1	155	E234663 N6022082	Grassy Woodlands	Coastal Valley Grassy Woodlands	South Coast Grassy Woodland	53	25	20	50	5	15	0.1	0	100	33
Zone 1	2	-	E234328 N6021777	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	61	20	20	15	30	5	0	0	10	48

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Zone	Quadrat	Waypoint	GDA Co-ordinates (Easting-Northing)	Formation	Class	Type	No. native plant sp.	Over-storey Cover (%)	Mid-storey Cover (%)	Ground-cover (%) - grasses	Ground-cover (%) - shrubs	Ground-cover (%) - other	Exotic plant cover (%)	No. Trees with Hollows	Over-storey regen (%)	Length fallen logs (m)
Zone 2	4	-	E234526 N6022853	Grassy Woodlands	Coastal Valley Grassy Woodlands	South Coast Grassy Woodland	40	20	5	5	2	3	50	0	50	6
Zone 1	5	165	E234456 E6022316	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	49	20	20	10	5	5	0.1	0	100	48
Zone 2	6	149	E234597 N6022095	Grassy Woodlands	Coastal Valley Grassy Woodlands	South Coast Grassy Woodland	57	30	30	25	5	30	3	1	100	35
Zone 1	7	-	E234334 N6021711	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	53	20	45	15	10	10	0	0	75	103
Zone 4	8	217	E234180 N6021931	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Southern Lowland Wet Forest	46	30	5	40	1	48	1	0	100	54
South Moruya																
Zone 1	1	147	E235289 N6021024	Grassy Woodlands	Coastal Valley Grassy Woodlands	South Coast Grassy Woodland	52	20	5	250	0	20	5	1	100	6
Zone 2	2	376	E235434 N6021169	Grassy Woodlands	Coastal Valley Grassy Woodlands	South Coast Grassy Woodland	9	-	-	5	-	5	80	1	0	11
Zone 2	3	192	E236223 N6020492	Grassy Woodlands	Coastal Valley Grassy Woodlands	South Coast Grassy Woodland	23	10	1	60	1	3	85	0	100	0
Zone 1	4	443	E236639	Grassy	Coastal	South Coast	37	20	15	5	5	5	45	0	100	5

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Zone	Quadrat	Waypoint	GDA Co-ordinates (Easting-Northing)	Formation	Class	Type	No. native plant sp.	Over-storey Cover (%)	Mid-storey Cover (%)	Ground-cover (%) - grasses	Ground-cover (%) - shrubs	Ground-cover (%) - other	Exotic plant cover (%)	No. Trees with Hollows	Over-storey regen (%)	Length fallen logs (m)
			N6020443	Woodlands	Valley Grassy Woodlands	Grassy Woodland										
Moruya Heads																
Zone 3	1	161	E240615 N6021047	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	56	30	20	35	10	5	0	1	100	30
Zone 2	2	392	E240939 N6021890	Dry Sclerophyll Forests (Shrubby)	South Coast Sands Dry Sclerophyll Forests	Coastal Sand Forest	41	25	35	5	5	35	5	0	33	61
Zone 3	3	-	E240968 N6021890	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	38	15	25	30	5	5	1	0	100	21
Zone 4	4	196	E240644 N6021139	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Southern Lowland Wet Forest	56	25	20	30	5	15	0.5	0	100	30
Zone 1	-	-	-	Forested Wetlands	Coastal Floodplain Wetlands	Estuarine Fringe Forest	No quadrat was undertaken within this zone									
Dalmney																
Zone 1	1	167	E241026 N5993157	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	55	30	15	35	10	5	1	1	100	52
Zone 1	2	395	E241396 N5993120	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	50	20	5	15	5	5	0.1	1	660	79
	3	170	E342931	Forested	Coastal	Estuarine	45	35	5	0	5	30	5	0	100	30

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Zone	Quadrat	Waypoint	GDA Co-ordinates (Easting-Northing)	Formation	Class	Type	No. native plant sp.	Over-storey Cover (%)	Mid-storey Cover (%)	Ground-cover (%) - grasses	Ground-cover (%) - shrubs	Ground-cover (%) - other	Exotic plant cover (%)	No. Trees with Hollows	Over-storey regen (%)	Length fallen logs (m)
Zone 3			N6257967	Wetlands	Floodplain Wetlands	Creek Flat Scrub										
Zone 1	4	399	E240832 N5992862	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	54	25	20	35	5	10	0	0	50	191
Zone 4	5	176	E240315 N599324	Wet Sclerophyll Forests (Shrubby)	South East Wet Sclerophyll Forests	Clyde Gully Wet Forest	41	5	80	5	0	5	0.1	0	100	18
Zone5	6	400	E240606 N5993333	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Southern Lowland Wet Forest	37	15	10	40	5	15	0	0	0	61
Zone 2	7	206	E240413 N5993275	Forested Wetlands	Eastern Riverine Forests	South Coast River Flat Forest	67	20	25	25	5	20	0.1	0	100	18
Zone 1	8	216	E240724 N5992655	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	52	15	15	30	5	10	0	0	100	48
West Kianga																
Zone 1	1	198	E241068 N5990296	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	50	35	20	25	5	10	5	0	100	52
Zone 2	2	-	E241137 N5990260	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Coastal Gully Shrub Forest	45	20	30	5	25	5	10	1	50	40
Zone 2	3	200	E241083 N5990151	Wet Sclerophyll Forests	Southern Lowland Wet	Coastal Gully Shrub Forest	45	30	30	20	5	25	15	0	100	51

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				(Grassy)	Sclerophyll Forests											
Zone 2	4	-	E241186 N5990183	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Coastal Gully Shrub Forest	39	15	30	5	5	30	10	0	100	41
Zone 2	5	215	E241053 N5990005	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Coastal Gully Shrub Forest	56	35	20	10	5	40	10	0	100	18
Zone 3	6	-	E241286 N5990130	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Coastal Gully Shrub Forest	19	0	0	15	5	5	65	0	0	0
South Narooma																
Zone 1	1	184	E241467 N5986318	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	61	15	10	40	5	5	5	0	100	0
Zone 1	2	-	E241630 N5986366	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	53	25	35	15	5	10	5	0	100	41
Zone 1	3	185	E342914 N6257633	Wet Sclerophyll Forests (Grassy)	Southern Lowland Wet Sclerophyll Forests	Batemans Bay Cycad Forest	52	35	2	5	3	7	3	0	100	0
Zone 1	4	401	E241513 N5986261	Wet Sclerophyll Forests	Southern Lowland Wet	Batemans Bay Cycad Forest	47	20	20	10	5	5	5	0	100	72

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				(Grassy)	Sclerophyll Forests											

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