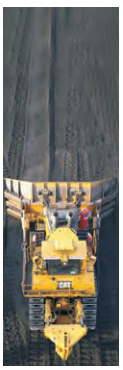
STRATFORDCOAL
Part of the Yancoal Australia Group

Stratford Extension Project
Environmental Impact Statement





APPENDIX E

FLORA ASSESSMENT

On Thursday 28 June 2012, Yancoal Australia Limited was listed on the Australian Stock Exchange and merged with Gloucester Coal Ltd (GCL) under a scheme of agreement on the same date. Stratford Coal Pty Ltd is now a wholly owned subsidiary of Yancoal Australia Limited. Any reference to GCL in this Appendix should be read as Yancoal Australia Limited.

STRATFORD EXTENSION PROJECT

FLORA ASSESSMENT

PREPARED BY
FLORASEARCH

APRIL 2012
Project No. GCL-10-12
Document No. 00446627

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EXECUTIVE SUMMARY

Flora Communities and Species

1. This report collates the results of flora surveys completed in 1994, 2001, 2007, 2008, 2010 and 2011 that have been conducted on the Stratford Coal Mine leases, along with supplementary work conducted by FloraSearch (Dr Colin Bower) in 2010 and 2011. In all, a total of 90 standard 20 × 20 metre floristic quadrats have been undertaken, with 80 random meanders and 26 rapid assessment spot samples.
2. Twelve native vegetation communities and two anthropogenic vegetation mapping units were distinguished on the study area and are described. The types of native vegetation present vary with landscape position. Riparian forests occur on the major watercourses, Red Gum - paperbark forests occur on flat areas of the valley floor with impeded drainage, while wet sclerophyll forests occur on foothills and steeper slopes. A small area of sub-tropical rainforest occurs in a sheltered gully in the east of the study area. Well-drained sites have dry sclerophyll forests with shrubby understoreys. Large cleared areas of the valley floor comprise grasslands dominated by introduced species.
3. A total of 510 (80 percent [%] native species and 20% introduced species) were found by the recent surveys conducted by FloraSearch and Ecobiological. Surveys conducted in the survey area and surrounds have recorded a total of 696 (81% native species and 19% introduced species).
4. The plant families with the highest numbers of native species were the Grasses, family Poaceae (83 species); Daisies, Asteraceae (52 species); the Eucalypts and related genera in the family Myrtaceae (49 species); Rushes and Sedges, Cyperaceae (38 species); Pea Flowers, subfamily Faboideae (34 species); the Orchids, Orchidaceae (21 species) and the Wattles, subfamily Mimosoideae (17 species). In all, some 121 plant families of native plants were represented.
5. The highest proportions of introduced species and weeds were in the cleared pasture areas and along the watercourses. The lowest proportions of weeds were found in undisturbed natural communities on steeper slopes and poorer soils. Semi-cleared, grazed natural communities and disturbed sites in bushland areas had intermediate weed levels.

Condition of the Vegetation

6. The condition of the vegetation within the Stratford Extension Project (the Project) area and surrounds varied considerably and is assessed in detail for each area of native vegetation within it. In general, the most disturbed areas were the watercourses and the flat to gently undulating areas cleared for grazing on the valley floor. The least disturbed areas were the steep rocky slopes and foothills of the wooded range to the east. The remaining areas with natural vegetation cover were all semi-cleared, former or current grazing land, with open areas and regeneration of various ages.

Threatened Species

7. No flora species listed in the schedules of the New South Wales (NSW) *Threatened Species Conservation Act, 1995* (TSC Act) or Commonwealth *Environment Protection and Biodiversity Conservation Act*, *1999* (EPBC Act) were found in the targeted searches conducted over the Project area and surrounds.

Threatened Vegetation Communities

8. No ecological communities listed as threatened in the schedules of the TSC Act or EPBC Act, were found in the Project area or surrounds.

Assessment

9. Some 105 hectares (ha) of native vegetation would be removed by the Project. The loss of this vegetation is unavoidable as it directly overlies the coal resource on which the Project depends, or is affected by essential infrastructure such as watercourse diversions.

Impact Avoidance, Mitigation and Offset

10. Refinements to the mine design have resulted in avoiding additional impacts on flora and their habitats (e.g. re-use of existing waste dump footprints, and maximisation of in-pit waste placement). Two main strategies to counter the unavoidable vegetation losses are proposed:

    - A comprehensive rehabilitation and revegetation plan that will replace the 105 ha of losses with 350 ha of revegetated woodland/open forest, including corridors that link significant isolated natural remnants on the study area to the Offset areas in the wooded range to the east of the Project area.
    - An Offset area of 935 ha including 490 ha of native remnant vegetation.

    Other mitigation measures applicable to flora have been developed for the Project are:

    - vegetation clearance procedures;
    - weed control and prevention;
    - bushfire prevention; and
    - dust control.

11. The proposed offset will ensure that biodiversity values would be maintained and improved in the region in the long-term as specified by the Requirements for the Project of the Director-General of the NSW Department of Planning and Infrastructure. The proposed offset has a number of features that ensure it meets the 'maintain and improve' test. These include:

    - The offset removes a substantial area of native vegetation from the deleterious effects of livestock grazing, thereby allowing it to recover and improve over time.
    - Cleared agricultural lands within the offset would be revegetated with local trees and shrubs appropriate to the positions in the landscape being replanted. These areas in time are expected to provide additional habitat for a wide range of native fauna species, including threatened species.
    - The Offset areas have been selected to replicate, as far as practicable, the vegetation communities on the study area, thereby maintaining biodiversity in the region.
    - The wooded range to the east of the Project area is broadly connected to large tracts of undisturbed natural vegetation, including Nature Reserves, National Parks and State Forests, to the east and south-east of the study area. Consequently, it is not isolated in the landscape and its high connectivity helps to ensure its long-term viability.
    - The addition of this new protected area to the existing reserved area enhances nature conservation over the region as a whole.

Conclusion

- The 105 ha of native vegetation that would be removed for the Project is offset with 490 ha of similar native vegetation in the immediate surrounds. Additionally, the offset includes 435 ha of cleared agricultural land that would be restored to native woodland and 10 ha of existing planted trees that would be retained.
- The offset supports samples of all native vegetation communities within the Project disturbance areas and has a greater diversity of vegetation communities than occur on the Project area.
- It is concluded that the Offset area meets the NSW Office of Environment and Heritage offset principles and results in a net improvement in regional biodiversity values.
- The proposal would result in the loss of 105 ha of native vegetation and 195 ha of anthropogenic vegetation.
- The area of native vegetation to be cleared represents a very small proportion of the extant native vegetation in the local area and wider region.
- The Project has been designed to avoid or minimise impacts on the larger remnant woodland patches that do not overlie proposed open cut pits, including vegetation communities that have been heavily impacted by past land use in the Gloucester Valley.
- A temporary loss of habitat connectivity would occur for remnant woodlands isolated by Project works.
- Mitigation strategies are considered adequate to control risks to native flora arising from weed invasion, dust and fires.
- The application of Seven Part Tests of Significance demonstrated the Project is highly unlikely to impact significantly on any threatened flora species, or their habitats that may potentially occur on the Project area.
- The Project would have no impact on threatened populations, threatened ecological communities or critical habitat, as none occurs on the Project area.
- The main cumulative impact on native flora is a further small depletion of vegetation communities that have been heavily cleared historically for agriculture in the region.
- Comprehensive rehabilitation and revegetation plans would ensure post-mine landforms provide a mix of native woodland, wildlife corridors and agricultural land.

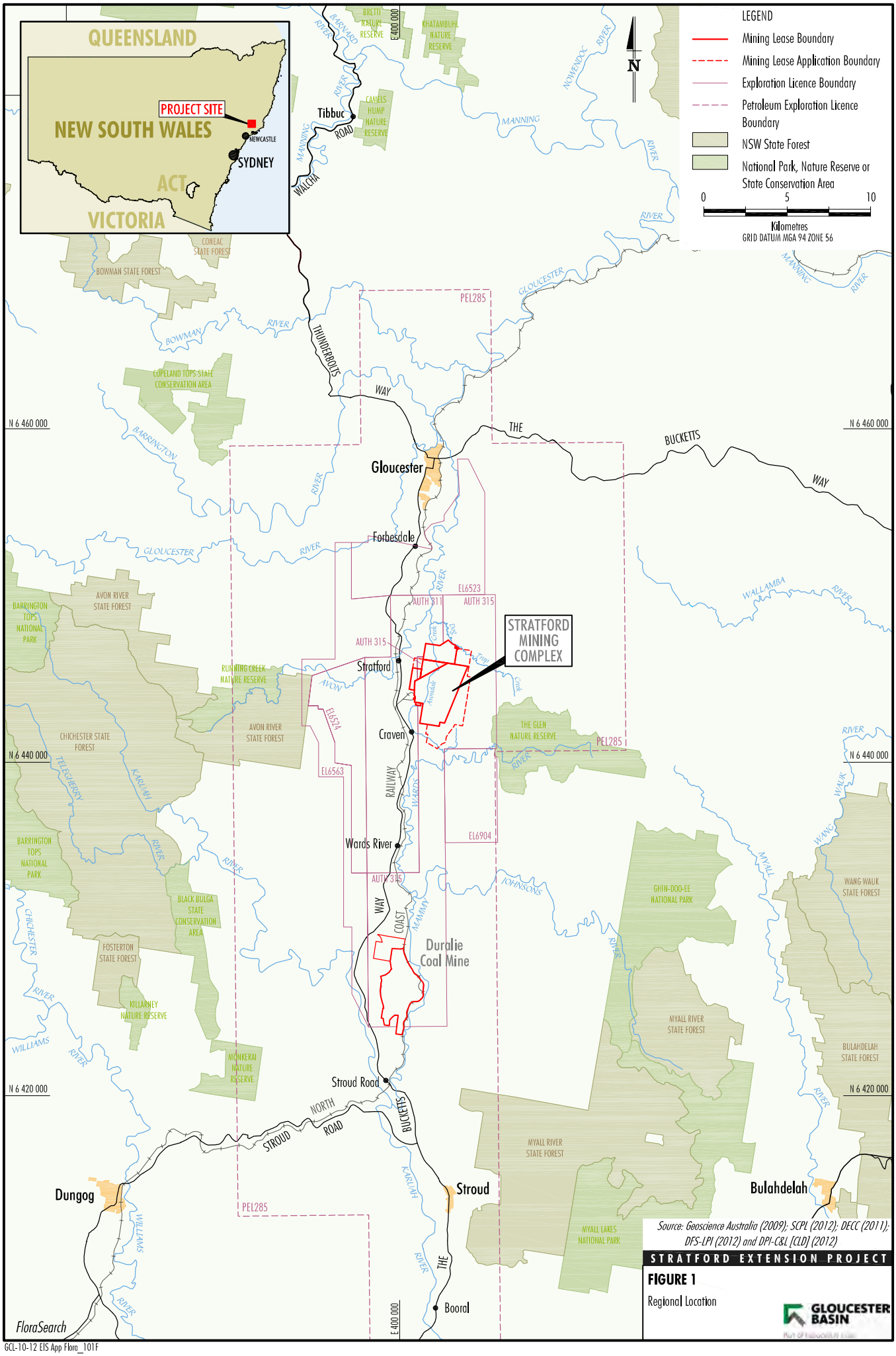
1 INTRODUCTION

FloraSearch (Dr Colin Bower) was commissioned by Stratford Coal Pty Ltd (SCPL), a wholly owned subsidiary of Gloucester Coal Limited, to conduct a flora assessment for the Stratford Extension Project (the Project), located approximately 95 kilometres (km) north of Newcastle, New South Wales (NSW) in the Gloucester Basin (Figure 1).

The Stratford Mining Complex is an existing mine (Figure 2). The Project is a proposed extension of open cut mining operations at the Stratford Mining Complex for an additional operational life of approximately 11 years. The main components of the Project are shown on Figure 3.

The main activities associated with the development of the Project would include:

- Run-of-mine (ROM) coal production up to 2.6 million tonnes per annum for an additional 11 years (commencing approximately 1 July 2013 or upon the grant of all required approvals), including mining operations associated with:
  - completion of the Bowens Road North Open Cut (BRNOC);
  - extension of the existing Roseville West Pit; and
  - development of the new Avon North and Stratford East Open Cuts;
- exploration activities;
- progressive backfilling of mine voids with waste rock behind the advancing open cut mining operations;
- continued and expanded placement of mine waste rock in the Stratford Waste Emplacement and Northern Waste Emplacement;
- progressive development of new haul roads and internal roads;
- coal processing at the existing coal handling and preparation plant (CHPP) including Project ROM coal, sized ROM coal received and unloaded from the Duralie Coal Mine (DCM) and material recovered periodically from the western co-disposal area;
- stockpiling and loading of product coal to trains for transport on the North Coast Railway to Newcastle;
- disposal of CHPP rejects via pipeline to the existing co-disposal area in the Stratford Main Pit and, later in the Project life, the Avon North Open Cut void;
- realignments of Wheatleys Lane, Bowens Road, and Wenham Cox/Bowens Road;
- realignment of a 132 kilovolt (kV) power line for the Stratford East Open Cut;
- continued use of existing contained water storages/dams and progressive development of additional sediment dams, pumps, pipelines, irrigation infrastructure and other water management equipment and structures;
- development of soil stockpiles, laydown areas and gravel/borrow areas, including modifications and alterations to existing infrastructure as required;
- monitoring and rehabilitation;
- all activities approved under Development Consents DA 23-98/99 and DA 39-02-01; and
- other associated minor infrastructure, plant, equipment and activities, including minor modifications and alterations to existing infrastructure as required.



Source: Geoscience Australia (2009); SCPL (2012); DECC (2011); DFS-LPI (2012) and DPI-C&L [CLD] (2012)

STRATFORD EXTENSION PROJECT

FIGURE 1

Regional Location

GLOUCESTER BASIN

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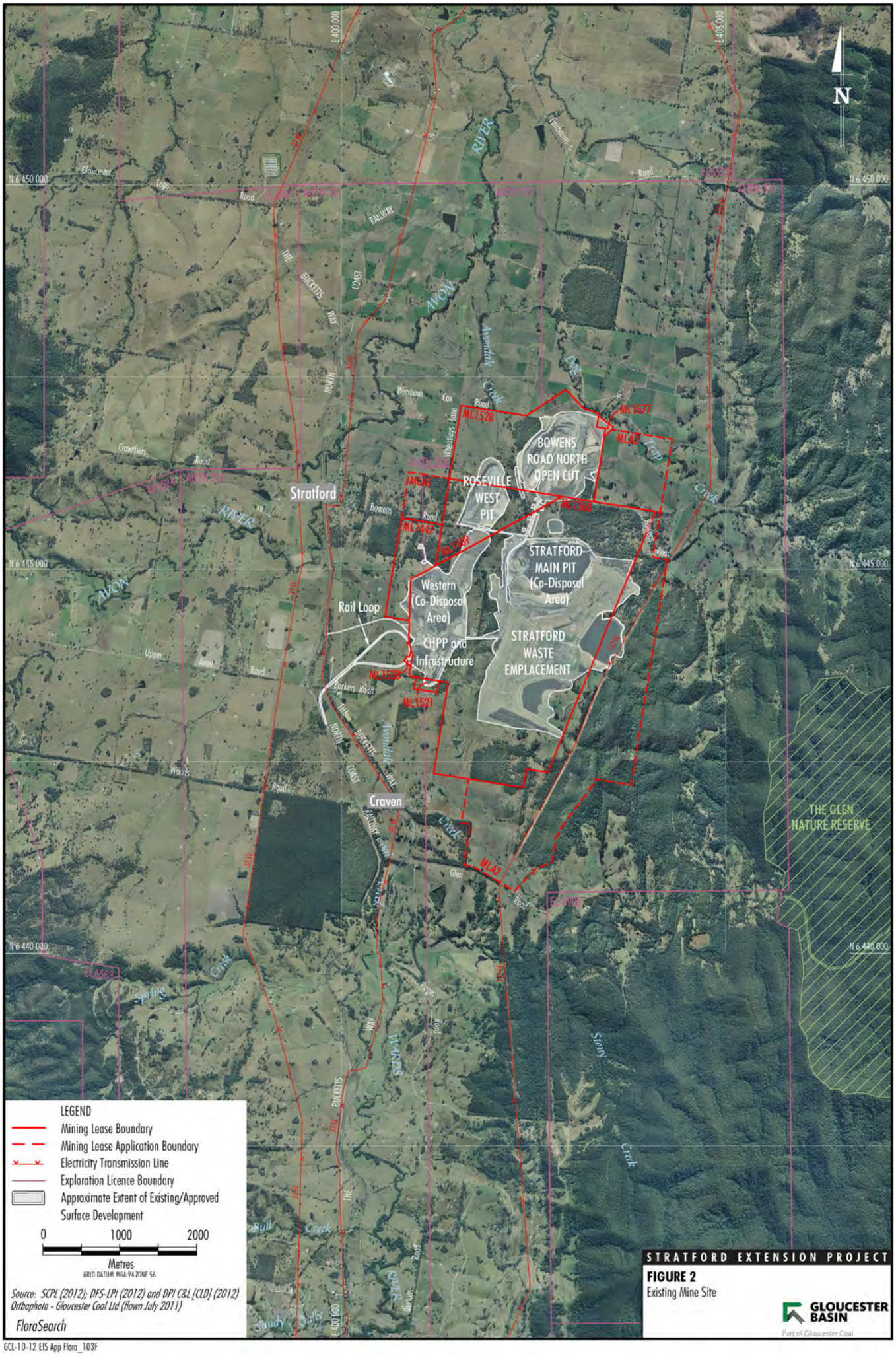

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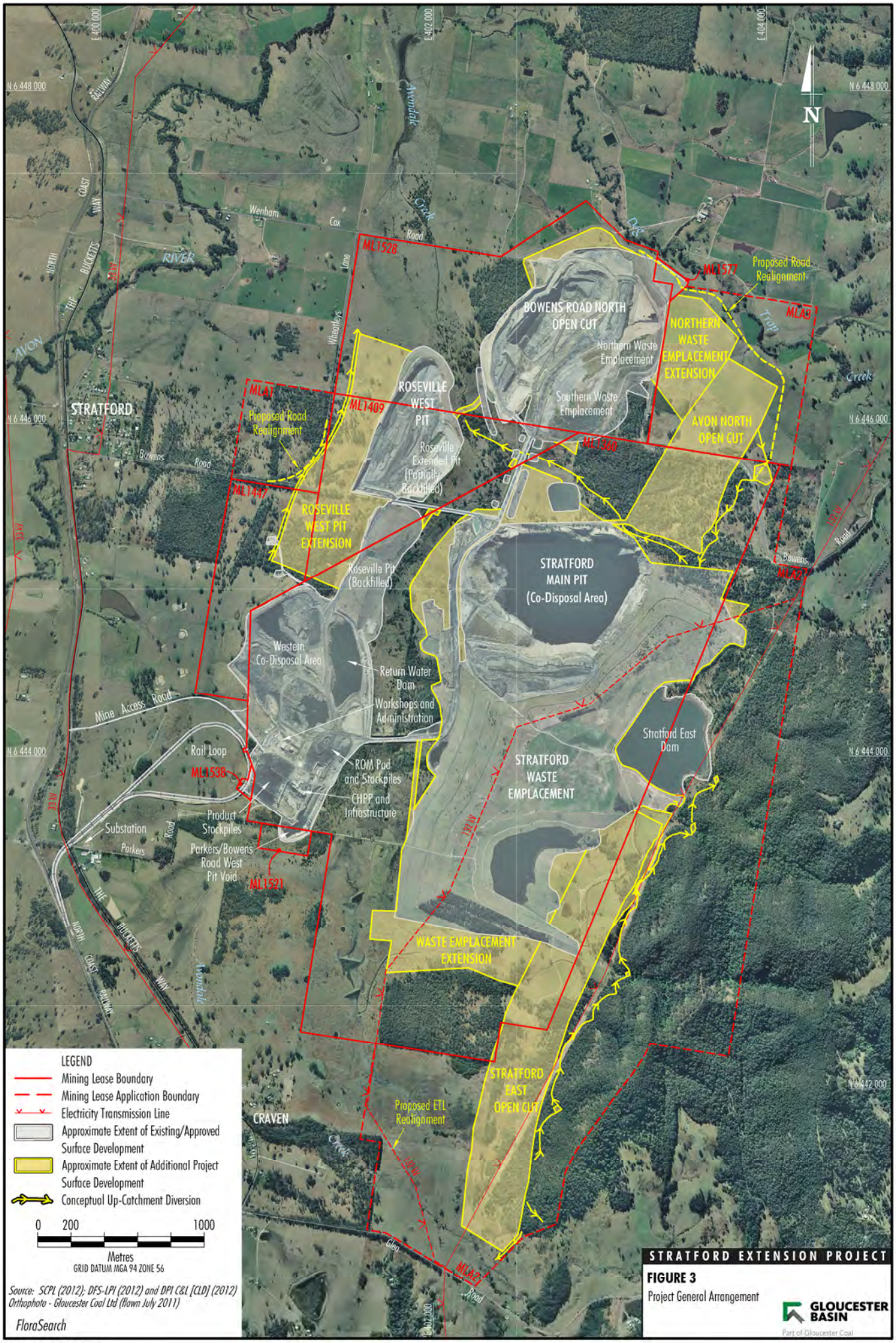


GCL-10-12 EIS App Flora_102H

The Project is a proposed extension of open cut mining operations at the Stratford Mining Complex for an additional operational life of approximately 11 years.

1.1 ASSESSMENT OBJECTIVES

The objectives of the assessment are to:

- describe the natural vegetation within the Project area and surrounds;
- map the vegetation communities and vegetation types present within the Project area and surrounds;
- compile comprehensive plant species lists for each vegetation community within the Project area and surrounds;
- develop a list of threatened plant species, populations, communities or critical habitat, listed in the schedules of the NSW *Threatened Species Conservation Act, 1995* (TSC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act*, *1999* (EPBC Act), those considered to be Rare or Threatened Australian Plants by Briggs and Leigh (1996), that could potentially occur in the Project area;
- identify the magnitude, nature and significance of impacts from the Project on flora species including threatened species, populations and ecological communities listed under the TSC Act and the EPBC Act; and
- present impact avoidance, mitigation and offsets measures to minimise impacts on flora.

1.2 REGIONAL SETTING

The Project area is within the Hunter-Central Rivers Catchment Management Authority (CMA) Region. The Project area lies in the hinterland of the NSW Lower North Coast region close to the catchment divide between the Karuah and Manning River Valleys (Figure 2). It lies in the catchment of the Avon River which flows north into the Gloucester River and then the Manning River, before entering the Pacific Ocean near Taree. The Avon River rises in rugged forested terrain to the west of the Project area in Avon River State Forest and Running Creek Nature Reserve where the altitude reaches 950 metres (m) Australian Height Datum (AHD) at Terrible Billy. Avon River State Forest and the adjoining Chichester State Forest form the eastern foothills of the Barrington Plateau, much of which comprises Barrington Tops National Park, with altitudes reaching more than 1,500 m AHD. The Barrington Plateau is a volcanic lava field formed some 16 million years ago.

Forested and dissected terrain also occurs to the east of the Project area, but with lower altitudes (to 450 m AHD) than to the west. The Glen Nature Reserve is situated approximately 2 km east of the Project area (Figure 2). The land north of the Project area is predominantly cleared farming country in broad river valleys formed by the confluence of the Avon, Gloucester and Barrington Rivers near the town of Gloucester. Less than a kilometre south of the Project area is the low catchment divide to the valley of the southward flowing Wards River which joins the Karuah River before emptying into Port Stephens. The Wards River Valley is relatively narrow between steep forested hills.

1.3 BIOGEOGRAPHICAL AND BOTANICAL REGIONS

The Project area lies in the south of both the North Coast Botanical Division of NSW (Anderson, 1968) and the NSW North Coast Bioregion (Thackway and Cresswell, 1995). The North Coast Bioregion runs up the east coast of NSW from just north of Newcastle to just inside the Queensland border. The NSW portion is 5,692,351.6 hectares (ha) or 96.1 percent (%) of the bioregion and 7.11% of the state (NSW Office of Environment and Heritage [OEH], 2011a). The Tweed, Richmond, Clarence, Coffs Harbour, Bellinger, Nambucca, Macleay, Hastings and Manning River catchments all fall in the North Coast Bioregion (OEH, 2011a). In NSW, the North Coast Botanical Division of NSW runs along the east coast from south of Newcastle to the Queensland border (Royal Botanical Gardens and Domain Trust, 2011a).

1.4 DESCRIPTION OF THE PROJECT AREA AND SURROUNDS

1.4.1 Topography

The majority of the Project area is on gently undulating terrain at elevations between approximately 120 m AHD in the north and 150 m AHD in the south. The exception is the eastern margin of the site which comprises the steeper eastern slopes of flanking wooded range with elevations in excess of 200 m AHD.

1.4.2 Geology and Soils

The Project exploits Permian Coal Measures that developed in the axis of the Stroud-Gloucester Syncline, a trough resulting from folding of the underlying Carboniferous sediments. The Stroud-Gloucester Syncline is a long shallow formation flanked on both sides by rugged outcropping of erosion-resistant early Permian Alum Mountain Volcanics, comprising tuffs, mudstones and acid volcanics. To the east of the Alum Mountain Volcanics, the dominant rocks of the wooded range to the east of the Project area are carboniferous sediments including lithic sandstone, conglomerates and mudstone, and some porphyritic rhylolites and volcanic breccias (Henderson, 2000).

The broad soil types of the study area are summarised in Table 1. The dominant soils are derived from the Permian sediments of the Gloucester Coal Measures that underlie much of the study area (Henderson, 2000). However, the eastern margin of the study area has colluvial soils on steep terrain derived from the Alum Mountain Volcanics and, further east, from Carboniferous sediments (Henderson, 2000).

Floodplains occur only outside the northern extremities of the study area on the Avon River and Dog Trap Creek. These floodplains are no longer considered to be active owing to declines in water volumes over geological time, and are designated as part of the Gloucester Stagnant Alluvial Soil Landscape (Henderson, 2000). The soils of the watercourses within the main parts of the study area, Avondale Creek and tributaries, are characterised as part of the Craven Transferral Soil Landscape and receive sediments from the adjacent low slopes (Henderson, 2000) in the immediate catchment. Importantly, they are not alluvial soils derived from water borne sediments carried over relatively long distances, such as occurs on permanent incised watercourses like the Avon River and Dog Trap Creek. Owing to the low relief of the Avondale Creek catchment, drainage is slow, resulting in seasonally waterlogged, swampy conditions in the drainage lines.

Table 1
Soil Landscapes of the Study Area and their Characteristics

Soil Landscape (SL)	Geology	Landscape Position	Topsoil	Subsoil	Soil Properties	Vegetation Formation
Gloucester Erosional SL	Gloucester Coal Measures	Undulating low hills on broad valley floor. Widespread in elevated positions on the valley floor.	A1 – Brownish black weakly structured loam. A2 – Hardsetting bleached loam.	B (top) – Brown strong prismatic clay. B (deep) – Grey mottled clay.	Low fertility, neutral to strongly acidic, seasonal waterlogging (lower slopes), moderately well-draining.	Cleared
Stroud Road Erosional SL	Permian Alum Mountain Volcanics (includes sedimentary series as well as volcanics)	Rolling to undulating low hills on the northern footslopes of the wooded range on the east side of the study area.	Soils variable depending on substrate material.	Soils variable depending on substrate material.	Soils variable depending on substrate material. Fertility varies from low to high, pH is generally neutral to slightly acid, localised seasonal hardsetting, some soils organic.	Tall open forest
Wards River Erosional SL	Gloucester Coal Measures	Rolling hills and steeper footslopes of the wooded range on the eastern side of the study area.	A1 – Brownish black earthy loam. A2 – Brown hardsetting, bleached loam.	B – Brown prismatic clay. B – Yellow prismatic clay.	Low to very low fertility, strongly to extremely acid, highly erodible and seasonally hardsetting, water repellent, locally saline, locally organic, moderately deep, and well to imperfectly draining.	Semi-cleared tall open forest
Gloucester Buckets Colluvial SL	Permian Alum Mountain Volcanics	Rolling to very steep hills on the western margin of the wooded range on the east side of the study area.	A1 – Dark, weakly structured loam/dark friable clay loam. A2 – Bleached earthy loam.	C – Gravelly brown earthy loam.	Very low fertility, shallow to moderately deep, high gravel and stone content, slightly to strongly acid, low water holding capacity, moderate to high erodibility.	Tall open forest
Linger and Die Colluvial SL	Carboniferous sediments and some acid volcanics	Steep to very steep hills of the wooded range on the eastern margin of the study area.	A1 – Weakly structured brownish black loam. A2 – Gravelly bleached loam	B – Mottled grey sandy clay.	Stony, very low fertility, slightly to moderately to very strongly acid, highly erodible.	Tall open forest
Craven Transferral SL	Quarternary deposits derived from adjacent slopes of the Permian Gloucester coal Measures	Low wide drainage depressions and swamps.	A1 – Brownish black massive loam. A2 – Brown hardsetting, bleached loam	B – Brown prismatic clay. B3 – Pale mottled clay.	Low to very low fertility, seasonally waterlogged, poorly draining, seasonally hardsetting surface, strongly acid. highly erodible, sodic/dispersible soils.	Mostly cleared tall open forest with paperbark understorey
Gloucester River Stagnant Alluvial SL	Quarternary Alluvium derived from Permian sedimentary and volcanic rocks	Broad alluvial plains in the Stroud-Gloucester Basin on the Avon River and the lower end of Dog Trap Creek.	A1 – Brownish black structured loam. P – Black sticky peat. A2 – Bleached, hardsetting loam.	B – Brown mottled silty clay.	Deep, imperfectly drained, permanently high watertables, slightly to locally strongly acid, seasonally hardsetting, high erodibility, locally organic, low fertility subsoils.	Tall open forest

After Henderson (2000).

The gently undulating terrain of the valley floor and the footslopes of the wooded range to the east of the Project area have similar soils derived from the Gloucester Coal Measures (Table 1). These comprise mainly brownish black earthy or weakly structured A1 horizons, hardsetting bleached loam A2 horizons and brown prismatic clay upper B horizons over grey mottled clay or yellow prismatic clay. The soils are of low fertility and tend to be acidic, highly erodible, mostly well-drained and hardsetting. The steeper slopes of the wooded range on the eastern margins of the study area have shallow to moderately deep soils derived from Permian Alum Mountain Volcanics with high stone and gravel contents, low fertility, low water holding capacity, moderate to high erodibility and may be strongly acidic (Henderson, 2000).

1.4.3 Land Use

Depression of the landscape within the trough of the Stroud-Gloucester Syncline provided an important road, rail and powerline (132 kV) corridor from the Hunter Valley to the north coast through the otherwise rugged terrain. The presence of the North Coast Railway line facilitated the establishment of a string of small villages, including Stratford, along the length of the valley.

The generally flat terrain of the valley floor coupled with moist, deep, relatively fertile soils was recognised as being suitable for agriculture from as early as 1826 (Gloucester Shire Council, 2011). Traditionally, the district has been used for dairying and beef production, and remnants of former dairy infrastructure are present within the Project area. There is also evidence of previous pasture improvement associated with milk production, particularly the Kikuyu (*Pennisetum clandestinum*) dominated pastures in many paddocks. Although the dairy industry within the valley has declined in recent years, it remains significant in the region (Gloucester Shire Council, 2011.). Most former dairy land has converted to beef production.

Logging of native forests for timber has also been an important industry in the region historically and still accounts for about ten percent of the local economy (Gloucester Shire Council, 2011). Large old stumps of logged trees are present in the hills lining the east side of the Project area. There is also a trend for land in the Project area surrounds to be subdivided for rural lifestyle blocks, especially on the more rugged foothills and in the secluded valleys of the flanking ranges.

1.4.4 Surface Hydrology

The predominant gently sloping terrain of the Project area and dense cover of ground vegetation has resulted in slow or impeded drainage of much of the landscape. Consequently, depositional rather than erosive conditions have prevailed with little evidence of incision in the broad shallow gullies draining into Avondale Creek. Rather, the drainage lines are swampy, remaining wet for long periods.

The incised section of Avondale Creek north of Bowens Road appears to be an exception which is understood to have been excavated by a former land owner to facilitate drainage. It is likely the area would have been level and swampy prior to excavation. In contrast, Dog Trap Creek is naturally deeply incised.

Some parts of Avondale Creek currently support permanent wetlands in the area between Bowens Road and Parkers Road, and immediately south of Parkers Road. These wetlands are considered unlikely to be natural. Rather, they are the result of low level damming by elevated earthworks associated with road construction across the swampy ground. This is supported by notes in the hydrology section of the *Stratford Coal Project: Environmental Impact Statement* (EIS) (AGC Woodward-Clyde, 1994) in which no mention is made of a wetland in the Bowens Road-Parkers Road area. Rather, reference is made to 'Avondale Swamp' which was said to occur on Avondale Creek north of Wenhams Cox Road. However, no swamp is noted at this point, or within the Project area, on the NSW Department of Lands 1:25 000 Gloucester topographic map (9233-1N, 2nd edition 2007).

1.4.5 Climate

The Project area is situated some 50 km inland from the coastline. Long-term meteorological data for the region is available from Commonwealth Bureau of Meteorology (BoM) meteorological stations and is summarised in Table 2.

With records dating back to 1888, the long-term average annual rainfall recorded at the Gloucester Post Office (60015), located approximately 14 km north of the Project, is 983 millimetres (mm) (Table 2). Closer to the Project, rainfall records at Craven (Longview) (60042) since 1961 and Gloucester (Hiawatha) (60112) since 1976 indicate the average annual rainfall is 1,057 mm and 1,021 mm, respectively (Table 2). The months with the highest monthly-average rainfalls at the Gloucester Post Office, Craven (Longview) and Gloucester (Hiawatha) meteorological stations are February and March (121.7 mm and 127.9 mm, 136.8 mm and 133.9 mm, and 131.7 and 124.1 mm, respectively) (Table 2).

It is likely that Stratford has higher evaporation than Chichester Dam due to its lower altitude (120 to 150 m AHD), which, coupled with the lower rainfall suggests a drier environment. Evaporation records are available from the Chichester Dam (61151), Taree Airport Automated Weather Station (AWS) (60141) and Paterson (Tocal) AWS (61250) meteorological stations, which have recorded average annual evaporation of approximately 1,059 mm, 1,607 mm and 1,571 mm, respectively (Table 2). The highest monthly average evaporation for Chichester Dam, Taree Airport AWS and Paterson (Tocal) AWS is in December (151.9 mm, 201.5 mm and 210.8 mm, respectively) and the lowest monthly average evaporation is in June (33 mm, 66 mm and 63 mm, respectively) (Table 2).

The closest BoM meteorological stations to the Project recording temperature data are located at Chichester Dam and Dungog Post Office (BoM, 2011). Long-term, monthly-average daily maximum and minimum temperatures from Chichester Dam and Dungog Post Office meteorological stations show that temperatures are warmest from November to February and coolest in the winter months of June, July and August (Table 2). Monthly-average daily maximum temperatures at the Dungog Post Office are highest in January (34.0 degrees Celsius [ºC]) and monthly-average daily minimum temperatures are lowest in July (0.3ºC) (Table 2).

Table 2
Meteorological Summary – Average Temperature, Rainfall and Evaporation

Period of Record	Average Daily Temperature (ºC) [1] (Minimum-Maximum)		Average Monthly Rainfall (mm) [2]					Average Monthly Evaporation (mm) [3]		
	Chichester Dam (61151)	Dungog Post Office (61017)	Data Drill Sequence [4]	Gloucester Post Office (60015) [1]	Craven (Longview) (60042) [1]	Gloucester (Hiawatha) (60112) [1]	Stratford Mining Complex AWS [2,5]	Chichester Dam (61151) [1]	Taree Airport AWS (60141) [1]	Paterson (Tocal) AWS (61250) [1]
	1938 to 1956	1966 to 1975	1889 to 2011	1888 to 2011	1961 to 2011	1976 to 2011	1996 to 2011	1942 to 2011	1999 to 2011	1967 to 2011
January	13.7-30.1	15.7-34.0	121.6	114.8	125.3	113.3	99.6	139.5	201.5	192.2
February	13.8-29.8	15.5-31.1	129.3	121.7	136.8	131.7	111.1	110.2	155.4	149.7
March	13.1-26.2	13.1-29.3	134.6	127.9	133.9	124.1	107.9	93.0	148.8	130.2
April	2.8-23.3	7.6-27.4	88.3	77.3	85.2	83.8	71.1	69.0	105.0	99.0
May	0.8-21.0	6.1-23.6	78.1	68.6	88.3	81.4	72.1	46.5	83.7	74.4
June	4.4-17.4	2.6-19.8	79.9	68.4	79.2	60.4	79.2	33.0	66.0	63.0
July	4.4-15.9	0.3-20.2	58.9	51.4	40.3	39.9	51.0	40.3	74.4	74.4
August	4.9-20.5	3.7-20.8	53.1	46.6	44.3	36.1	36.6	58.9	99.2	105.4
September	6.8-21.8	5.9-25.2	55.9	51.2	47.4	44.5	42.8	87.0	138.0	132.0
October	7.8-23.9	7.5-28.0	73.9	69.2	79.3	68.5	70.6	108.5	158.1	161.2
November	12.3-28.7	10.8-31.4	85.6	83.9	91.8	102.4	106.1	123.0	162.0	174.0
December	14.4-30.7	11.2-31.3	108.1	104.4	98.5	101.7	78.7	151.9	201.5	210.8
Annual Average	***11.0-21.9***	***10.3-24.8***	***1,067***	***983***	***1,057***	***1,021***	***924***	***1,059***	***1,607***	***1,571***

1 Source: BoM (2011).

2 Source: After Gilbert & Associates (2012).

3 As measured by Class A Evaporation Pan.

4 Data Drill located at 32.15ºS, 151.95ºE – located to the south-west of Mining Lease 1360 at the Stratford Mining Complex. The Data Drill sequence is a continuous, synthetic record based on interpolation of data from nearby sites.

5 Records missing for periods: 12 March 2001 to 31 December 2001; 10 February 2005 to 25 March 2005; 7 November 2005 to 30 November 2005; and 17 January 2008 to 13 February 2008.

1.5 LITERATURE REVIEW

1.5.1 Regional Flora Surveys

Broad scale classification and mapping of NSW Lower North Coast vegetation was conducted for the Comprehensive Regional Assessments (NSW National Parks and Wildlife Service [NPWS], 1999). This study identified 157 forest ecosystems between the Hunter Valley, the New England Highway and the Queensland border on the NSW North Coast and Northern Tablelands (NPWS, 1999). However, the mapping output from the Project varies considerably in the accuracy and detail of its coverage (NPWS, 2001). Within the study area, the coverage is based on predictions of vegetation types from Geographic Information System (GIS) modelling and has relatively low reliability. However, the mapping is much more detailed for The Glen Nature Reserve to the east of the study area (NPWS, 2001). The potential vegetation types listed in Table 3 for the study area include communities mapped for The Glen Nature Reserve in addition to those mapped more broadly across the study area by NPWS (2001).

The Biometric Vegetation Types Database (NSW Department of Environment, Climate Change and Water [DECCW], 2008) compiles lists of vegetation types according to the CMA area in which they occur. The study area lies within the Hunter-Central Rivers CMA area. Some 166 vegetation types are listed by DECCW (2008a) within this area which includes a diverse range of landscapes and habitats. Only a small proportion of these vegetation types are likely to occur within the study area. The vegetation types with most potential to occur on the study area and surrounds are shown in Table 3. The vegetation types identified by previous studies on the Project area do not all appear to have equivalents in DECCW (2008a) (Table 3), and some that have been listed in Table 3 as the nearest equivalents may have significant floristic differences to vegetation communities on the study area.

1.5.2 Flora and Vegetation Surveys Conducted for the Stratford Mine

AGC Woodward-Clyde (1994) conducted flora surveys and vegetation mapping for the *Stratford Coal Project: Environmental Impact Statement*. This study divided the vegetation on the Project area into ten structural mapping units (Table 4). Brief accounts of the floristics were given for each mapping unit including the dominant species and associated shrub and ground layer species where present. A flora list of 130 species included none that are listed as threatened under the TSC or EPBC Acts.

Dowling (2001) recognised four vegetation units in the BRNOC area between Wenhams Cox Road and Bowens Road. As for AGC Woodward-Clyde (1994), these were landscape/structural units rather than vegetation types based on floristic analysis. The units are cleared grazing land, dry sclerophyll woodland, riparian vegetation and heathland. Descriptions of the condition and floristics are given for each unit. Dowling (2001) provided a flora species list comprising 103 species, none of which is listed as threatened.

Table 3
Native Forest Types Previously Identified within the NSW Lower North Coast

	CRA Map (NPWS, 2001)/RN17 (Forestry Commission of NSW, 1989)		Vegetation Types (DECCW, 2008)	
Formation	**Community Name**	**Scientific Names**	**Community Name**	**Scientific Names**
Rainforests	Rainforest	-	Giant Stinging Tree – Fig dry subtropical rainforest of the North Coast and Brigalow Belt South	*Dendrocnide excelsa, Ficus coronata, F. obliqua, Doryphora sassafras*
	-	-	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin.	*Backhousia sciadophora, Dendrocnide excelsa, Drypetes deplanchei*
	-	-	Weeping Lilly Pilly – Water Gum Riparian Rainforest of the southern North Coast	*Waterhousea floribunda, Tristaniopsis laurina, Neolitsea dealbata*
	Booyong/Viney Scrub	*Heritiera actinophylla*	Black Booyong – Rosewood – Yellow Carabeen subtropical rainforest of the North Coast	*Heritiera actinophylla, Dysoxylum fraserianum, Sloanea woollsii*
	Rainforest with eucalypt emergents	-	Brush Box – Tallowwood – Sydney Blue Gum tall moist forest of the ranges of the central North Coast	*Lophostemon confertus, Eucalyptus microcorys, E. saligna*
Wet Sclerophyll Forests	Brush Box	*L. confertus*	Brush Box – Turpentine shrubby open forest of the coastal ranges of the North Coast	*L. confertus, Syncarpia glomulifera*
	Sydney Blue Gum	*E. saligna*	Sydney Blue Gum – White Mahogany shrubby tall open forest of coastal ranges of the southern North Coast	*E. saligna, E. acmenoides, E. tereticornis*
	Sydney Blue Gum/Brush Box	*E. saligna/L. confertus*	Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast	*E. microcorys, L. confertus, E. saligna*
	-	-	Small-fruited Grey Gum – Tallowwood shrubby open forest on coastal foothills of the southern North Coast	*E. propinqua, E. microcorys, S. glomulifera, E. carnea, E. acmenoides*
	Narrow-leaved White Mahogany – Red Mahogany – Grey Ironbark – Grey Gum	*E. acmenoides – E. Resinifera – E.paniculata – E. punctata*	-	-
	Eastern Red Gums	*E. amplifolia*	Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands	*E. amplifolia, E. moluccana, E. tereticornis*
Semi-mesic Grassy Forests	Spotted Gum-Ironbark/Grey Gum	*Corymbia maculate – E. paniculata/ E. punctata*	Spotted Gum – Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, North Coast	*C. maculata, E. paniculata, E. umbra, E. punctata, Angophora costata*
	Forest Red Gum – Grey Gum/Grey Ironbark – Rough-barked Apple	*E. tereticornis – E.punctata/ E. paniculata – Angophora floribunda*	Grey Box – Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast	*E. moluccana, E. tereticornis, E. siderophloia, E propinqua*
	Grey Gum – Grey Ironbark – White Mahogany	*E.punctata – E. paniculata – E. acmenoides*	-	-
Grassy Dry Sclerophyll Forests	Grey Box – Ironbark	*E. moluccana – E. crebra*	Grey Box – Narrow-leaved Ironbark shrubby woodland on hills of the Hunter Valley, North Coast and Sydney Basin	*E. moluccana, E. crebra*

Table 4
Vegetation Communities Previously Identified on the Study Area and Equivalent Biometric Vegetation Types

Formation	AGC Woodward-Clyde (1994)		DECCW (2008a)	
	Mapping Unit	**Scientific Name**	**Community Name**	**Scientific Name**
Rainforests	Subtropical rainforest	*Baloghia inophylla, Mallotus philippensis, Dendrocnide excelsa*	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin	*Backhousia sciadophora, Dendrocnide excelsa, Drypetes deplanchei, Backhousia myrtifolia, Lophostemon confertus, Choricarpia leptopetala*
	Riparian forest	*Tristaniopsis laurina, Cryptocarya microneura*	Weeping Lilly Pilly – Water Gum Riparian Rainforest of the southern North Coast	*Waterhousea floribunda, Tristaniopsis laurina, Neolitsea dealbata*
Wet Sclerophyll Forests	Gully vegetation	*Eucalyptus microcorys*	Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast	*E. microcorys, Lophostemon confertus, E. saligna*
	Melaleuca/Eucalyptus open forest	*Melaleuca decora, E. amplifolia*	Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands	*E. amplifolia, E. moluccana, E. tereticornis*
	Melaleuca low open forest	*M. decora*	N/A	-
Dry Sclerophyll Forests	N/A	-	Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast	*Corymbia maculata, E. siderophloia, E. umbra, E. punctata, Angophora costata*
	N/A	-	Grey Box – Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast	*E. moluccana, E. tereticornis, E. siderophloia, E. propinqua*
	Shrubby dry sclerophyll	*E. crebra, E. punctata, E. moluccana, E. globoidea*	N/A	-
	Grassy dry sclerophyll (grazed)			
Cleared Land	Open woodland	*E. crebra, E. moluccana*	Derived Grasslands in Coastal Valleys	*T. australis, Aristida vagans, Cymbopogon refractus*
	Dryland pasture	*Paspalum dilatatum, Cynodon dactylon, Panicum effusum*	N/A	-
	Sedgeland	*Juncus* spp., *Scirpus* spp., *Gahnia* spp.	N/A	-

2 ASSESSMENT METHODS

2.1 SURVEY EFFORT

This assessment is based on results of three flora surveys conducted between 2007 and 2011 that together provide a comprehensive coverage of the study area and the proposed Offset area.

EcoBiological (Attachment A) surveyed most of the study area over three seasons (April to May 2007, August 2008 and February to March 2010) using currently recommended flora survey techniques (NSW Department of Environment and Conservation [DEC], 2004a, OEH, 2011b). The flora surveys recorded 450 flora species on the study area, of which 57 are introduced exotics. Eighty 30 minute random meander searches for threatened flora species were conducted in the vicinity of each quadrat site. No threatened species were recorded on the quadrats, on random meanders or in general movements around the study area.

Australian Museum Business Services (AMBS) (Attachment B) conducted a vegetation survey of the proposed Offset area for this Project in August 2011. The Offset area includes lands to the east, south and west of the Project area (refer to Section 6). The AMBS survey comprised a total of 194 ground survey sites, 130 of which recorded full site floristics and 64 were Rapid Data Points at which the three dominant species are recorded in order of importance within the tree, shrub and ground cover layers. Multivariate analysis of data from the 130 full floristic plots yielded nine native woodland or forest vegetation assemblages. An additional three derived or anthropogenic vegetation types were recognised: derived exotic grassland, eucalyptus plantation and highly cleared valley floor. A total of 421 plant taxa were recorded including 351 native taxa and 70 introduced taxa. This survey is described separately in Attachment B as it does not relate directly to the Project disturbance areas.

Additional flora survey of the study area conducted by FloraSearch is described below. This work examined parts of the study area in more detail and extended the surveys to additional areas necessitated by modifications to Project design.

The level of flora survey for the Project has exceeded the minimum survey effort prescribed in the OEH biodiversity survey guidelines (DEC, 2004a; OEH, 2011b). All surveys used are less than 5 years old.

2.2 FLORA SURVEY METHODS

2.2.1 Flora Quadrats/Rapid Assessment Sampling

A total of 80 standard 20 × 20 m flora quadrat samples were sampled by Ecobiological in the study area (Attachment A). Ten additional standard 20 × 20 m flora quadrat samples were conducted in January (3 quadrats) and April (7 quadrats) 2011 by FloraSearch to provide further floristic information on:

- Vegetation dominated by Cabbage Gum, *Eucalyptus amplifolia* and White Feather Honeymyrtle, *Melaleuca decora*, in order to clarify the status of the community in relation to the *River Flat Eucalypt Forest on Coastal Floodplains* Endangered Ecological Community (EEC) (Section 2.3.3).
- An isolated patch of dry rainforest in a gully draining west from the wooded range to the east.
- Vegetation along the Avon River and Dog Trap Creek.

The location of the flora quadrat samples are mapped on Figure 4. Data collected during the quadrat sampling is provided in Attachment C. In addition, FloraSearch conducted 26 rapid assessment samples (Attachment D) in the north and east of the study area to provide floristic information on the composition of grasslands, patches of Acacia regeneration, riparian vegetation and the disturbed areas in the 132 kV powerline easement. Rapid Assessment Samples are lists of the dominant species in each vegetation layer within a radius of approximately 15 m in typical areas of habitat.

2.2.2 Vegetation Communities and Vegetation Types

Vegetation communities are groups of plant species that commonly associate with each other, through a shared ability to survive and reproduce on certain physical sites under specific climatic conditions. The vegetation communities are sorted via the broad category of vegetation formation.

Mapping units (A and B) are mappable vegetation units that are largely non-native (Map Unit A – Introduced Pasture with Scattered Native Trees) or planted vegetation (Map Unit B – Planted Trees) (Section 3.1).

Vegetation types are the names given to the plant assemblages in a standardised list for vegetation across NSW. As previously mentioned, the Vegetation Types Database (DECCW, 2008) compiles lists of vegetation types according to the CMA area in which they occur.

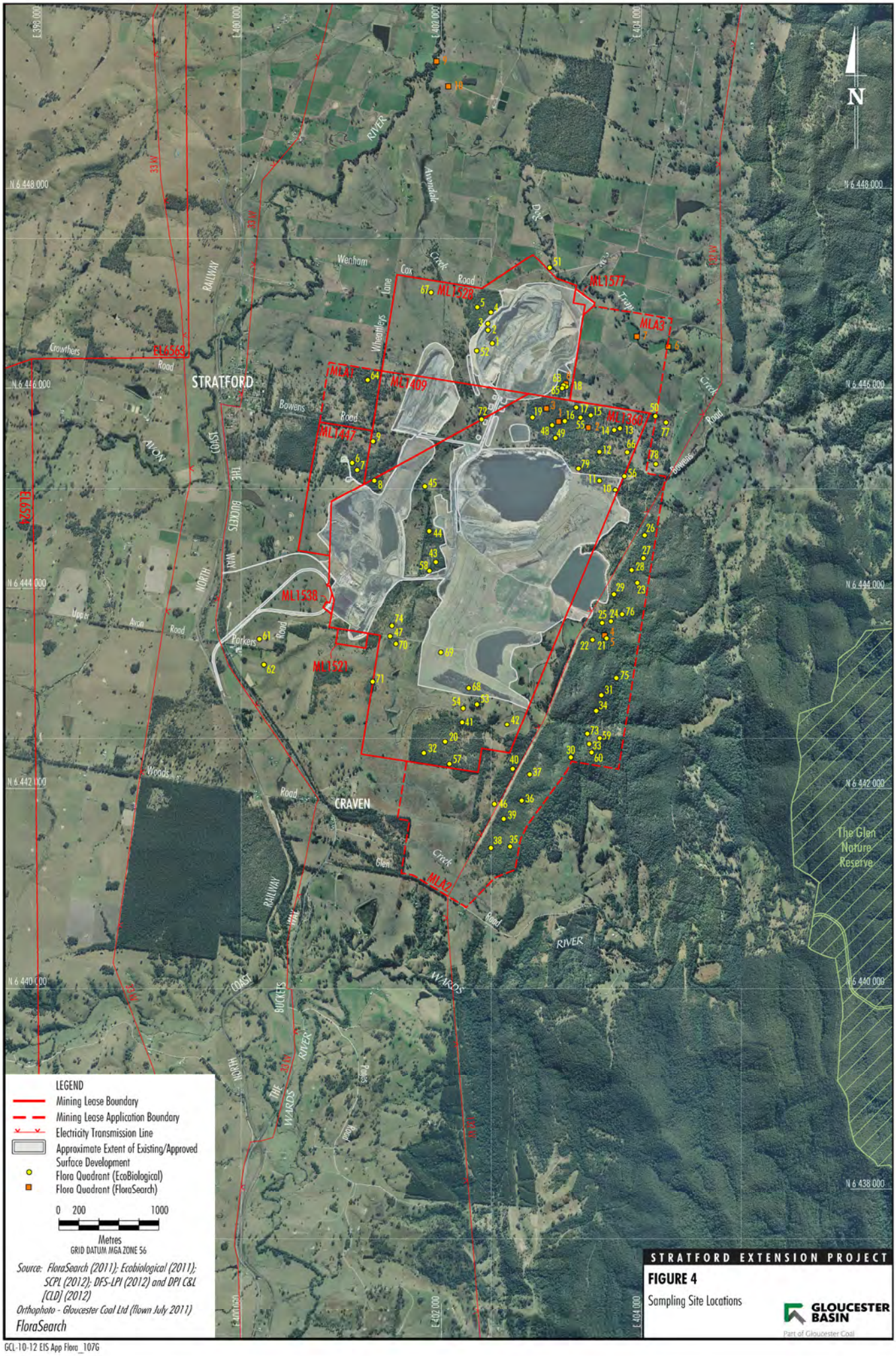
It is a requirement of the OEH (2011c) field survey methods to identify all DECCW (2008a) BioMetric vegetation types in a study area. It is recognised that some vegetation communities will not fit neatly into any of the DECCW (2008a) BioMetric vegetation types listed for a CMA area (e.g. where the vegetation lies in an ecotone between two types). In these cases, professional judgement is used in deciding the appropriate vegetation type (OEH, 2011c).

2.2.3 Vegetation Mapping

Vegetation mapping of the study area was conducted progressively over eight days by FloraSearch along with other field work from 14 to 17 September 2010, and 10 to 13 January 2011. All patches of remnant native forest and woodland on the study area were visited. At each site the dominant trees were recorded along with notes on the shrub and ground cover vegetation layers, and site characteristics including landscape position. In addition, vegetation in areas around the study area was also examined, classified and mapped. Additional mapping and ground truthing took place in conjunction with other work from 12 to 15 and 18 to 21 April 2011. Vegetation communities and vegetation types have been mapped separately.

2.2.4 Species Listing

A comprehensive list of all flora species recorded in all surveys of the study area, including AGC Woodward-Clyde (1994), Dowling (2001), Ecobiological (2011), Australian Museum Business Services (2011) and this current survey is given in Attachment E. Where necessary, changes to the scientific names of species in the reports have been made in accordance with the names currently used on the Royal Botanic Gardens and Domain Trust (2011a) PlantNet website. In addition, the lists have been vetted to remove, as far as possible, incorrect records of species whose known geographical distributions or habitats are remote from the study area.



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2.2.5 Vegetation Condition Assessment

Native vegetation condition varies widely across the Project area and surrounds according to the history of land use. This report aims to broadly describe vegetation condition enabling a general understanding of the variation across the Project area and surrounds. The condition assessment considers the status of key parameters commonly used in vegetation condition monitoring. These are:

- *Disturbance*. Anthropogenic disturbance factors such as land clearing, vegetation thinning, fire roads and tracks, grazing, logging, quarrying, hazard reduction burning and recreation are considered. Natural disturbance factors considered include wildfires, storms and drought.
- *Native vegetation cover*. Broad comparisons are made between the current cover percentages of each vegetation layer and those expected in undisturbed examples of each community.
- *Juveniles*. The presence of juvenile plants of perennial species indicating that successful reproduction is occurring.
- *Exotic flora.* The presence of exotic flora species and their likely impacts on the viability of natural communities.
- *Fragmentation.* The degree to which the original natural vegetation has been broken into small patches isolated from other such patches and/or large undisturbed areas.
- *Overall degradation*. An overall level of degradation is assessed from the degree of disturbance and weed invasion.
- *Resilience*. An assessment is made of the likely ability of the area to naturally regenerate its native vegetation cover, either partially or fully, if degrading influences are removed.

Each of these factors is rated on a scale from 1 to 5: 1 = very low (0 to 10%), 2 = low (10 to 30%), 3 = moderate (30 to 70%), 4 = high (70 to 90%) and 5 = very high (90 to 100%).

2.3 DATABASE REVIEW

Lists of threatened species, populations, ecological communities and critical habitat that are known, or have potential, to occur in the Project area were derived by consulting the following sources in addition to the literature previously described. Database searches were conducted within a 30 × 30 km square centred on the Project area, except for NSW FloraOnline where a circle radius of 25 km was used. The databases were searched twice, in March 2011 and in November 2011, with the same results. Databases searched include the:

- Atlas of NSW Wildlife (OEH, 2011d).
- NSW FloraOnline – Spatial Search (Royal Botanic Gardens and Domain Trust, 2011b).
- Protected Matters Search Tool (Commonwealth Department of Sustainability, Environment, Water, Population and Communities [SEWPaC], 2011).
- Schedules of the TSC Act and the EPBC Act.
- Preliminary and Final Determinations of the NSW Scientific Committee.

2.3.1 Threatened Flora Species

A list of threatened species was developed considering DEC (2004a) and OEH (2011b). Attachment F compiles all threatened flora species listed in the TSC Act and the EPBC Act that were returned by the database searches for the wider region around the study area. Attachment F provides information on the known distribution and habitats of these species and assesses the likelihood of their occurrence within the habitats present on the study area. These considerations identified eight threatened species for assessment, five of which are considered to have a low probability and three a medium probability, of occurring on the study area (Table 5). These species were specifically targeted during the surveys conducted for this study.

Of the threatened species considered to have some potential to occur on the study area, three are trees, one is a climber, two are shrubs, one is a perennial herb and the last is an annual herb (Table 5). The presence of the trees, shrubs and climber can be detected at any time of the year and in any seasonal conditions, although identification is usually easier when flowering or fruiting material is present. It is considered that the survey effort, including quadrats, random meanders and other site inspections, has been adequate for detecting the presence of any occurrences of threatened flora species (if they were to occur).

Table 5
Threatened Flora Species Targeted for Impact Assessment

Family Name	Scientific Name	Conservation Status[1]		Likelihood of Occurrence	Growth Form and Habitat
		TSC Act	EPBC Act		
Apocynaceae	*Cynanchum elegans*	E	E	Medium	Small slender climber, twining stems to 1 m, opposite broad acute leaves, milky sap, oval 6 to 10 centimetres (cm) long seed pod, seeds with silky hairs. Mainly rainforest, but also woodland (OEH, 2011e).
Fabaceae (Caesalpinioideae)	*Senna acclinis*	E	-	Medium	Shrub to 3 m with compound leaves to 15 cm long, each with up to 6 pairs of oval-shaped leaflets. Groups of 2 to 5 golden yellow, cup-shaped flowers hang below branchlets. The flat seed pod is long and narrow, 12 to 15 cm long, 6 to 8 mm wide. Edges of subtropical and dry rainforest on the coast and tablelands (OEH, 2011e).
Myrtaceae	*Eucalyptus glaucina*	V	V	Medium	Tree to 30 m, red gum bark, juvenile leaves ovate, glaucous; adult leaves lanceolate to 18 × 3 cm, green or grey-green, concolorous; umbellasters 7-flowered, buds glaucous; fruit ovoid to globose, to 10×10 mm, disc raised, valves exserted. On deep, fertile soils (OEH, 2011e).
	Melaleuca groveana	V	-	Low	Small tree to 5 m or more; bark fibrous and papery. Leaves narrow-elliptic, to 55 × 8 mm, acute, apiculate, glabrous; spikes to 30 mm with few to many white flowers; fruit 4 to 7 mm diameter, barrel-shaped, sepals non-persistent. Heath in higher areas (OEH, 2011e).
	Syzygium paniculatum	E	V	Low	Small to medium sized rainforest tree that grows to 8 m tall. The leaves are shiny, dark-green above and paler underneath. Plants produce white flower-clusters between November and February. The deep magenta fruits, which may be spherical or egg-shaped, mature in May. It occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities (OEH, 2011e).

Table 5 (Continued)
Threatened Flora Species Targeted for Impact Assessment

Family Name	Scientific Name	Conservation Status[1]		Likelihood of Occurrence	Growth Form and Habitat
		TSC Act	EPBC Act		
Rhamnaceae	*Pomaderris queenslandica*	E	-	Low	Medium-sized shrub 2 to 3m tall with whitish stellate hairy stems; oval to narrow elliptical leaves, 2.5 to 7 cm long and 10 to 25 mm wide, shiny above and woolly below. Clusters of small creamy yellow flowers in spring-summer. Moist eucalypt forest, sheltered shrubby woodlands, and occasionally along creeks (OEH, 2011e).
Rubiaceae	*Asperula asthenes*	V	V	Low	Trailing perennial herb with leaves in whorls of four around the stem. It has tiny white star-shaped flowers and two-lobed fruit, only 1 mm long. Grows in moist near coastal locations, particularly on river banks (OEH, 2011e).
Scrophulariaceae	*Euphrasia arguta*	CE	CE	Low	Annual herb to 35 cm high with densely hairy branches and lobed leaves. Erect racemes of up to 90 white to lilac, 5.5 to 7 mm long flowers are borne at the ends of the branches. Recorded from grassy areas near rivers (Barker, 1992).

[1] Threatened flora species conservation status under the TSC Act and/or EPBC Act (current at 13 March 2012).
V = Vulnerable E = Endangered CE = Critically Endangered.

2.3.2 Threatened Populations

Twenty-four endangered populations are currently (March 2012) listed in Schedule 1 of the TSC Act. None of the populations potentially occur on the Project area.

2.3.3 Threatened Ecological Communities

Seventeen TECs listed in the schedules of the TSC Act are listed for the Hunter-Central Rivers CMA area (DECCW, 2008). Only two of these occur on the NSW North Coast, are not restricted to either near coastal habitats, or to altitudes below 50 m, and therefore have some potential to occur on the study area:

- River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions EEC (the River-flat Eucalypt Forest on Coastal Floodplains EEC).
- Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions VEC.

The River-flat Eucalypt Forest on Coastal Floodplains EEC is considered to have a low likelihood of occurring in the Project area for the following reasons:

- The River-flat Eucalypt Forest on Coastal Floodplains EEC generally occurs below 50 m AHD, but may occur on localised river flats up to 250 m AHD.
- It occurs on coastal floodplains, which are defined as, '*level landform patterns on which there may be active erosion and aggradation by channelled and overbank stream flow with an average recurrence interval of 100 years or less*'. Such landforms do not occur on the study area (Section 1.4.2).

The potential for the River-flat Eucalypt Forest on Coastal Floodplains EEC to occur on the study is further discussed in detail in Section 3.6.1.

The potential for the Lower Hunter Valley Dry Rainforest VEC to occur on the study area is discussed in detail in Section 3.6.2.

The *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Grassland* Critically Endangered Ecological Community was indicated as potentially occurring in the search area by the EPBC Act Protected Matters Search Tool. This community is also listed as Endangered under the TSC Act as the *White Box Yellow Box Blakely's Red Gum Woodland* EEC. However, it is confined to the central and upper Hunter Valley within the Hunter-Central Rivers CMA area, and is not known from the Lower North Coast.

2.3.4 Critical Habitat

No Critical Habitat for flora has been declared on or near the Project area under the TSC Act (OEH, 2011f) or the EPBC Act (SEWPaC, 2011b).

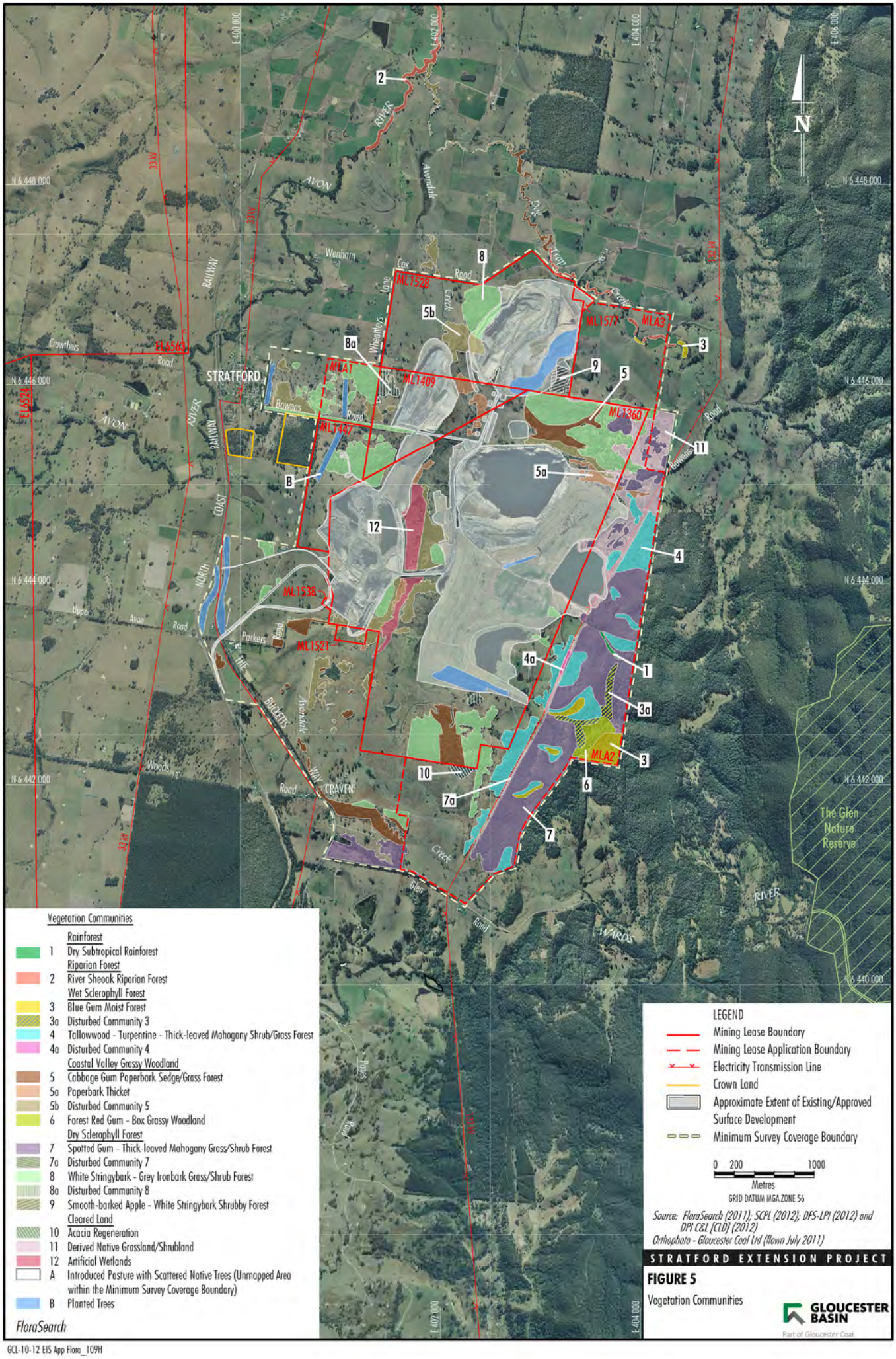
3 RESULTS AND DISCUSSION

3.1 VEGETATION IN THE PROJECT AREA AND SURROUNDS

Fourteen vegetation communities are considered to occur on the study area and immediate surrounds in this report (Table 6, Figure 5). The floristics, landscape setting, soil landscapes and equivalent Biometric Vegetation Types (DECCW, 2008) of each community are given in Tables 7 to 20. Vegetation types identified by FloraSearch and Australian Museum Business Services are mapped on Figure 6.

Table 6
Vegetation Communities Recognised on the Study Area and Nearest Equivalent Vegetation Type

Map unit	Formation	Vegetation Communities		Vegetation Types (DECCW, 2008)	
		Community name	Dominant tree species	Community name	Dominant tree species
1	Rainforest	Dry Subtropical Rainforest	*Dendrocnide excelsa, Backhousia sciadophora, B. myrtifolia, Drypetes deplanchei, Claoxylon australe, Syzygium australe, Dysoxylum fraserianum*	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin	*Backhousia sciadophora, Dendrocnide excelsa, Drypetes deplanchei, Backhousia myrtifolia, Lophostemon confertus, Choricarpia leptopetala*
2	Riparian Forest	River Sheoak Riparian Forest	*Casuarina cunninghamiana, Angophora subvelutina, Callistemon salignus, B. myrtifolia, Acronychia oblongifolia, Duboisia myoporoides*	River Oak riparian woodland of the North Coast and Northern Sydney Basin	*Casuarina cunninghamiana, Angophora subvelutina, Angophora floribunda, Waterhousea floribunda*
3	Wet Sclerophyll Forests	Blue Gum Moist Forest	*Eucalyptus saligna, Lophostemon confertus, E. microcorys*	Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast	*E. microcorys, L. confertus, E. saligna*
3a		Disturbed Community 3			
4		Tallowwood – Turpentine – Thick-leaved Mahogany Shrub/Grass Forest	*E. microcorys, Syncarpia glomulifera, E. carnea, E. siderophloia, E. propinqua, E. globoidea*	Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast	*E. microcorys, E. propinqua, E. siderophloia, E. carnea, S. glomulifera, L. Confertus*
4a		Disturbed Community 4			
5	Coastal Valley Grassy Woodlands	Cabbage Gum Paperbark Sedge/Grass Forest	*E. amplifolia, Angophora subvelutina, E. moluccana, E. tereticornis, Melaleuca linariifolia, M. decora*	Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands	*E. amplifolia, E. moluccana, E. tereticornis*
5a		Paperbark Thicket	*M. linariifolia, M. decora*		
5b		Disturbed Community 5	*E. amplifolia*		
6		Forest Red Gum – Box Grassy Woodland	*E. tereticornis, E. largeana, E. siderophloia, Corymbia maculata*	Grey Box – Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast	*E. moluccana, E. tereticornis, E. siderophloia, E propinqua*
7	Dry Sclerophyll Forests	Spotted Gum – Thick-leaved Mahogany Grass/Shrub Forest	*Corymbia maculata, E. carnea, E. globoidea, E. siderophloia, E. punctata, E. canaliculata, E. moluccana, Angophora costata*	Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast	*Corymbia maculata, E. siderophloia, E. umbra,E. punctata, Angophora costata*
7a		Disturbed Community 7			
8		White Stringybark – Grey Ironbark Grass/Shrub Forest	*E. globoidea, E. paniculata, E. moluccana*		
8a		Disturbed Community 8			
9		Smooth-barked Apple – White Stringybark Shrubby Forest	*Angophora costata, E. globoidea*	N/A	-
10	Cleared Land	Acacia Regeneration	*Acacia longissima*	N/A	-
11		Derived Native Grassland/Shrubland	*Themeda australis, Imperata cylindrica/M. nodosa, Leptospermum polygalifolium*	Derived Grasslands in Coastal Valleys (HU670)	*T. australis, Aristida vagans, Cymbopogon refractus*
12		Artificial Wetlands	*Paspalum distichum, Eleocharis dietrichiana, Carex longebrachiata*	N/A	-
A		Introduced Pasture with Scattered Native Trees	*Paspalum dilatatum, Axonopus fissifolius, Pennisetum clandestinum*	N/A	-
B		Planted Trees	Various local native species	N/A	-



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3.1.1 Rainforest

Table 7
Community 1. Dry Subtropical Rainforest

No. of Quadrats:	3
Landscape Position:	Confined to a single sheltered gully on the western fall of the wooded range on the east side of the study area (Figure 5).
Soil Landscape:	Gloucester Buckets Colluvial Soil Landscape.
General Comments:	The rainforest occurs along a small semi-permanent watercourse and the adjoining lower slopes. Much of the slope on the south side is loose scree of rocks and small boulders. The canopy is dense with tall emergent trees; vines are numerous and the ground cover is dominated by ferns (Plate 1).
Dominant and Characteristic Species	
Trees:	Tall emergent trees are diverse and include Shatterwood (*Backhousia sciadophora*), Brittlewood (*Claoxylon australe*), Black Apple (*Pouteria australis*), Giant Stinging Tree (*Dendrocnide excelsa*), Brush Cherry (*Syzygium australe*), Rosewood (*Dysoxylon fraserianum*), Yellow Tulip (*Drypetes deplanchei*) and Flintwood (*Scolopia braunii*).
Low trees/shrubs:	Low trees and shrubs are also diverse and include: Brown Bolly Gum (*Litsea australis*), Guioa (*Guoia semiglauca*), Acronychia (*Acronychia oblongifolia*), Grey Myrtle (*Backhousia myrtifolia*), Grey Possumwood (*Quintinia verdonii*), Whalebone Tree (*Streblus brunonianus*), Orange Kamala (*Mallotus philippensis*), Sandpaper Fig (*Ficus coronata*), Native Holly (*Alchornea ilicifolia*), Coast Canthium (*Cyclophyllum longipetalum*), Orange Thorn (*Pittosporum multiflorum*), Red Olive-berry (*Elaeodendron australe* var. *australe*), Orange Boxwood (*Denhamia celastroides*) and Snow-wood (*Pararchidendron pruinosum*).
Vines:	This community is characterised by numerous vines. The largest are Water Vine (*Cissus antarctica*), Five-leaved Water Vine (*Cissus hypoglauca*), Long-leaved Water Vine (*Cissus sterculiifolia*), Gum Vine (*Aphanopetalum resinosum*), Common Slikpod (*Parsonsia straminea*) and Burny Vine (*Trophis scandens*).
Creepers:	Creepers include Morinda (*Morinda jasminoides*), Native Yam (*Dioscorea transversa*), Austral Sarsaparilla (*Smilax australis*), Embelia (*Embelia australiana*) and Climbing Panax (*Cephalaralia cephalobotrys*).
Ground Covers:	Ferns are the dominant ground covers and included mainly Creeping Shield Fern (*Lastreopsis microsora* subsp. *microsora*), Black Stem Maidenhair (*Adiantum formosum*), Prickly Rasp Fern (*Doodia aspera*), Horse-shoe Felt Fern (*Pyrrosia confluens*), *Pellaea paradoxa*, Rough Maidenhair Fern (*Adiantum hispidulum*), *Arthropteris tenella*, Bird's Nest Fern (*Asplenium australasicum*) and Jungle Brake (*Pteris umbrosa*). Other ground covers were Settler's Flax (*Gymnostachys anceps*), *Peperomia blanda* var. *floribunda*, *Aneilema biflorum* and *Lomandra spicata*.
Introduced Species:	One prominent introduced species is present, Creeping Crofton Weed (*Ageritina riparia*) in the watercourse.
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 1** – Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin (Figure 6).
Variants:	No known variants.

Plate 1. Community 1, Quadrat 4

3.1.2 Riparian Forest

Table 8
Community 2. River Sheoak Riparian Forest

No. of Quadrats:	3
Landscape Position:	Alluvium in Avon Creek and Dog Trap Creek (Figure 5).
Soil Landscape:	Nominally the Craven Transferral Soil Landscape, however, the habitat of this community is considered more likely to be a restricted alluvial community within the Craven Soil Landscape area as mapped by Henderson (2000).
General Comments:	Community 2 occurs along Avon Creek and Dog Trap Creek entirely within cleared farmland. A narrow band of remnant natural vegetation is associated with the incised watercourses and their steep banks. The flat tops of the creek banks have been cleared for grazing throughout their lengths on the study area. Community 8 comprises aquatic and riparian species with occasional species that would likely have been components of the adjoining terrestrial communities (Plate 2).
Dominant and Characteristic Species	
Trees:	Dominated by River Sheoak (*Casuarina cunninghamiana*) with some Broad-leaved Apple (*Angophora subvelutina*).
Low Trees:	Occasional White Cedar (*Melia azedarach*).
Shrubs:	Tree violet (*Melicytus dentatus*) and White Bottlebrush (*Callistemon salignus*).
Vines:	No vines were recorded.
Creepers:	The main creepers were Slender Grape (*Cayratia clematidea*), Native Raspberry (*Rubus parvifolius*) and Native Wandering Jew (*Commelina cyanea*).
Ground Covers:	A range of native ground cover species persist on the steep banks and in the riparian zone of Dog Trap Creek and the Avon River including Berry Saltbush (*Einadia hastata*), Kidney Weed (*Dichondra repens)*, Twining Glycine (*Glycine clandestina*), Whiteroot (*Pratia purpurascens*), Waterpiper (*Persicaria hydropiper*), Swamp Dock (*Rumex brownii*), *Juncus usitatus*, Spiny-headed Matrush (*Lomandra longifolia*), Couch (*Cynodon dactylon*), Weeping Grass (*Microlaena stipoides*) and Basket Grass (*Oplismenus imbecilis*).
Introduced Species:	Introduced species are common in this community owing to the high levels of disturbance through heavy clearing, the proximity of cleared, pasture-improved paddocks and unrestricted access by stock. These include Moth Vine (*Araujia serifera*), Prairie Grass (*Bromus cartharticus*), Japanese Honeysuckle (*Lonicera japonica*), Narrow-leaved Cottonbush (*Gomphocarpus fruticosus*), Fireweed (*Senecio madascariensis*), Wild Aster (*Aster subulatus*), Great Beggar's Ticks (*Bidens subalternans*), Catsear (*Hypochaeris radicata*), Cobbler's Pegs (*Bidens pilosa*), Spear Thistle (*Cirsium vulgare*), Canadian Fleabane (*Conyza canadensis*), Noogoora Burr (*Xanthium occidentale*), Common chickweed (*Stellaria media*), Paddys Lucerne (*Sida rhombifolia*), Large Leaved Privet (*Ligustrum lucidum*), Small Leaved Privet (*Ligustrum sinense*), Lamb's Tongues (*Plantago lanceolata*), Wild Tobacco Bush (*Solanum mauritianum*), Paspalum (*Paspalum dilatatum*), Kikuyu (*Pennisetum clandestinum*) and Pale Pigeon Grass (*Setaria pumila*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 3** – River Oak riparian woodland of the North Coast and Northern Sydney Basin (Figure 6).
Variants:	No known variants.

Plate 2. Community 2, Avon River, near Quadrat 7

3.1.3 Wet Sclerophyll Forests

Table 9
Community 3. Blue Gum Moist Forest

No. of Quadrats:	4
Landscape Position:	Sheltered south facing slopes and deep gullies of the wooded range to the east (Figure 5).
Soil Landscape :	Gloucester Buckets Colluvial Soil Landscape
General Comments:	
Dominant and Characteristic Species	
Trees:	An emergent canopy of Tallowwood (*Eucalyptus microcorys*), Thick-leaved Mahogany (*Eucalyptus carnea*), Smooth-barked Apple (*Angophora costata*), Red Mahogany (*Eucalyptus resinifera*), Spotted Gum (*Corymbia maculata*) and Brush Box (*Lophostemon confertus*). Trees with rainforest affinities are present below the eucalypts and include Black Plum (*Diospyros australis*), Brittlewood (*Claoxylon australe*), Bolwara (*Eupomatia laurina*), Murrogun (*Cryptocarya microneura*), White Bolly Gum (*Neolitsea dealbata*), Whalebone Tree (*Streblus brunonianus*), Grey Myrtle (*Backhousia myrtifolia*) and Guoia (*Guoia semiglauca*).
Shrubs:	Shrubs comprise rainforest and wet sclerophyll species such as Elderberry Panax (*Polyscias sambucifolia*), Orange bark (*Maytenus silvestris*), Green Wattle (*Acacia irrorata*), Hairy Clerodendrum (*Clerodendrum tomentosum*), Native Rosella (*Hibiscus heterophyllus*), Hairy Pittosporum (*Pittosporum revolutum*), Coffee Bush (*Breynia oblongifolia*) and Orange Thorn (*Pittosporum multiflorum*).
Vines:	Vines are prominent in this community and include Gum Vine (*Aphanopetalum resinosum*), Wonga Wonga Vine (*Pandorea pandorana*), Pearl Vine (*Sarcopetalum harveyanum*), Water Vine (*Cissus antarctica*), Native Yam (*Dioscorea tranversa*) and Lawyer Vine (*Smilax australis*). Creepers include Twining Glycine (*Glycine clandestina*) and Scrambling Lily (*Geitonoplesium cymosum*).
Ground Covers:	The ground cover may be dominated by ferns including Rough Maidenhair Fern (*Adiantum hispidulum*), Sickle Fern (*Pellaea paradoxa*), Prickly Rasp Fern (*Doodia aspera*), Bird's Nest Fern (*Asplenium australasicum*), Rainbow Fern (*Calochlaena dubia*) and Rock Felt Fern (*Pyrrosia rupestris*). Other common ground cover species include Pastel Flower (*Pseuderanthemum variabile*), Spiny-headed Matrush (*Lomandra longifolia*), Birds Nest Fern (*Asplenium australasicum*), Blue Flax-lily (*Dianella caerulea*) and Basket Grass (*Oplismenus imbecilis*).
Introduced Species:	The main introduced species found in this community is Lantana (*Lantana camara*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 4** – Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast (Figure 6)
Variants:	
Community 3a – ***Disturbed Community 3***	
Disturbed occurrences of Community 3 occur in valleys in the wooded range. The trees have been thinned historically, but are regenerating successfully. Few introduced species, other than Lantana, have become established.	

Plate 3. Community 3, near Spot Sample 105

Table 10
Community 4. Tallowwood – Turpentine – Thick-leaved Mahogany Shrub/Grass Forest

No. of Quadrats:	6
Landscape Position:	Better soils on the lower western slopes of the wooded range to the east (Figure 5).
Soil Landscape:	Stroud Road Erosional Soil Landscape and Wards River Erosional Soil Landscape.
General Comments:	
Dominant and Characteristic Species	
Trees:	Tallowwood (*Eucalyptus microcorys*), White Stringybark (*Eucalyptus globoidea*), Thick-leaved Mahogany (*Eucalyptus carnea*), Turpentine (*Syncarpia glomulifera*) and Grey Ironbark (*Eucalyptus siderophloia*). The presence of Tallowwood and Turpentine indicates moister conditions and more fertile soil.
Low Trees:	Forest Oak (*Allocasuarina torulosa*) and Native Cherry (*Exocarpos cupressiformis)*.
Shrubs:	The dominant shrubs are *Pomaderris lanigera*, *viz*. Elderberry Panax (*Polyscias sambucifolia*), Rusty Tick-trefoil (*Desmodium rhytidophyllum*), Prickly Shaggy Pea (*Podolobium ilicifolium*), Long-leaf Wattle (*Acacia longissima*), Prickly Moses (*Acacia ulicifolia*), Woolly Pomaderris (*Pomaderris lanigera*), Coffee bush (*Breynia oblongifolia*), Narrow-leaved Geebung (*Persoonia linearis*) and Large-leaf Hopbush (*Dodonaea triquetra*).
Vines:	The dominant vines are Scented Marsdenia (*Marsdenia suaveolens*) and Wonga Wonga Vine (*Pandorea pandorana*).
Creepers:	The main creepers are Purple Coral Pea (*Hardenbergia violacea*), Slender Tick-trefoil (*Desmodium varians*), Hairy Apple Berry (*Billardiera scandens*), Climbing Guinea flower (*Hibbertia scandens*), Twining Glycine (*Glycine clandestina*), Small-leaf Glycine (*Glycine microphylla*) and Native Raspberry (*Rubus parvifolius*).
Ground Covers:	Prominent species include Poison Rock Fern (*Cheilanthes sieberi*), Bracken Fern (*Pteridium esculentum*), Pastel flower (*Pseuderanthemum variabile*), Wedge Guinea Flower (*Hibbertia diffusa*), Whiteroot (*Pratia purpurascens*), *Opercularia diphylla*, Spiny-headed Mat-rush (*Lomandra longifolia*), Many-flowered Matrush (*Lomandra multiflora*), Blue Flax-lily (*Dianella caerulea*), Three-awn Speargrass (*Aristida vagans*), Wiry Panic (*Entolasia stricta*), Blue-bottle Daisy (*Lagenophora stipitata*), Kidney Weed (*Dichondra repens*), Rough Guinea Flower (*Hibbertia aspera*), Variable-leaved Goodenia (*Goodenia heterophylla* subsp. *heterophylla*), Germander Raspwort (*Gonocarpus teucrioides*), Purple Violet (*Viola betonicifolia*), Pale Vanilla Lily (*Arthropodium milleflorum*), Blue Flax-lily (*Dianella revoluta* var. *revoluta*), Barbwire Grass (*Cymbopogon refractus*), Bordered Panic (*Entolasia marginata*), Blady Grass (*Imperata cylindrica*) and Kangaroo Grass (*Themeda australis*).
Introduced Species:	Introduced species are uncommon in this community except for Lantana (*Lantana camara*) which occurred on most quadrats.
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 6** – Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (Figure 6)
Variants:	
Community 4a – ***Disturbed Community 4***	
Disturbed examples of Community 4 occur below the 132 kV power line in the east of the study area, where the mature trees have been removed in the power line easement and regrowth is regularly cut back close to ground level. The disturbed community has not been significantly invaded by exotic species and comprises mainly dense regrowth of the original vegetation.	

3.1.4 Coastal Valley Grassy Woodlands

Table 11
Community 5. Cabbage Gum Paperbark Sedge/Grass Forest

No. of Quadrats:	14
Landscape Position:	Frequently waterlogged sites on drainage lines and lower slopes on the valley floor (Figure 5).
Soil Landscape:	Craven Transferral Soil Landscape.
General Comments:	
Dominant and Characteristic Species	
Trees:	Cabbage Gum (*Eucalyptus amplifolia*), Broad-leaved Apple (*Angophora subvelutina*), Forest Red Gum (*E. tereticornis*), Tallowwood (*E. microcorys*), White Stringybark (*E. globoidea*) and Coast Grey Box (*E moluccana*).
Low Trees:	A dense subcanopy of White Feather Honeymyrtle (*Melaleuca decora*) and Flax-leaved Paperbark (*M. linariifolia*) is present on undisturbed sites.
Shrubs:	Few shrubs are present and may include scattered Rice flower (*Ozothamnus diosmifolius*), Prickly Moses (*Acacia ulicifolia*), Coffee Bush (*breynia oblongifolia*), Boxthorn (*Bursaria spinosa*) and Slender Rice-flower (*Pimelea linifolia*).
Vines:	Common Silkpod (*Parsonsia straminea*) can be abundant in heavily shaded situations.
Creepers:	Creepers include Native Raspberry (*Rubus parvifolius*), Headache Vine (*Clematis glycinoides*), Slender Tick-trefoil (*Desmodium varians*) and Twining Glycine (*Glycine clandestina*).
Ground Covers:	This community is characterised by a dense ground cover of sedges, forbs and grasses including Indian Pennywort (*Centella asiatica*), a Pennywort (*Hydrocotyle peduncularis*), Yellow Eclipta (*Eclipta platyglossa*), Kidney Weed, (*Dichondra repens*), Polymeria (*Polymeria calycina*), Whiteroot (*Pratia purpurascens*), Ivy-leaved Violet (*Viola hederacea*), Native wandering Jew (*Commelina cyanea*), a Spike-sedge (*Eleocharis dietrichiana*), a Sedge (*Carex longebrachiata*), Common Fringe-sedge (*Fimbristylis dichotoma*), Common Rush (*Juncus* usitatus), Spiny-headed Matrush (*Lomandra longifolia*), Couch (*Cynodon dactylon*), Bordered Panic (*Entolasia marginata*), Tufted Hedgehog Grass (*Echinopogon caespitosus*), Common Lovegrass (*Eragrostis brownii*), Weeping Grass (*Microlaena stipoides*), Blady Grass (*Imperata cylindrica*) and Kangaroo Grass (*Themeda australis*).
Introduced Species:	Common introduced species in this community include the shrub Small-leaved Privet (*Ligustrum sinense*, Narrow-leaved Cotton Bush (*gomphocarpus friticosus*), Spear thistle (*Cirsium vulgare*), Catsear (*Hypochaeris radicata*), Fireweed (*Senecio madascariensis*), Lamb's Tongues (*Plantago lanceolata*), Blackberry (*Rubus fruticosus*), the Purpletops (*Verbena quadrangularis* and *V. bonariensis*), Whiskey Grass (*Andropogon virginicus*), Narrow-leaved Carpet Grass (*Axonopus fissifolius*) and Paspalum (*Paspalum dilatatum*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 8** – Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (Figure 6)
Variants:	
1. Community 5a – ***Paperbark Thicket*** Paperbark Thicket is considered to be a disturbed variant of Community 5 that has lost its cover of trees due to past clearing. Paperbark Thicket occurs principally on drainage lines and swampy flats and has the same diverse ground cover assemblage as described above (Plate 5).	
2. Community 5b – ***Disturbed Community 5*** The disturbed variant of Community 5 is widespread in poorly drained, swampy sites on the study area. It comprises scattered remnant eucalypts and paperbarks over a dense ground cover of primarily introduced grasses, particularly Paspalum (*Paspalum dilatatum*) and Narrow-leaved Carpet Grass (*Axonopus fissifolius*) and native sedges and forbs as described above (Plate 6).	

Plate 4. Community 5, near Quadrat 1

Plate 5. Community 5a, near Quadrat 1

Plate 6. Community 5b, Bowens Road

Table 12
Community 6. Forest Red Gum – Box Grassy Woodland

No. of Quadrats:	3
Landscape Position:	Ridge and associated north and west slopes in the wooded range to the east (Figure 5).
Soil Landscape:	Gloucester Buckets Colluvial Soil Landscape and Linger and Die Colluvial Soil Landscape.
General Comments:	Community 6 occurs on a limited area of suitable soils in the wooded range in the east of the study area. The community has been cleared historically for grazing and much of the remnant area comprises young trees (20+ years old) with scattered mature trees (Plate 7).
Dominant and Characteristic Species	
Trees:	Dominated by Forest Red Gum (*Eucalyptus tereticornis*) and Large-fruited Grey Gum (*Eucalyptus canaliculata*). Small representations of other tree species include Spotted Gum (*Corymbia maculata*), Thick-leaved Mahogany (*Eucalyptus carnea*) and Grey Ironbark (*Eucalyptus siderophloia*).
Low Trees:	Scattered Hickory Wattle (*Acacia* implexa) and Green Wattle (*Acacia irrorata*).
Shrubs:	Scattered Rusty Tick-trefoil (*Desmodium rhytidophyllum*), Dogwood (*Jacksonia scoparia*) and Coffee Bush (*Breynia oblongifolia*).
Vines:	The following two vines were recorded: Wonga Vine (*Pandorea pandorana*) and Five-leaf Water Vine (*Cissus hypoglauca*).
Creepers:	The main creepers are Climbing Guinea Flower (*Hibbertia scandens*), a Glycine (*Glycine tabacina*), Purple Coral Pea (*Hardenbergia violacea*), Old Man's Beard (*Clematis aristata*), Native Raspberry (*Rubus parvifolius*), Trailing Speedwell (*Veronica plebeia*) and Scrambling Lily (*Geitonoplesium cymosum*).
Ground Covers:	A wide range of native ground cover forbs and grasses were recorded, including Poison Rock Fern (*Cheilanthes sieberi*), Blue Trumpet (*Brunoniella australis*), Star Cudweed (*Euchiton involucratus*), Indian Weed (*Sigesbeckia orientalis*), Kidney Weed (*Dichondra repens*), Native Geranium (*Geranium solanderi*), Cockspur Flower (*Plectranthus parviflorus*), Whiteroot (*Pratia purpurascens*), Creeping Oxalis (*Oxalis perennans*), Scented-top Grass (*Capillipedium cymosum*), Blady Grass (*Imperata cylindrica*), Common Lovegrass (*Eragrostis brownii*), Silvertop Wallaby Grass (*Joycea pallida*), Forest Hedgehog Grass (*Echinopogon ovatus*), Bushy Hedgehog Grass (*Echinopogon caespitosus*), Blady Grass (*Imperata cylindrica*), Basket Grass (*Oplismenus imbecillis*), Hairy Panic (*Panicum effusum*) and Kangaroo Grass (*Themeda australis*).
Introduced Species:	Introduced species are common in this community due to previous disturbance and include Crofton Weed (*Ageratina adenophora*), Cobbler's Pegs (*Bidens pilosa*), Spear Thistle (*Cirsium vulgare*), Fireweed (*Senecio madascariensis*), Lantana (*Lantana camara*), Purpletop (*Verbena bonariensis*), *Cyperu brevifolius*, South African Pigeon Grass (*Setaria sphacelata*) and Rhode's Grass (*Chloris gayana*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 9** – Grey Box -– Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast (Figure 6).
Variants:	No known variants.

Plate 7. Community 6, Spot Sample 33

3.1.5 Dry Sclerophyll Forests

Table 13
Community 7. Spotted Gum – Thick-leaved Mahogany Grass/Shrub Forest

No. of Quadrats:	13
Landscape Position:	Drier exposed slopes and ridges of the wooded range to the east (Figure 5).
Soil Landscape:	Wards River Erosional Soil Landscape and Gloucester Buckets Colluvial Soil Landscape.
General Comments:	This community adjoins and grades into Community 3, which could be regarded as a moister variant. However, there are consistent differences between the two types in the overstorey species and many ground cover components.
Dominant and Characteristic Species	
Trees:	Spotted Gum (*Corymbia maculata*), Thick-leaved Mahogany (*Eucalyptus carnea*) and Narrow-leaved Ironbark (*Eucalyptus crebra*).
Low Trees:	Forest Oak (*Allocasuarina torulosa*) is a common sub-canopy dominant. Native Cherry (*Exocarpos cupressiformis*) is scattered, but widespread.
Shrubs:	Shrubs are frequent. The most prominent are Elderberry Panax (*Polyscias sambucifolia*), Slender Tick-trefoil (*Desmodium rhytidophyllum*), Prickly Shaggy Pea (*Podolobium ilicifolium*), Long-leaf Wattle (*Acacia longissima*), Muttonwood (*Myrsine variabilis*), Coffee Bush (*Breynia oblongifolia*), Narrow-leaved Geebung (*Persoonia linearis*) and Woolly Pomaderris (*Pomaderris lanigera*).
Vines:	Scented Marsdenia (*Marsdenia suaveolens*), Wonga Wonga Vine (*Pandorea pandorana*) and Lawyer Vine (*Smilax australis*) are prominent in this community.
Creepers:	Creepers include Climbing Guinea Flower (*Hibbertia scandens*), Purple Coral Pea (*Hardenbergia violacea*), Dogwood (*Jacksonia scoparia*), Slender Tick-trefoil (*Desmodium varians*), Hairy Apple Berry (*Billardiera scandens*) and Native Raspberry (*Rubus parvifolius*).
Ground Covers:	This community has a diverse, moderately dense cover of forbs and grasses including: Poison Rock Fern (*Cheilanthes sieberi* subsp. *sieberi*), Bracken Fern (*Pteridium esculentum*), Pastel flower (*Pseuderanthemum variabile*), Kidney Weed (*Dichondra repens*), the Guinea Flowers (*Hibbertia aspera* and *Hibbertia diffusa*), Whiteroot (*Pratia purpurascens*), *Opercularia diphylla*, Variable Rapier-sedge (*Lepidosperma laterale*), a Matrush (*Lomandra confertifolia* subsp. *rubiginosa*), Matrush (*Lomandra longifolia*), Many-flowered Matrush (*Lomandra multiflora*), Blue Flax-lily (*Dianella caerulea* var. *caerulea*), Three-awn Speargrass (*Aristida vagans*), Barbed Wire Grass (*Cymbopogon refractus*), Wiry Panic (*Entolasia stricta*), Red-anther Wallaby Grass (*Joycea pallida*), Blady Grass (*Imperata cylindrica*) and Kangaroo Grass (*Themeda australis*).
Introduced Species:	Introduced species are uncommon in this community and may include some Lantana (*Lantana camara*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 10** – Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (Figure 6).
Variants:	
Community 7a – *Disturbed Community 7*	
Disturbed examples of Community 7 occur below the 132 kV powerline where the vegetation is pruned periodically to ground level.	

Table 14
Community 8. White Stringybark – Grey Ironbark Grass/Shrub Forest

No. of Quadrats:	16
Landscape Position:	Undulating hills of the valley floor (Figure 5).
Soil Landscape:	Gloucester Erosional Soil Landscape and drier parts of the Craven Transferral Soil Landscape.
General Comments:	
Dominant and Characteristic Species	
Trees:	White Stringybark (*Eucalyptus globoidea*), Grey Ironbark (*Eucalyptus siderophloia*) and Grey Box (*Eucalyptus moluccana*).
Low Trees:	Scattered clumps of White Feather Honeymyrtle (*Melaleuca decora*), Prickly-leaved Paperbark (*Melaleuca nodosa*) and Native Cherry (*Exocarpus cupressiformis*).
Shrubs:	Shrubs are common and may include Rice Flower (*Ozothamnus diosmifolius*), Prickly Beard-heath (*Leucopogon juniperinus*), Gorse Bitter Pea (*Daviesia ulicifolia*), Large Tick Trefoli (*Desmodium rhytidophyllum*), Hairy Bush-pea (*Pultenaea villosa*), Prickly Moses (*Acacia ulicifolia*), Prickly-leaved Paperbark (*Melaleuca nodosa*) and Boxthorn (*Bursaria spinosa*).
Vines:	No vines are prominent in this community.
Creepers:	Creepers include Slender Tick-trefoil (*Desmodium varians*), Purple Coral Pea (*Hardenbergia violacea*), Glycines (*Glycine clandestina* and *Glycine tabacina*) and Hairy Apple Berry (*Billardiera scandens*).
Ground Covers:	This community is characterised by moderate ground cover of forbs and grasses including Poison Rock Fern (*Cheilanthes sieberi* subsp. *sieberi*), Blue Bottle-daisy (*Lagenophora stipitata*), Fuzzweed (*Vittadinia cuneata*), Kidney Weed, (*Dichondra repens*), Whiteroot (*Pratia purpurascens*), *Opercularia diphylla*, Many-flowered Matrush (*Lomandra multiflora*), Blue Flax-lily (*Dianella caerulea* var. *caerulea*), Three-awn Speargrass (*Aristida vagans*), Barbwire Grass (*Cymbopogon refractus*), Wiry Panic (*Entolasia stricta*), Tufted Hedgehog Grass (*Echinopogon caespitosus*), Weeping Grass (*Microlaena stipoides*), Blady Grass (*Imperata cylindrica*) and Kangaroo Grass (*Themeda australis*).
Introduced Species:	Introduced species are generally uncommon in this community and may include Catsear (*Hypochaeris radicata*), Fireweed (*Senecio madascariensis*) and Whiskey Grass (*Andropogon virginicus*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	A variant of **Vegetation Type 10** – Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (Figure 6).
Variants:	
Community 8a – *Disturbed Community 8*	
Patches of Community 8 in the study area all occur on former farmland and have all undergone varying degrees of tree thinning and grazing. The most heavily thinned patches with most undertorey disturbance are mapped as Community 8a.	

Plate 8. Community 8, near Spot Sample 12

Table 15
Community 9. Smooth-barked Apple – White Stringybark Shrubby Forest

No. of Quadrats:	3
Landscape Position:	Sandy shallow soils of hilltops on the valley floor (Figure 5).
Soil Landscape:	Gloucester Erosional Soil Landscape.
General Comments:	Community 9 is most likely a small outlying, depauperate example of vegetation that usually occurs on sandy soils closer to the coast. As a western outlier of a coastal sands community, the occurrence on the Project area has some scientific value (Plate 9). There appear to be no other examples in the immediate region. This community will not be disturbed by the Project.
Dominant and Characteristic Species	
Trees:	White Stringybark (*Eucalyptus globoidea*) and Smooth-barked Apple (*Angophora costata*).
Low Trees:	Scattered White Feather Honeymyrtle (*Melaleuca decora*).
Shrubs:	Shrubs are abundant, diverse and include species commonly found on sandy clay soils. The most prominent are Pill Flower (*Ozothamnus diosmifolius*), Rough Guinea Flower (*Hibbertia aspera*), Prickly Broom-heath (*Monotoca scoparia*), Gorse Bitter Pea (*Daviesia ulicifolia*), Heathy Parrot-pea (*Dillwynia retorta*), Pinnate Wedge Pea (*Gompholobium pinnatum*), Prickly Moses (*Acacia ulicifolia*),Tantoon (*Leptospermum polygalifolium* subsp. *cismontanum*), Slender Tea-tree (*Leptospermum trinervium*), a Honeymyrtle (*Melaleuca decora*), Thyme Spurge (*Phyllanthus hirtellus*), Hairpin Banksia (*Banksia spinulosa* var. *collina*), Narrow-leaved Geebung (*Persoonia linearis*), Slender Rice Flower (*Pimelea linifolia*) and a Grasstree (*Xanthorrhoea glauca*).
Vines:	No vines are prominent in this community.
Creepers:	The main creepers are Devil's Twine (*Cassytha glabella*) and Hairy Apple Berry (*Billardiera scandens*).
Ground Covers:	This community has a relatively sparse ground cover of forbs and grasses including Screw Fern (*Lindsaea linearis*), Variable Goodenia (*Goodenia heterophylla* subsp. *heterophylla*), a Saw Sedge (*Gahnia radula*), Ptilothrix (*Ptilothrix deusta*), Three-awned Speargrass (*Aristida vagans*) and Wiry Panic (*Entolasia stricta*).
Introduced Species:	Introduced species are rare in this community.
Equivalent Biometric Vegetation Type (DECCW, 2008):	
Community 9 is considered to be most similar to the DECCW (2008a) community *Smooth-barked Apple heathy open forest on sands of the North Coast*, which occurs in coastal districts to the east of the study area. The occurrence on the study area may be a small species-poor outlier lacking many of the species normally found in the *Smooth-barked Apple heathy open forest on sands of the North Coast* community, including some of the dominant trees. Mapped as **Vegetation Type 11** – Smooth-barked Apple – White Stringybark Shrubby Forest (Figure 6)**.**	
Variants:	No known variants.

Plate 9. Community 9, Quadrat 8

3.1.6 Cleared Land

Table 16
Community 10. Acacia Regeneration

No. of Quadrats:	N/A
Landscape Position:	Undulating hills of the valley floor (Figure 5).
Soil Landscape:	Gloucester Erosional Soil Landscape.
General Comments:	This vegetation type has a limited occurrence on the study area to the west of the proposed Stratford East Open Pit, with other occurrences within the pit area below the existing 132 kV power line (Plate 10).
Dominant and Characteristic Species	
Trees:	Trees are absent.
Low Trees:	The dominant species is Long-leaf Wattle (*Acacia longissima*), which may form a dense continuous canopy.
Shrubs:	Only Prickly Moses (*Acacia ulicifolia*).
Vines and creepers:	No vines or creepers are present.
Ground Covers:	The main native ground covers are Bracken Fern (*Pteridium esculentum*), Kidney Weed (*Dichondra repens*), Raspwort (*Gonocarpus tetragynus*), Whiteroot (*Pratia purpurascens*), Yellow Autumn Lily (*Tricoryne elatior*) and native grasses including Weeping Grass (*Microlaena stipoides*) and Blady Grass (*Imperata cylindrica*).
Introduced Species:	Common introduced species are Catsear (*Hypochaeris radicata*), Whiskey Grass (*Andropogon virginicus*) and Narrow-leaved Carpet Grass (*Axonopus fissifolius*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	N/A. Mapped as **Vegetation Type 14** – Acacia Regeneration (Figure 6)**.**
Variants:	No known variants.

Plate 10. Community 10, west of Stratford East Open Cut

Table 17
Community 11. Derived Native Grassland/Shrubland

No. of Quadrats:	5
Landscape Position:	Unimproved pastures in semi-cleared and cleared farming areas, mainly on Avondale Creek and in the hilly eastern surrounds of Wenhams Cox Road (Figure 5).
Soil Landscape:	N/A.
General Comments:	This community comprises grazing lands from which the tree and shrub cover has been removed leaving an understorey of native forbs and grasses that has been invaded to varying degrees by introduced species.
Dominant and Characteristic Species	
Trees:	This community is largely treeless.
Low Trees:	None.
Shrubs:	No shrubs behave as dominants.
Vines:	No vines present.
Creepers:	Twining Glycine (*Glycine clandestina*) and Polymeria (*Polymeria calycina*).
Ground Covers:	A range of native forbs and grasses is present. The dominant species are Bracken Fern (*Pteridium esculentum*), Indian Pennywort (*Centella asiatica*), a Pennywort (*Hydrocotyle peduncularis*), the Raspworts (*Gonocarpus tetragynus* and *G. teucrioides*), Whiteroot (*Pratia purpurascens*), Common Fringe-sedge (*Fimbristylis dichotoma*), a Rush (*Juncus continuus*), Bushy Hedgehog Grass (*Echinopogon caespitosus*), Blady Grass (*Imperata cylindrica*) and Kangaroo Grass (*Themeda australis*).
Introduced Species:	Introduced species are relatively common in this community and include Catsear (*Hypochaeris radicata*), Fireweed (*Senecio madagascariensis*), Lamb's Tongues (*Plantago lanceolata*), the Purpletops (*Verbena bonariensis* and *V. rigida*), Whiskey Grass (*Andropogon virginicus*), Paspalum (*Paspalum dilatatum*) and Narrow-leaved Carpet Grass (*Axonopus fissifolius*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	**Vegetation Type 13** – Derived Grasslands in Coastal Valleys (Figure 6).
Variants:	This community varies according to the vegetation communities from which it is derived.

Table 18
Community 12. Artificial Wetlands

No. of Quadrats:	3
Landscape Position:	Farm dams and impounded water on Avondale Creek (Figure 5).
Soil Landscape:	Craven Transferral Soil Landscape.
General Comments:	
Dominant and Characteristic Species	
Trees:	None present.
Low Trees:	Low trees are paperbarks including *Melaleuca decora*, the Flax-leaved Paperbark (*Melaleuca linariifolia*) and the Prickly-leaved Paperbark (*Melaleuca nodosa*).
Shrubs:	None recorded.
Vines and creepers:	None recorded.
Ground covers:	A wide range of native aquatic and semi-aquatic forbs, sedges, rushes and grasses were recorded. Species include: Lesser Joyweed (*Alternanthera denticulata*), Water Primrose (*Ludwigia peploides* subsp. *montevidensis*), Slender Knotweed (*Persicaria decipiens*), Waterpiper (*Persicaria hydropiper*), River Buttercup (*Ranunculus inundatus*), Jointed Twig-rush (*Baumea articulata*), Tall Sedge (*Carex appressa*), *Cyperus difformis*, *Eleocharis dietrichiana*, *Eleocharis sphacelata*, *Schoenoplectus mucronatus*, *Schoenoplectus validus*, Swamp Lily (*Ottelia ovalifolia* subsp. *ovalifolia*), the rushes (*Juncus continuus, J. prismatocarpus* and *J. usitatus*), Woolly Waterlily (*Philydrum lanuginosum*), Water Couch (*Paspalum distichum*) and Broadleaf Cumbungi (*Typha orientalis*).
Introduced Species:	Introduced species are not common in this community and include Curled Dock (*Rumex crispus*), a Sedge (*Cyperus sesquiflorus*) and Paspalum (*Paspalum dilatatum*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	N/A. Mapped as **Vegetation Type 15** – Artificial Wetlands (Figure 6)**.**
Variants:	No known variants.

Table 19
Map Unit A. Introduced Pasture with Scattered Native Trees

No. of Quadrats:	8
Landscape Position:	Throughout the historically more intensively farmed areas (Figure 5).
Soil Landscape:	N/A.
General Comments:	This community comprises the more intensively managed farming areas where pasture improvement has taken place. Such paddocks are dominated by a narrow range of preferred introduced pasture species and weeds (Plate 11).
Dominant and Characteristic Species	
Trees:	This community is largely treeless.
Low Trees:	None.
Shrubs:	Shrubs are absent.
Vines and creepers:	Vines and creepers are absent.
Ground Covers:	The dominant species in the improved pastures are Kikuyu (*Pennisetum clandestinum*), Paspalum (*Paspalum dilatatum*) and White Clover (*Trifolium repens*). Improved pastures tend to be progressively invaded by colonising native species and weedy exotics over time. The main native species recorded in improved pastures on the study area were Common Fringe-sedge (*Fimbristylis dichotoma*), Blady Grass (*Imperata cylindrical*), Couch (*Cynodon dactylon*), Common Rush (*Juncus usitatus*) and Indian Pennywort (*Centella asiatica*).
Introduced Species:	The main exotic weedy species were Catsear (*Hypochaeris radicata*), Flax-leaf Fleabane (*Conyza bonariensis*), Fireweed (*Senecio madascariensis*), Lamb's Tongues (*Plantago lanceolata*), Purpletop (*Verbena bonariensis*), a Sedge (*Cyperus brevifolius*), A Rush (*Juncus cognatus*), Whiskey Grass (*Andropogon virginicus*) and Narrow-leaved Carpet Grass (*Axonopus fissifolius*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	N/A. Cleared land.
Variants:	No known variants.

Plate 11. Map Unit A, west of the proposed Stratford East Open Cut

Table 20
Map Unit B. Planted Trees

No. of Quadrats:	1
Landscape Position:	Undulating hills on the valley floor and on rehabilitated landforms of the Stratford Coal Mine waste rock emplacement (Figure 5).
Soil Landscape:	N/A.
General Comments:	The following description applies to mine rehabilitation land with a low grassy woodland structure.
Dominant and Characteristic Species	
Trees:	Predominantly Large-fruited Grey Gum (*Eucalyptus canaliculata*) with some Tallowwood (*Eucalyptus microcorys*).
Low Trees:	Prickly-leaved Paperbark (*Leptospermum nodosa*) and Green Wattle (*Acacia irrorata*).
Shrubs:	Only Coffee Bush (*Breynia oblongifolia*).
Vines and creepers:	The creeper *Glycine tabacina* was present.
Ground Covers:	Native ground covers included Poison Rock Fern (*Cheilanthes sieberi*), Indian Pennywort (*Centella asiatica*), Kidney Weed (*Dichondra repens*), Whiteroot (*Pratia purpurascens*) and a range of grasses; Red Grass (*Bothriochloa macra*), Couch (*Cynodon dactylon*), Paddock Lovegrass (*Eragrostis leptostachya*), Weeping Grass (*Microlaena stipoides* var. *stipoides*), *Paspalidium distans* and Blady Grass (*Imperata cylindrica*).
Introduced Species:	Cobbler's Pegs (*Bidens pilosa*), Star Cudweed (*Euchiton involucratus*), the Catsears (*Hypochaeris radicata* and *H. glabra*), Common Centaury (*Centaurium erythraea*), Lamb's Tongues (*Plantago lanceolata*), Blackberry (*Rubus fruticosus*), Wild Tobacco Bush (*Solanum mauritianum*), Parramatta Grass (*Sporobolus africanus*) and Paspalum (*Paspalum dilatatum*).
Equivalent Biometric Vegetation Type (DECCW, 2008):	N/A.
Variants:	N/A.

3.1.7 Mine Revegetation

There are three distinct areas of mine rehabilitation at the Stratford Mining Complex:

- Stratford Waste Emplacement revegetation comprising pasture grasses and legumes with selective placement of trees;
- BRNOC Northern and Southern Waste Emplacement revegetation comprising native trees, shrubs and grasses; and
- Stratford Waste Emplacement tree patch (mapped as planted trees on Figure 5).

3.2 FLORA SPECIES

Attachment G summarises the plant species recorded on the study area according to the vegetation communities in which they occur. A total of 510 plant species were identified on the quadrat plots, spot sample sites and random meanders by Ecobiological (2011) and FloraSearch (during the current survey) (Table 21, which is summarised from Attachment G). Of these, 408 (80%) are native to the natural communities of the Project area and surrounds and 102 (20%) are introduced (Table 21). The numbers of species found in each community varied according to the sampling intensity (Table 21). The largest numbers of species were found in Communities 5, 7, and 2 with 171, 154 and 150 species, respectively (Table 21). Because of their area and distribution these communities attracted the largest sampling efforts. Conversely, relatively few species were recorded in communities occupying smaller areas with lower sample numbers.

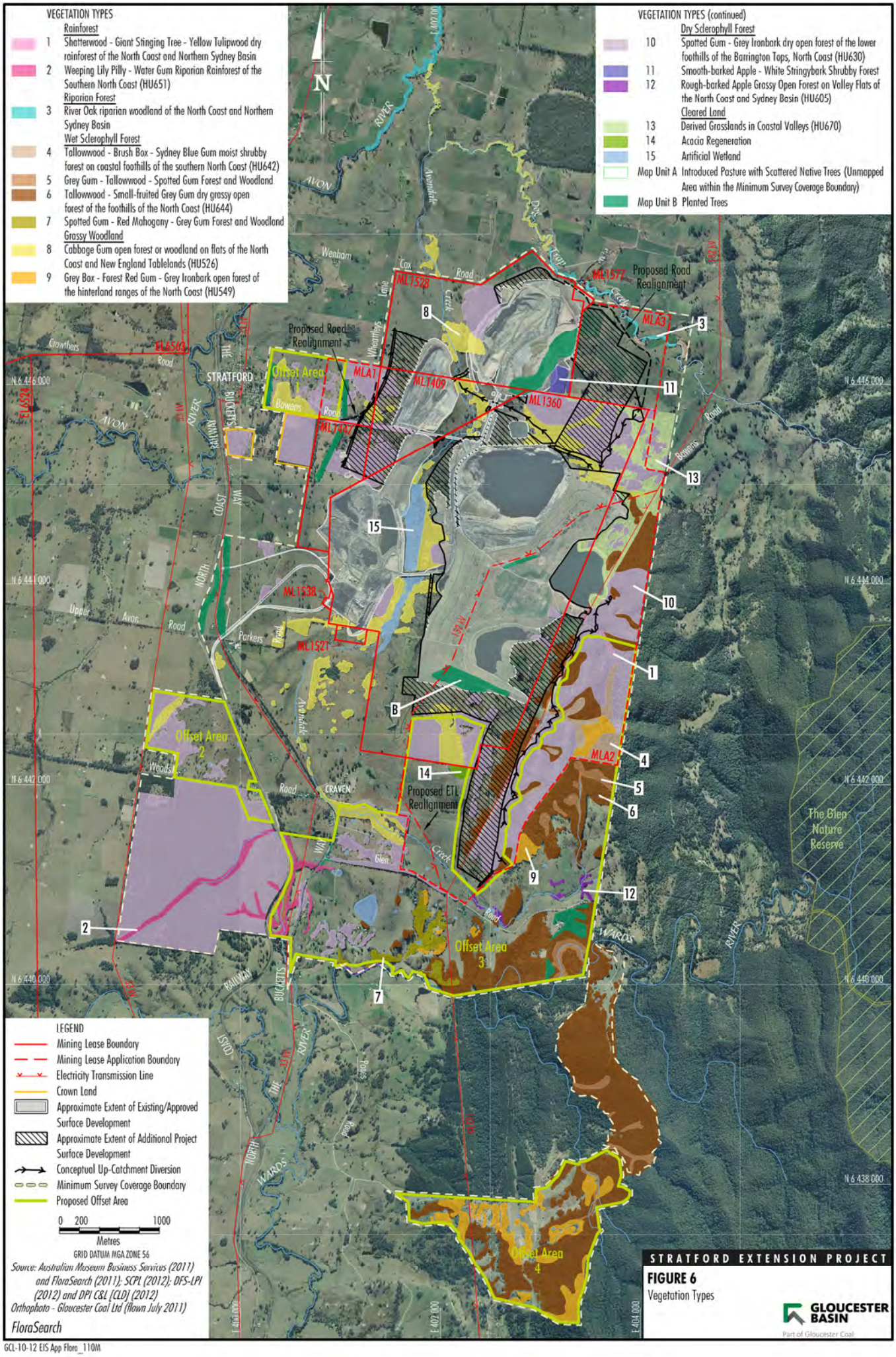

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Table 21
Number of Native and Introduced Flora Species and the Total Number of Species Recorded in each Vegetation Community

Community	Number of Samples[1]	Total Plant Species	Number of Native Species	% Native Species	Number of Introduced Species	% Introduced Species
1	3	99	93	93.9	6	6.1
2	7	150	91	60.7	59	39.3
3	4	127	108	85	19	15
3a	2	59	55	93.2	4	6.8
4	5	95	90	94.7	5	5.3
4a	2	27	26	96.3	1	3.7
5	15	171	133	77.8	38	22.2
5a	1	52	43	82.7	9	17.3
5b	8	115	91	79.1	24	20.9
6	3	91	72	79.1	19	20.9
7	12	154	145	94.2	9	5.8
7a	1	27	22	81.5	5	18.5
8	16	133	116	87.2	17	12.8
8a	1	41	28	68.3	13	31.7
9	4	47	47	100.0	0	0.0
10	1	17	10	58.8	7	41.2
11	9	80	61	76.3	19	23.8
12	3	24	21	87.5	3	12.5
A	18	92	47	51.1	45	48.9
B	1	31	19	61.3	12	38.7
Total	**116**	**510**	**408**	**80**	**102**	**20**

[1] Number of samples includes 90 quadrats and 26 spot samples.

Attachment E is a consolidated species list from all flora surveys conducted on the study area since 1994, including AGC Woodward-Clyde (1994), Dowling (2001), Ecobiological (2011), FloraSearch (during the current survey) and Australian Museum Business Services (2011). This list gives a total of 696 flora species for the study area and surrounds, comprising 564 (81%) native species and 132 (19%) introduced species. The plant families with the highest numbers of native species (Attachment E) were the Grasses, family Poaceae (83 species); the Daisies, Asteraceae (52 species); the Eucalypts and related genera in the family Myrtaceae (49 species); the Rushes and Sedges, Cyperaceae (38 species); the Pea Flowers, subfamily Faboideae (34 species); the Orchids, Orchidaceae (21 species) and the Wattles, subfamily Mimosoideae (17 species). In all, some 121 families of native plants were represented.

3.3 INTRODUCED FLORA SPECIES

Table 21 shows the numbers and percentages of introduced species found on the study area by Ecobiological (2011) and FloraSearch (during the current survey). Overall, the number (102) and percentage (20%) of introduced species (Table 21) is low to moderate, especially since much of the Project area and surrounds is cleared or semi-cleared farmland used for grazing livestock. The numbers and proportions of introduced species vary considerably among the 14 vegetation types identified in this study, from as low as zero in Community 9 to 48.9% in Community A (Table 21). The highest proportion of introduced species, 48.9%, was found in the more intensively grazed improved pasture paddocks of Community A (Table 21). However, even though some 51.1% of the species recorded in Community A are native, their abundance is very low compared to the dominant introduced species.

The proportion of introduced species in each community is generally correlated with the degree of disturbance. The lowest proportions of introduced species (0 to 6%) occurred in Communities 4, 4a, and 7, (Table 21) in the wooded range to the east where the natural vegetation is least disturbed, and in Community 9 which has poor soils that are not conducive to introduced species. Moderate levels of introduced species (10 to 25%) occur in the larger remnant woodland patches that have been grazed in the past and derived native grasslands (Communities 5, 5a, 5b, 8, 11), while higher levels (30 to 45%) occur in riparian systems and acacia regeneration (Communities 2 and 10) (Table 21).

Introduced flora species on the study area belong to 24 plant families (Attachment G); the main ones being the Grasses, Poaceae (23 species), Daisies, Asteraceae (20 species), the Verbenaceae (5 species) and the Pea Flowers, Faboideae (4 species).

On some farm lands owned by Gloucester Coal Limited, the removal of intensive grazing by stock has allowed exotic pasture species to grow and mature forming tall, dense rank grasslands. Additionally, some species that are normally maintained at low heights by grazing, are now more obvious in the paddocks on the study area. One of these is Whisky Grass (*Andropogon virginicus*) that imparts a reddish tinge to rank grassland when in flower (Plate 11). Whisky Grass is a common widespread species found mainly in disturbed areas and on roadsides (Royal Botanical Gardens and Domain Trust, 2011c). It is normally suppressed by heavy grazing in pastoral areas and is not regarded as a significant weed.

3.4 CONDITION OF THE VEGETATION

In this section an assessment is made of the existing vegetation condition relative to pristine habitat of the original native communities. Table 22 presents condition ratings for seven disturbance factors (Section 2.2.5) for each of the vegetation communities recognised on the study area. An overall rating for the condition or range of conditions, of each community is also given. As would be expected, the condition of different patches of the same community varies considerably depending on size, disturbance and land use history. The vegetation areas surveyed for the vegetation assessment are shown on Figure 7.

Historic air photos of Stratford are shown on Figures 8a to 8e. The following account describes the condition of the natural vegetation on different parts of the study area (Figure 7).

North of Bowens Road (Area 1)

This area is immediately north of the existing Stratford Main Pit and includes the existing northern waste rock emplacement. A large area of remnant native vegetation (eastern patch) occurs immediately to the north and north-east of the Stratford Main Pit. Other remnant vegetation patches (northern patch) lie to the west of the Northern Waste Emplacement and north of the western end of Bowens Road (western patch). Scattered swampy remnant vegetation (central patch) occurs along Avondale Creek west of the haul road to the Northern Waste Emplacement. This area is mapped as Areas 1a to 1f and is shown on Figure 7.

1a *Eastern patch*. The native vegetation in this area varies in condition from moderate to good. The eastern areas have been largely cleared historically, but were not pasture improved. The ground cover retains a predominance of native species. The western areas have been partially cleared historically, especially in the east and south, but retains quite large patches with a continuous tree canopy that are in good condition.

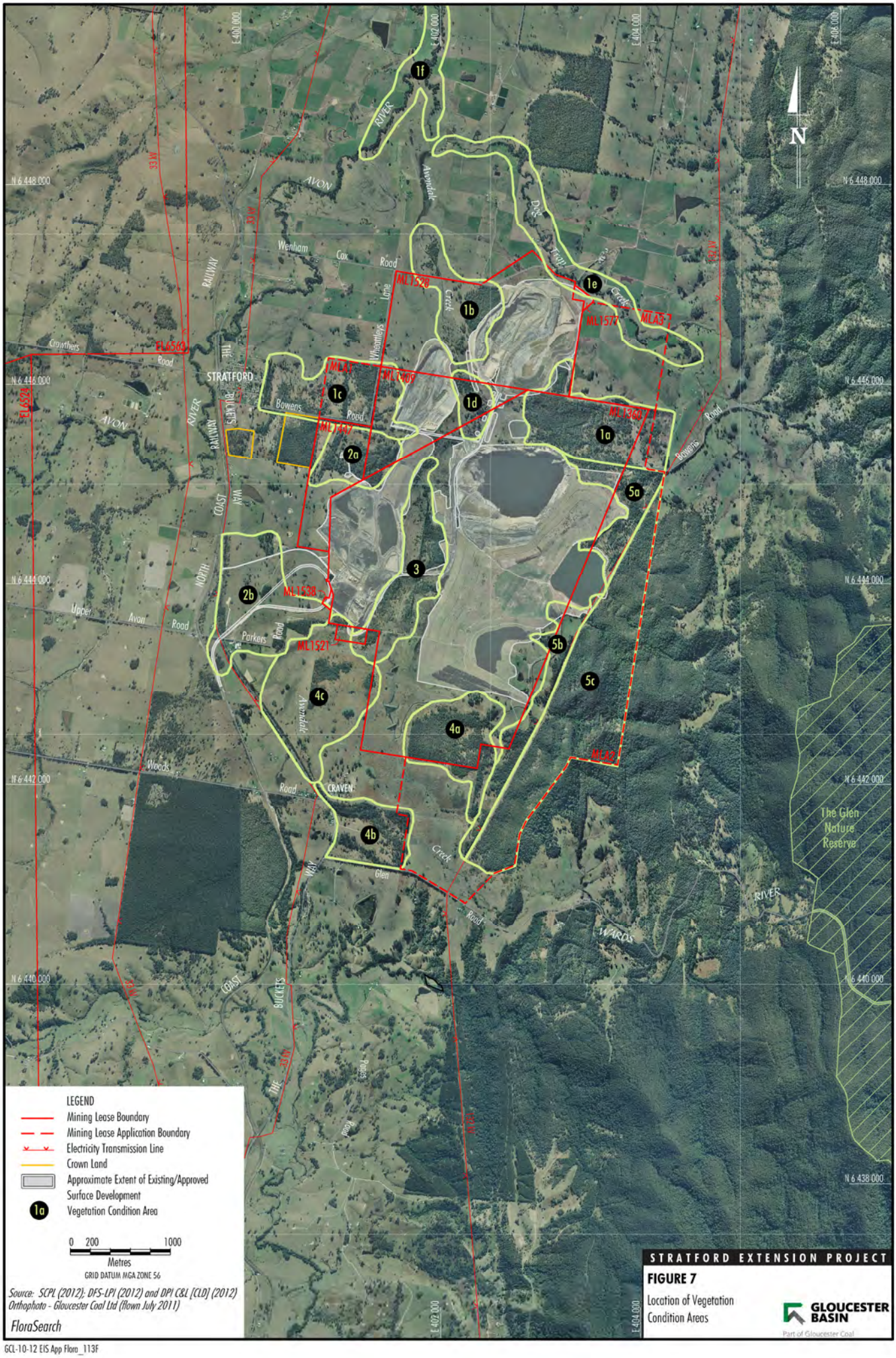
Table 22
Vegetation Condition

Community No./ Map Unit	Disturbance Level	Native Vegetation Cover	Presence of Canopy Juveniles	Incidence of Exotic Species	Degree of Fragmentation	Resilience	Overall Condition Rating[1]
1	1	5	4	1	2	5	5
2	4-5	2	2	2	1	2	2
3 and 3a[2]	1	5	5	1	2	3-5	4-5
4 and 4a	1-4	3-5	5	1	2	4-5	4-5
5	2-3[3]	4	3	2	5	4	3-4
5a	2-4	3	1	3	4	3	3
5b	4-5	2-3	4	3	4	3	2-3
6	3-4	4	4	3	1	4	4
7	1-4	3-5	5	1	2	3-5	4-5
8	2-4	3-5	4	2	4	4	3
8a	4-5	2-3	3	3	4	3	2-3
9	3	4	4	1	4	5	4
10	4	4	1	3-4	4	3	3
11	5	3	2	2	2	2	2
12	2-3	4	NA	2	2	NA	4
A	5	1	1	4	5	1	1
B	NA						

[1] Overall condition rating: 1 = very poor, 2 = poor, 3 = moderate, 4 = good, 5 = very good.

[2] Disturbed (Disturbed and undisturbed areas of communities are mapped separately on Figure 5).

[3] Rating system: 1 = very low (0 to 10%), 2 = low (10 to 30%), 3 = moderate (30 to 70%), 4 = high (70 to 90%), 5 = very high (90 to 100%).



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* The location of the Project on the photo is indicative only due to the historic nature of the air photo.

LEGEND

Approximate Extent of Existing/Approved Surface Development

Approximate Extent of Additional Project Surface Development (Open Cut Mining Operations)

Source: NSW Lands Department (2011); SCPL (2012)

STRATFORD EXTENSION PROJECT

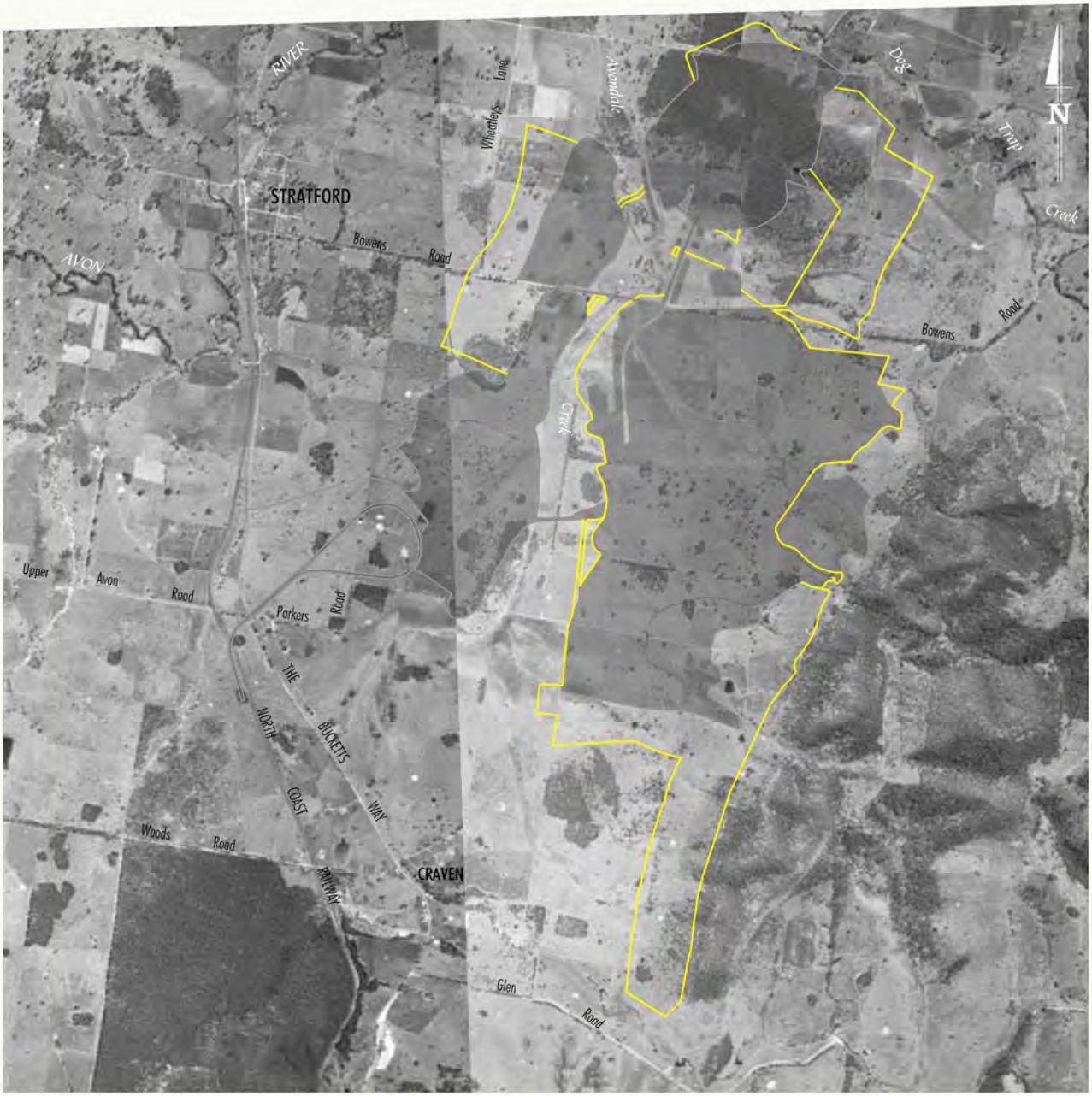
FIGURE 8a

Historic Air Photo of Stratford - 1964

GLOUCESTER BASIN

FloraSearch

GCL-10-12 EIS App Flora_F15E



* The location of the Project on the photo is indicative only due to the historic nature of the air photo.

LEGEND

Approximate Extent of Existing/Approved Surface Development

Approximate Extent of Additional Project Surface Development (Open Cut Mining Operations)

Source: NSW Lands Department (2011); SCPL (2012)

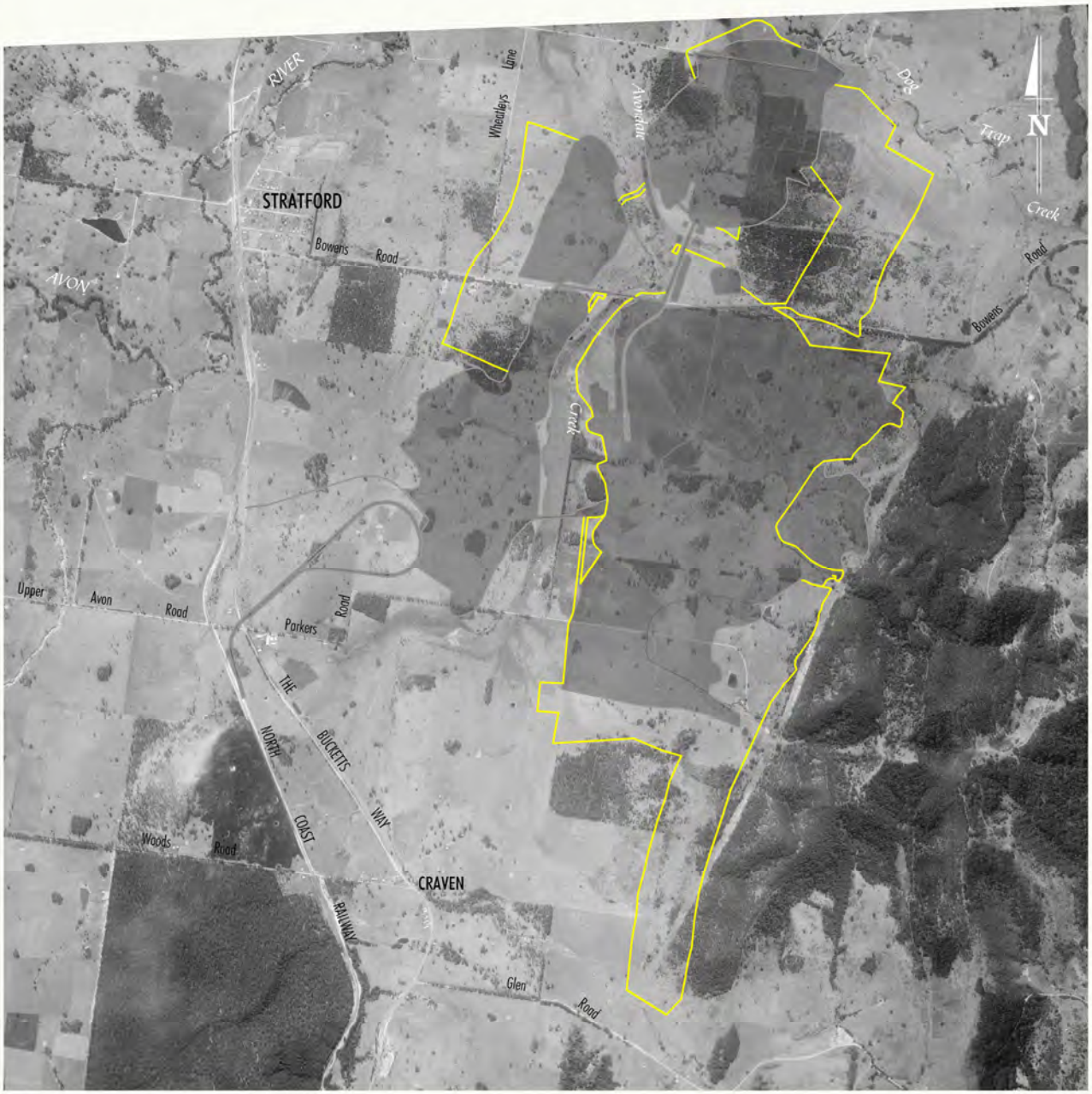
STRATFORD EXTENSION PROJECT

FIGURE 8b

Historic Air Photo of Stratford - 1971

GLOUCESTER BASIN

FloraSearch



* The location of the Project on the photo is indicative only due to the historic nature of the air photo.

LEGEND

Approximate Extent of Existing/Approved Surface Development

Approximate Extent of Additional Project Surface Development (Open Cut Mining Operations)

Source: NSW Lands Department (2011); SCPL (2012)

STRATFORD EXTENSION PROJECT

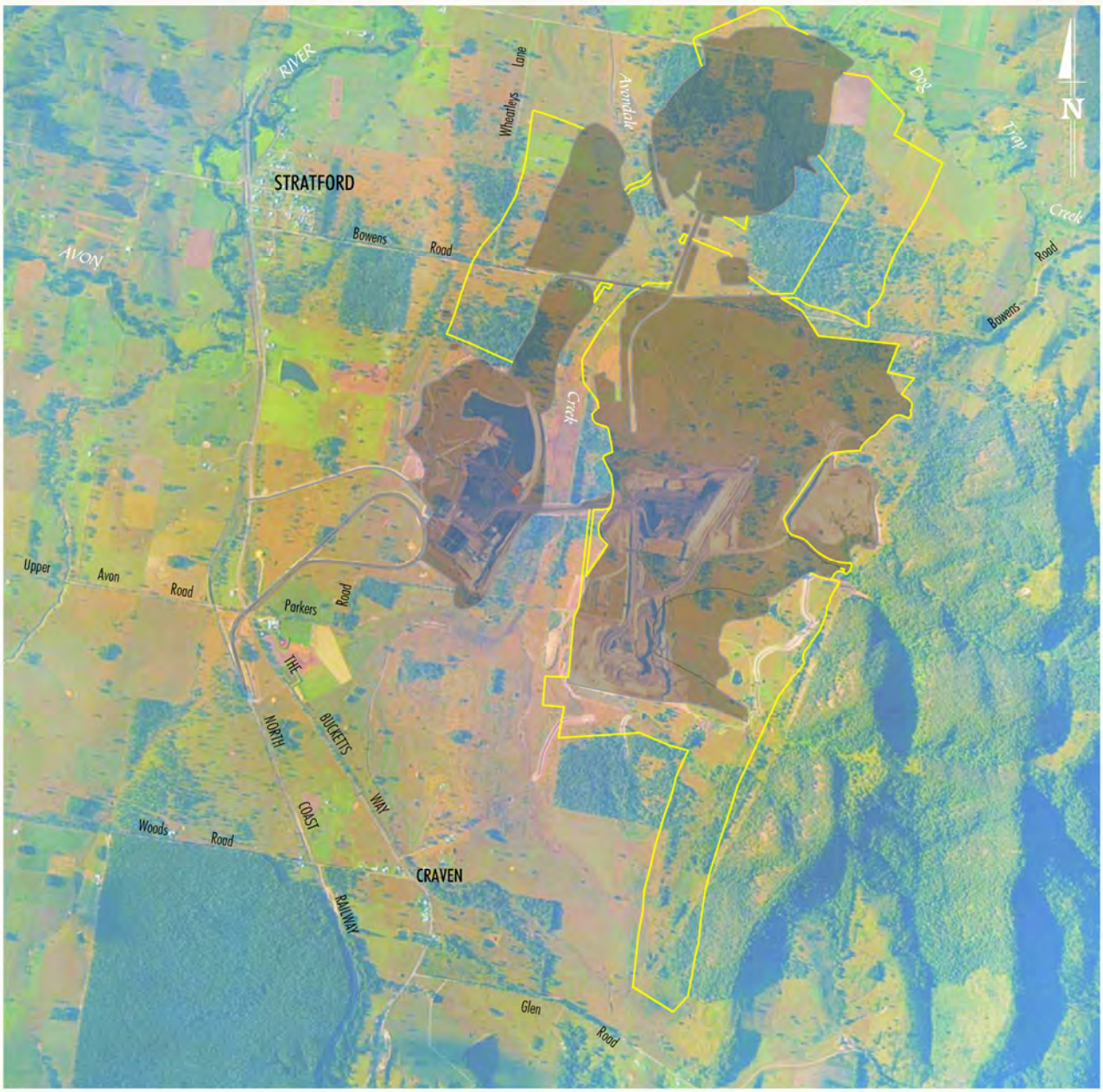
FIGURE 8c

Historic Air Photo of Stratford - 1989

GLOUCESTER BASIN

FloraSearch

GCL-10-12 EIS App Flora_f17f



* The location of the Project on the photo is indicative only due to the historic nature of the air photo.

LEGEND

Approximate Extent of Existing/Approved Surface Development

Approximate Extent of Additional Project Surface Development (Open Cut Mining Operations)

Source: NSW Lands Department (2011); SCPL (2012)

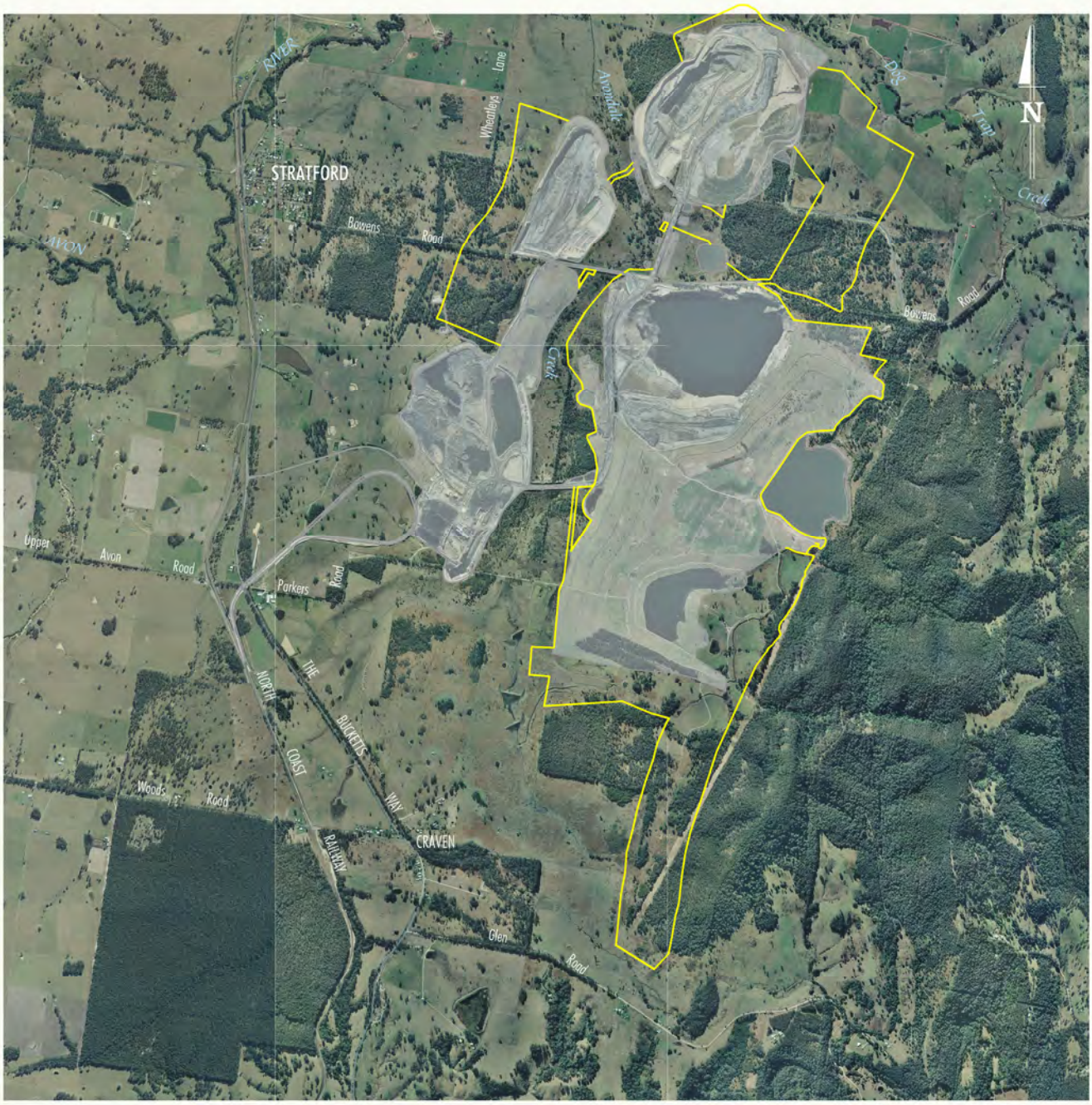
STRATFORD EXTENSION PROJECT

FIGURE 8d

Historic Air Photo of Stratford - 1996

GLOUCESTER BASIN

FloraSearch



LEGEND

Approximate Extent of Existing/Approved Surface Development

Approximate Extent of Additional Project Surface Development (Open Cut Mining Operations)

Source: Gloucester Coal Ltd (flown July 2011); SCPL (2012)

STRATFORD EXTENSION PROJECT

FIGURE 8e

Air Photo of Stratford - 2011

GLOUCESTER BASIN

FloraSearch

1b *Northern patch*. This area comprises two vegetation types, Community 8 in the centre and adjoining Community 5b to the south and present in the north (Figures 5 and 7). The Community 5b area is considered to be in moderate condition consisting of scattered mature and regenerating trees over a predominantly native understorey. By contrast, the Community 8 area is in good condition with a continuous tree canopy, low incidence of exotic species and high resilience.

1c *Western patch*. Except for one large, relatively continuous patch of Community B adjoining the west side of Wheatleys Road, the native vegetation in this area comprises mainly isolated trees in cleared paddocks with some large areas of young Cabbage Gum regeneration (Community 5b) and a patch of Community 8a (Figures 5 and 7). Despite historical grazing, the mature Community 8 patch is considered to be in good condition. The regeneration patches are classed as moderate and the introduced pasture with scattered native trees (Map Unit A) (Figures 5 and 7) is in poor condition.

1d *Central patch*. The central area includes two semi-cleared patches of paperbark thicket (Community 5a) and scattered remnant eucalypts and paperbarks over a predominantly exotic understorey (Figures 5 and 7). The vegetation condition in the heavily cleared areas is considered to be very poor, and poor in the patches of Community 5a.

1e This area includes riparian vegetation along Dog Trap Creek where there is little to no remnant native vegetation above the banks. Streamside vegetation is dominated by *Lomandra* species with obvious damage from cattle. This vegetation area is considered in overall poor condition.

1f This area includes riparian vegetation along downstream Avon River, which is diverse and includes several large trees. However, the riparian zone has been used for grazing/agriculture and overall is considered in poor condition.

West of Study Area between Bowens and Parkers Roads (Area 2)

This section encompasses the area between Bowens and Parkers Roads, and west of the existing CHPP and infrastructure area and the approved BRNOC. This area has been mapped as Areas 2a and 2b and is shown on Figure 7.

2a In the north of this area immediately south of Bowens Road is a semi-cleared area of Community 8 comprising four mapped patches surrounded by cleared grassland (Map Unit A) (Figures 5 and 7). The remnant vegetation retains a high diversity of native shrub and ground cover species and, despite past disturbance, is considered to be in good condition with high diversity and resilience, low levels of introduced species and active regeneration occurring. On the west side of this area is a native tree woodlot planting (Map Unit B) (Figures 5 and 7).

2b The remainder of this area to the south is primarily cleared pasture land (Map Unit A) with scattered remnant native trees (Figures 5 and 7). There is an amenity tree planting (Map Unit B) beside The Bucketts Way north of Parkers Road, three small mapped patches of Community 8 in the paddocks and small patches of Community 5 and one small patch of Community 5b beside Parkers Road (Figures 5 and 7). The paddock areas have been subject to ongoing heavy grazing and are considered to be in poor condition. The small woodlots have also been heavily grazed, are used as shelter for stock and are also in poor condition.

Central Area between Bowens and Parkers Roads (Area 3)

This area comprises a relatively narrow north-south oriented band of land between the existing CHPP and infrastructure area, the approved BRNOC (Figure 7) and the Stratford Main Pit and rehabilitated waste rock emplacement to its south. It largely encompasses low lying poorly drained areas along Avondale Creek and comprises artificial wetlands (Community 12), Community 5b, a small area of Paperbark Thicket (Community 5a) and two areas of White Stringybark – Grey Ironbark Grass/Shrub Forest (Community 8) (Figures 5 and 7).

The artificial wetlands (Community 12) have been colonised by a range of mainly native and some exotic aquatic and semi-aquatic species. The high cover of native species, low incidence of exotics and low fragmentation indicate this community is in good condition (Table 22).

The remnant of Community 5a is small, disturbed, has low resilience, a high incidence of exotic species and is in poor condition (Figures 5 and 7).

The areas of Community 5b are considered to be in moderate condition with good regeneration of canopy species occurring and a generally diverse and predominantly native understorey (Figures 5 and 7).

The two areas of Community 8 differ in condition; the northern patch is in good condition with a continuous tree cover and mainly native ground cover, whereas the southern patch is in moderate condition with a thinned canopy and more disturbed and weedy understorey (Figures 5 and 7).

Southern Area between Parkers Road, Glen Road and the Footslopes (Area 4)

This area is located between Parkers Road, Glen Road and the footslopes of the wooded range to the east. Although predominantly cleared farmland, it includes several large patches of remnant native vegetation. Much of the cleared farmland has been subject to pasture improvement (Map Unit A), is considered to have very low potential for regeneration of the original native plant communities and is consequently classed as in very poor condition. The following sub-sections discuss the condition of each of the native remnants. This area has been mapped as Areas 4a, 4b and 4c and is shown on Figures 6 and 7.

4a The largest remnant in this area lies immediately south of the existing rehabilitated waste rock emplacement south of the Stratford Main Pit (Figure 7). It includes a central drainage line supporting Community 5 flanked on the east and west sides by large patches of Community 8 (Figures 5 and 7). Except for patchy past clearing in Community 8 on the eastern side, the tree canopy is continuous and in good condition. The shrub and ground cover layers are also dominated by native species and are in good condition with low levels of introduced species. The western two thirds of this area is in very good condition, while the eastern third is classed as good, due to its higher degree of fragmentation. This area also contained a small patch of disturbed Community 8a in the north and Community 10 to the south (Figures 5 and 7). Community 10 is in moderate condition.

4b Patchy remnant native vegetation occurs in the south west corner of the area at the junction of The Bucketts Way and Glen Road. Most of this vegetation is associated with the upper reaches of Avondale Creek and contains thinned mature trees of Community 5 (Figures 5 and 7)with a considerable amount of young regeneration between them. Adjoining the creek vegetation are areas of Communities 8 and 7, which are similarly regenerating (Figures 5 and 7). The extent of regeneration occurring in this area indicates a condition rating of moderate to good is appropriate (Table 22). Between the patches of regeneration are small improved pasture paddocks that have condition ratings of very poor.

4c This area contains highly fragmented patches comprising disturbed examples of Community 5 (Community 5b) and regeneration of Community 5 north-east of Bucketts Road and south of Parkers Road (Figures 5 and 7). Small patches of Community 5 also occur adjacent to The Bucketts Way and south of Parkers Road (Figures 5 and 7). All of these patches occur within grazing paddocks that have been subject to pasture improvement (Map Unit A) in the past. Consequently, they have been assigned condition ratings of poor owing to the low likelihood of shrub and ground cover recovery.

Wooded Range to the East (Area 5)

The areas addressed in this section lie immediately to the south of the eastern end of Bowens Road, east of the existing Southern Waste Emplacement and Stratford East Dam and, in the south, on either side of the 132 kV powerline. Following the survey in January, the vegetation in the powerline easement was pruned in May 2011. This area occurs on generally steeper, more dissected terrain and on different soil landscapes from the rest of the study area. Sections of this area are considered in detail below. This area has been mapped as Areas 5a, 5b and 5c and is shown on Figures 6 and 7.

5a This area occurs in the north-eastern corner between Bowens Road, the existing Stratford Waste Emplacement and the 132 kV powerline. This area contains highly fragmented remnant forest patches of various communities (Figure 5). In general, these retain their original shrub and ground cover diversity and are actively regenerating. The cleared areas are dominated by native shrub and ground cover species. Overall, there is good potential for recovery of the original vegetation communities and structure in this area. Accordingly, the condition is rated as good.

5b This area occurs west of the 132 kV powerline and encompasses elongated remnants on the footslopes of the wooded range to the east that have been separated from the large block of native vegetation to the east by the easement for the powerline. Although somewhat fragmented, this area has a generally continuous tree canopy, a representative diversity of shrubs, a diverse native ground cover and evidence of regeneration. This area is considered to be in good condition. This area also contains two patches of Community 8 to the west.

5c This area occurs east of the 132 kV powerline. Most of the area east of the powerline, comprising Communities 1, 3, 4, 6 and 7 (Figures 5 and 7) and smaller patches of other communities, is in close to pristine condition, except for the loss of most of the original old growth trees due to historical logging, invasion of the wetter slopes and gullies by Lantana (*Lantana camara*) and small areas that have been cleared historically. Consequently, except for the cleared patches discussed below, this area is rated as being in good to very good condition, depending on the local levels of Lantana infestation. Areas disturbed by past clearing are identified as Communities 3a, 4a and 7a (Figures 5 and 7). Such areas generally occur on the better soils and in gullies, have high levels of Lantana infestation and do not appear to be regenerating. They are considered to be in moderate to poor condition. By contrast a small area of Community 6 (Figures 5 and 7) that was cleared historically, and occurs on a ridge and adjoining slopes, has good tree regeneration, low weed levels and is in good condition (Table 22).

3.5 THREATENED FLORA SPECIES

No species listed under the TSC Act or the EPBC Act were found on the study area despite extensive surveys between 1994 and 2011 by multiple botanists.

3.6 THREATENED ECOLOGICAL COMMUNITIES

Two threatened ecological communities, the River-flat Eucalypt Forest on Coastal Floodplains EEC, and the Lower Hunter Valley Dry Rainforest VEC, which are listed under the TSC Act, were revealed by database searches as possible occurrences on the study area.

3.6.1 River-flat Eucalypt Forest on Coastal Floodplains EEC

Community 5 in this study, Cabbage Gum Paperbark Sedge/Grass Forest, has floristic similarities to the River-flat Eucalypt Forest on Coastal Floodplains EEC. However, the following discussion demonstrates that Community 5 is not part of this EEC.

Key features of the River-flat Eucalypt Forest on Coastal Floodplains EEC (DEC, 2004b) are (see also Table 23):

- *It occurs on silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains.*
- *the River-flat Eucalypt Forest on Coastal Floodplains EEC generally occurs below 50 m elevation, but may occur on localised river flats up to 250 m above sea level…*
- *the most widespread and abundant dominant trees include Eucalyptus tereticornis (forest red gum), E. amplifolia (cabbage gum), Angophora floribunda (rough-barked apple) and A. subvelutina (broad-leaved apple)…*
- *a layer of small trees may be present, including Melaleuca decora, M. styphelioides (prickly-leaved teatree), Backhousia myrtifolia (grey myrtle), Melia azaderach (white cedar), Casuarina cunninghamiana subsp. cunninghamiana (river oak) and C. glauca (swamp oak).*
- *the combination of features that distinguish River-flat Eucalypt Forest on Coastal Floodplains from other endangered communities on the coastal floodplains include: its dominance by either a mixed eucalypt canopy or by a single species of eucalypt belonging to either the genus Angophora or the sections Exsertaria or Transversaria of the genus Eucalyptus (Hill 2002); the relatively low abundance or sub-dominance of Casuarina and Melaleuca species; the relatively low abundance of Eucalyptus robusta; and the prominent groundcover of soft-leaved herbs and grasses.*

Each of the above points is discussed below for the study area.

Table 23
Comparison of the Diagnostic Characteristics of the River-flat Eucalypt Forest on Coastal Floodplains EEC with Cabbage Gum – Paperbark Forest

Diagnostic Feature	River-flat Eucalypt Forest on Coastal Floodplains EEC	Cabbage Gum – Paperbark Forest at Stratford
1. South of Port Stephens	Yes	No
2. Situated on coastal floodplain	Yes	No
3. Silty clay or sandy loam	Yes	Yes
4. Lack of humic layers	Yes	No (A prominent humic layer has been observed below the Paperbarks)
5. Little saline influence	Yes	Yes
6. Situated on river flat or flood terrace	Yes	No (Located on gently sloping, poorly drained watercourses and lower hill slopes)
7. Open forest or woodland structure	Yes	No (There is a dense layer of Paperbarks in the mid-storey)
8. Forest Red Gum, Cabbage Gum and Broad-leaved Apple present	Yes	Yes
9. Characteristic ground layer species present	Yes	Yes
10. Relatively low numbers of Sheoaks, Paperbarks and Swamp Mahogany trees	Yes	No (Paperbarks are abundant)

Coastal Floodplains

The study area has no coastal floodplain habitat (Section 1.4.2). The poorly drained soils on which the Cabbage Gum Paperbark Sedge/Grass Forest community occurs are a transferral soil landscape and not alluvial. The study area and Community 5 are in the uppermost parts of the relatively small catchment of Avondale Creek, a non-incised watercourse that is too small to have developed floodplains. The nearest floodplains to the study area are on the Avon River and Dog Trap Creek, to the north-west and north-east, respectively. Both are much larger incised watercourses than Avondale Creek and have true alluvial flats (Section 1.4.2), although their soils belong to a 'stagnant alluvial soil landscape' indicating they are no longer considered to be active floodplains.

Elevation

The elevation of areas occupied by Community 5 is approximately 120 to 130+ m AHD (Gloucester 1:25 000 topographic map) and is within the range specified for the EEC in the Final Determination (DEC, 2004b).

Dominant Tree Species

Cabbage Gum Paperbark Sedge/Grass Forest is dominated by Cabbage Gum (*Eucalyptus amplifolia*), and Broad-leaved Apple (*Angophora subvelutina*) with Forest Red Gum (*E. tereticornis*) and Coast Grey Box (*E. moluccana*) also prominent. These trees are characteristic of the River-flat Eucalypt Forest on Coastal Floodplains EEC. However, Community 5 is also similar to the DECCW (2008a) Hunter and Central Rivers CMA Biometric community, *Cabbage Gum open forest or woodland of the North Coast and New England Tablelands*. The latter community is described as occurring on *poorly drained lower slopes, valley flats and creek banks* in the DECCW (2008a) database, which is an accurate description of the landscape position of the community on the study area. DECCW (2008a) does not regard the *Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands* vegetation type as belonging to the River-flat Eucalypt Forest on Coastal Floodplains EEC.

Small Tree Species

The community on the study area has a very prominent understorey of Paperbarks (*Melaleuca* species), which are specifically stated to be in relatively low abundance or sub-dominance in the River-flat Eucalypt Forest on Coastal Floodplains EEC (DEC, 2004b).

It is clear that the vegetation on the lower lying parts of the study area does not represent the River-flat Eucalypt Forest on Coastal Floodplains EEC. Rather, it is a similar community that occurs at higher altitudes and occupies poorly drained gently sloping sites in coastal valleys.

Table 23 compares the diagnostic characteristics of the River-flat Eucalypt Forest on Coastal Floodplains EEC with the Cabbage Gum –Paperbark Forest found on the study area. While Cabbage Gum – Paperbark Forest shares the major canopy species and many ground layer species with the River-flat Eucalypt Forest on Coastal Floodplains EEC, it differs in six out of ten of the distinguishing features of the EEC (Table 23).

It should also be noted that Australian Museum Business Services (Attachment B) also recorded the Cabbage Gum community in the surrounds of the study area and also concluded that it does not equate to the River-flat Eucalypt Forest on Coastal Floodplains EEC.

3.6.2 Lower Hunter Valley Dry Rainforest VEC

Community 1 in this study, Dry Subtropical Rainforest, has floristic similarities to the Lower Hunter Valley Dry Rainforest VEC (DECCW, 2008b). The following discussion demonstrates that Community 1 is not part of this VEC.

The Final Determination of the NSW Scientific Committee for the Lower Hunter Valley Dry Rainforest VEC (DECCW, 2008b) defines the diagnostic characteristics of the VEC and its relationships to rainforest types described in other publications and studies. In particular, it is clear that the VEC is based largely on community MU 2 of Peake (2006), viz., Barrington Footslopes Complex Dry Rainforest. This community '*typically occurs on Carboniferous sediments of the Barrington footslopes along the northern rim of the Hunter Valley floor, where it occupies gullies and steep hillslopes with south facing aspects*'. The Final Determination also indicates the VEC falls broadly within '*Sub-alliance 23 Ficus-Streblus-Dendrocnide-Cassine in the rainforest classification of Floyd (1990)*'. The VEC '*has been recorded from the local government areas of Cessnock, Maitland and Port Stephens, and is likely to occur or have occurred in Muswellbrook, Singleton, Upper Hunter and Dungog (within the Sydney Basin Bioregion and NSW North Coast Bioregion)*'. '*It may occur elsewhere in the Bioregions*'. The VEC has not previously been recorded in Gloucester Shire, although is considered likely to occur in the adjoining Dungog Shire.

The Biometric Vegetation Types Database for the Hunter-Central Rivers CMA (DECCW, 2008a) area identifies three dry rainforest types with the CMA area:

- Fig – Whalebone Tree – Stinging Tree dry rainforest of the southern North Coast. This community is equivalent to Sub-alliance 23 of Floyd (1990) and includes the VEC.
- Giant Stinging Tree – Fig dry subtropical rainforest of the North Coast and Brigalow Belt South. This community is equivalent to Floyd's (1990) Sub-alliance 15 and is not part of the VEC. It is noted as being common in the Gloucester/Woko area in the Biometric Vegetation Types Database (DECCW, 2008a).
- Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin. This community is equivalent to Floyd's (1990) Sub-alliance 28 and is also not part of the VEC.

Of these three communities, only the last two have been documented previously in the Gloucester area (Floyd, 1990). Community 1 of this study is considered to be closest floristically to Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest or Floyd's (1990) Sub-alliance 28. The following points justify the conclusion that the small rainforest occurrence in the hills to the east of the Project area is most similar to Sub-alliance 28 of Floyd (1990):

- Sub-alliance 28 characteristically occurs '*on steep stony slopes and dry stony gullies*' (DECCW, 2008a). The rainforest occurrence on the study area is characterised by a scree of large rocks and boulders on the lower slopes beside a watercourse.
- The dominant trees in the study area rainforest include Shatterwood, Giant Stinging Tree and Yellow Tulipwood, which are dominants in Sub-alliance 28 (Floyd, 1990). In contrast, the VEC is dominated by Hard Quandong (*Elaeocarpus obovatus*), Brush Bloodwood (*Baloghia inophylla*), Whalebone Tree (*Streblus brunonianus*), Red Kamala (*Mallotus philippensis*), Brush Caper Berry (*Capparis arborea*), Native Olive (*Olea paniculata*) and Giant Stinging Tree (*Dendrocnide excelsa*) (DECCW, 2008b). Shatterwood and Yellow Tulipwood are not dominants in the VEC. However, as pointed by Floyd (1990), Sub-alliance 28 is closely related floristically to Sub-alliance 23 (the VEC), the latter occupying more fertile soils owing to '*enrichment by igneous rocks*'. Consequently, many of the species found in the VEC, particularly the low trees and shrubs, occur on the study area, some commonly.

- The study area also has a different and more diverse spectrum of vines than found in the VEC. The main vines in the VEC are Wonga Vine (*Pandorea pandorana* subsp. *pandorana*), Scrambling Lily (*Geitonoplesium cymosum*), Native Grape (*Cayratia clematidea*), Stiff Jasmine (*Jasminum volubile*) and Cockspur Thorn (*Maclura cochinchinensis*) (DECCW, 2008b). In contrast, large vines on the study area include mainly three species of Water Vine (*Cissus Antarctica*, *C. hypoglauca* and *C. sterculiifolia*), Gum Vine (*Aphanopetalum resinosum*), Common Silkpod (*Parsonsia straminea*) and Burny Vine (*Trophis scandens*). Smaller vines and creepers on the study area include Morinda (*Morinda jasminoides*), Native Yam (*Dioscorea transversa*), Austral Sarsaparilla (*Smilax australis*), Embelia (*Embelia australiana*) and Climbing Panax (*Cephalaralia cephalobotrys*).
- The presence of a semi-permanent watercourse in the study area rainforest patch provides moist habitat for a much denser ground cover of ferns and rainforest herbs along the creek than on the rocky slopes. The ground cover in the study area has a considerably more diverse range of ferns than in the VEC.

The diversity of vines and ground cover ferns on the study area suggests subtropical rainforest components are present owing to the influence of the watercourse. Consequently, the patch has elements in common with Giant Stinging Tree – Fig dry subtropical rainforest [Floyd's (1990) Sub-alliance 15] along the watercourse, while being predominantly Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest on the nearby adjoining rocky slopes. Neither of these communities is part of the Lower Hunter Valley Dry Rainforest VEC.

3.7 NOXIOUS WEEDS

A small number of the introduced species recorded in the surveys are regarded as noxious weeds in the Gloucester Shire Council area, including Blackberry (*Rubus fruticosus*) aggregate species (class 4[1]), Crofton Weed (*Ageratina adenophora*) (class 4), Giant Parramatta Grass (*Sporobolus fertilis*) (class 4), Lantana (*Lantana camara*) (class 4) and Basket Willow (*Salix viminalis*) (class 5[2]) (DPI, 2011) (Attachment E).

However, none were abundant anywhere within the Project area, although Lantana is common in moist gullies in the wooded range to the east. Lantana and Blackberry are also listed as Weeds of National Significance (Weeds Australia, 2011).

[1] For class 4 noxious weeds, *the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant must not be sold, propagated or knowingly distributed.*

[2] For class 5 noxious weeds, *the requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with*.

4 EVALUATION OF POTENTIAL IMPACTS ON FLORA

4.1 NATIVE VEGETATION/HABITAT CLEARANCE

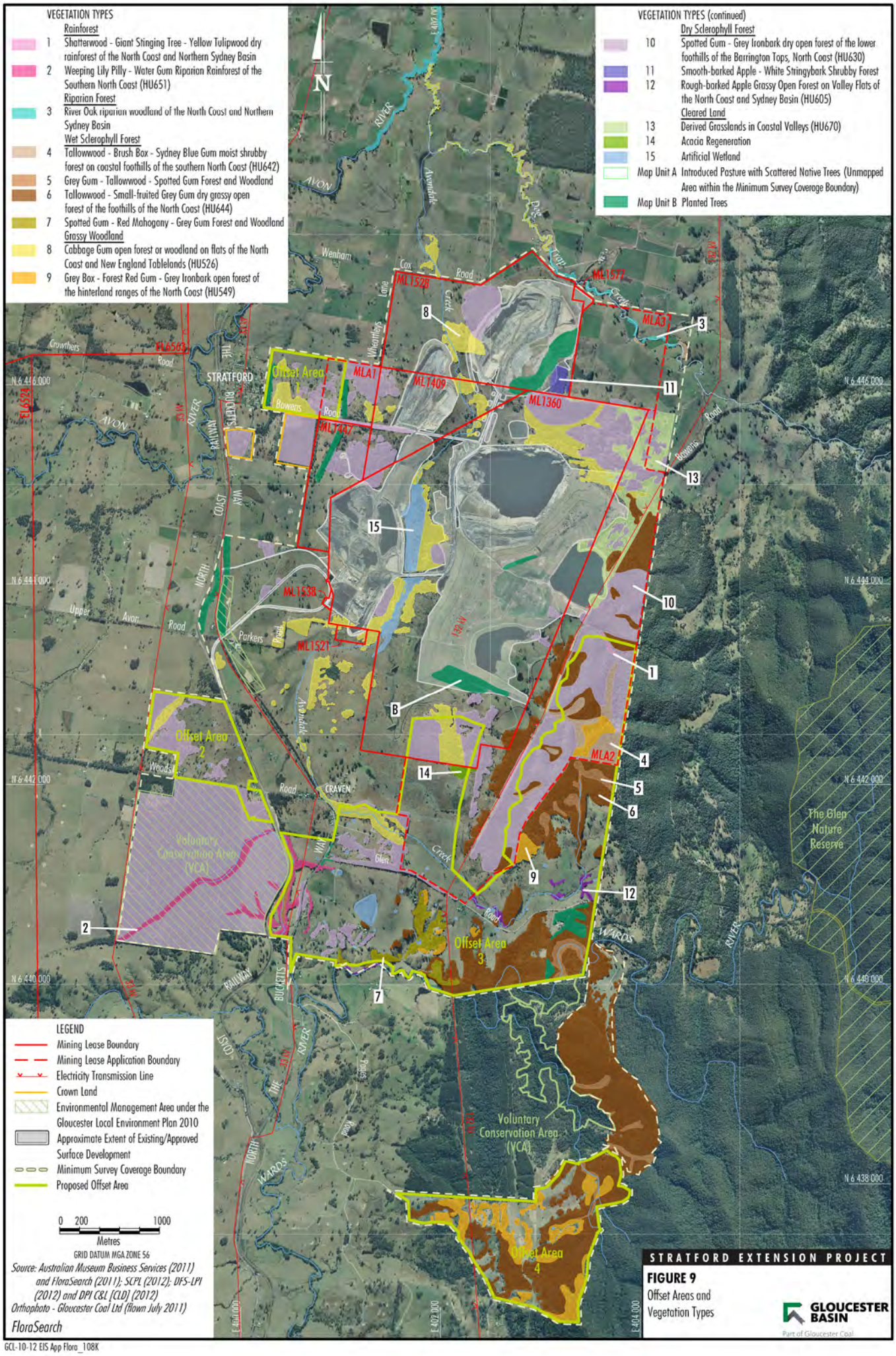
Clearing of native vegetation is listed as a key threatening process under both the TSC Act and the EPBC Act. The total disturbance area for the Project is 300 ha, including approximately 105 ha of native vegetation communities and 195 ha of introduced or planted vegetation (Tables 24 and 25). This is not made up of a single block, but rather multiple patches of vegetation, some of which are disjunct (Figure 6).

Table 24
Clearance of Each Vegetation Type within the Project Area

Vegetation Type	Approximate Area to be Cleared (ha)	Composition
4: Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast (HU642)	0.2	Vegetation Type 4 occurs to the east of the Project in several large patches. To be disturbed is the small tip of the western-most extent of one of these patches (Figure 6).
6: Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (HU644)	19	Disturbance to Vegetation Type 6 occurs to narrow patches in the east of the Project area. This Vegetation type continues in large patches to the east and in larger, more continuous patches to the south, leading into the proposed Offset area (Figures 6 and 9).
8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526)	13.5	Vegetation Type 8 occurs in numerous patches, dispersed throughout the Project and proposed Offset area. Disturbance will occur to small patches in the northern section of the Project leaving larger sections to the west and south-west undisturbed (Figures 6 and 9).
10: Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630)	65	Vegetation Type 10 occurs extensively throughout the Project and proposed Offset area, with several very large, continuous patches. Disturbance will occur to scattered patches to the north-west and north of the Project area. A length of disturbance will occur along the western-most extent of a large patch to the east of the Project (Figures 6 and 9).
13: Derived Grasslands in Coastal Valleys (HU670)	5.5	A scattered patch of Vegetation Type 13 occurs in the north-east corner of the Project area. Disturbance will occur to marginal outskirts of this Vegetation Type (Figure 6).
14: Acacia Regeneration	0.5	One small patch of Vegetation Type 14 occurs to the south of the Project area, the majority being within the proposed Offset area. Disturbance will occur to a very small area on the eastern-most tip of this Vegetation Type (Figures 6 and 9).
Total	**103.7 (rounded to 105 ha)**	

Table 25
Clearance of Each Map Unit within the Project Area

Vegetation Type	Approximate Area to be Cleared
Map Unit A: Introduced Pasture with Scattered Native Trees	190 ha
Map Unit B: Planted Trees	1.3 ha
Total	**191.3 (rounded to 195 ha)**



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The majority of the native vegetation loss is associated with the open cut (Figure 3) and is consequently unavoidable. The affected native vegetation lies mostly within the three proposed open cut areas: Avon North, Stratford East and Roseville West (Figure 3).

The commenced revegetation on the BRNOC waste emplacement rehabilitation would also be cleared for the Project.

4.1.1 Avoidance Measures

The following refinements to the mine design have resulted in avoiding additional impacts on flora and their habitats:

- Optimising the area of the open cut pit that is backfilled to minimise the overall mine footprint, including complete backfilling of the Stratford Main Pit and BRNOC as well as partial backfilling of the Rosewell West Pit Extension and Stratford East Open Cut.
- Continued use of several existing features at the Stratford Mining Complex, including:
  - open cut voids for water and rejects storage;
  - Stratford East Dam for water management;
  - CHPP; and
  - rail facilities.
- Avoiding clearance of large areas of bushland:
  - between the Stratford Main Pit, the Southern Waste Emplacement, the proposed Avon North Open Cut and the proposed Northern Waste Emplacement Extension;
  - west of the BRNOC; and
  - south of the Stratford Waste Emplacement and west of the proposed Stratford East Open Cut.
- Avoiding disturbance to Avondale Creek.
- Increasing the maximum height of the existing waste emplacements to be comparable to surrounding landform heights and less than the maximum height of ridge line to the east of the Development Application Area (470 m AHD) to minimise the overall mine footprint.

4.1.2 Regional Context

The study area is situated on the western edge of a very large area of native vegetation, including The Glen Nature Reserve (2,750 ha) and surrounding forested private land, the Myall River State Forest (approximately 15,000 ha) and Ghin-Doo-Ee National Park (4,819 ha) to the south and south-east. These forests are in turn connected to Myall Lakes National Park (47,593 ha) on the coast through Nerong State Forest (2,200 ha). Bulahdelah and Wauk Wauk State Forests are also connected to the Myall Lakes National Park, making a very large connected network of Parks, Reserves, State Forests and forested private land comprising well over one hundred thousand hectares in all. Much larger areas of natural vegetation exist in the Barrington Tops complex of State Forests and National Parks extending west from the western side of the Avon River valley approximately 4.7 km from the study area. In this context, the loss of 105 ha of native vegetation on the study area is a comparatively small proportion of the forested land in the local area and wider region.

The main impact of the Project on native flora is considered to be a further depletion of the vegetation communities that occur on the Permian sediments of the Gloucester Coal Measures. Table 26 shows the estimated percentage of pre-European extent of the relevant vegetation types remaining in NSW (DECCW, 2008). While most vegetation types are only moderately cleared (30 to 35%), Vegetation Type 8 is considered to be 70% cleared (Table 26). This vegetation type has been one of the communities most heavily impacted by past clearing for agriculture in the Gloucester Valley. While there are many remnants of Vegetation Type 8 on surrounding farmland, most are small, highly fragmented and severely affected by livestock grazing and weed invasion. Very few larger remnants of these communities remain in the wider region in good condition.

Table 26
Estimated Percentage of Pre-European Extent of Vegetation Types Remaining in NSW

Vegetation Type	Cleared Estimate Rounded to Nearest 5%
4: Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast	30%
6: Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (HU644)	30%
8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526)	70%
10: Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630)	35%
13: Derived Grasslands in Coastal Valleys (HU670)	-

Source: DECCW (2008a).

Historic air photos of the mining lease (Figures 8a to 8e) show that Vegetation Type 8 has regenerated over the past 47 years. Regeneration of this community was observed on the study area (e.g. Vegetation Community 5a).

The Project layout has been designed to minimise harm to Vegetation Type 8 in the mining lease by avoiding, as far as possible, disturbance to any occurrences that do not overlie the open cut areas. In addition, the offset strategy (Section 6) includes some, albeit fragmented, areas of this vegetation type that occur in the Project surrounds. The inclusion of cleared land adjoining these patches also provide for a net gain in their biodiversity value by expansion of the overall size of the patch.

4.2 POTENTIAL IMPACTS FROM IRRIGATION

The existing Stratford Mining Complex is approved to undertake irrigation on rehabilitation areas within a contained catchment. This irrigation method would be continued for the Project with the proposed irrigation areas draining directly to mine water storages. No impacts on existing native vegetation would occur.

4.3 LOSS OF HABITAT CONNECTIVITY

Within the study area, the Project would increase the fragmentation and isolation of two remnants of native vegetation (Figure 6) as follows:

- The Avon North Open Cut would remove approximately 25 ha of native vegetation resulting in the isolation of a similar area of vegetation to the west of the proposed pit. The connection of this patch to the wooded range to the east would be removed, thereby isolating it between the Stratford Waste Emplacement Expansion, the Stratford Main Pit and the proposed Avon North Open Cut.

- Similarly, the Stratford East Open Cut would disconnect a large remnant of native vegetation south of the Stratford Waste Emplacement from the wooded range to the east. This remnant would be surrounded by cleared farmland on the south and west sides, the Stratford Waste Emplacement to the north and the proposed Stratford East Open Cut to the east.

The relatively small size and isolation of these areas would increase the risk of extinction of plant and animal populations within them. It would also reduce the potential for recolonisation from the large reservoir of biodiversity in the wooded range to the east. However, for many species this is likely to be temporary given that the mine rehabilitation plan would progressively reconnect these patches with the wooded range to the east via corridors of native vegetation.

4.4 GROUNDWATER DEPENDENT ECOSYSTEMS

No groundwater dependent ecosystems have been identified on or near the Project Area (after National Water Commission, 2006). In addition, the flora surveys have not detected any vegetation that appears to be associated with groundwater. All vegetation on the study area appears to be dependent on rainfall and surface flows.

4.5 INTRODUCED FLORA

Soil disturbance related to vegetation clearance is likely to create opportunities for weed establishment around the margins of the open pits, on soil stockpiles and waste rock emplacements. This would increase the potential for weed incursion into the native habitats of the wooded range to the east and the remnants on the study area. Some 100 introduced flora species occur on the study area (Table 21), five of which are listed as Noxious in the Greater Taree Council area (Section 3.7). Most of the weeds are associated with previously disturbed areas, especially cleared farmland, derived native grasslands and riparian habitats.

The Project would not significantly exacerbate the incidence of weeds in the wooded range to the east, since all environmental and noxious weeds that are likely to survive there are already established, particularly Lantana (*Lantana camara*). It is unlikely the Project would result in the establishment of any new weeds given the long history of agriculture on the site and the range of weeds already present. In addition, SCPL undertakes weed control programmes to reduce the occurrence of noxious weeds (Section 5.5). With the continued implementation of these measures, it is considered that the Project is unlikely to significantly increase weed incidence in the local area generally.

An increased incidence of exotic vines and scramblers has been raised as a potential impact of the Project (AMBS, 2012). This is not considered to be a high risk since exotic vines and scramblers are not currently a significant problem in the environs of the Project area or the surrounding region, suggesting that the local environmental conditions are not highly conducive to them. In addition, there is no feasible mechanism by which the Project is likely to increase the establishment of exotic vines and scramblers in areas of bushland adjacent to the Project area.

4.6 DUST AND VEGETATION

Project activities such as blasting, materials handling and vehicle movements may result in the generation and dispersion of atmospheric dust. Excessive dust generation can impact on the health and viability of surrounding vegetation by inhibiting physiological processes such as photosynthesis, respiration and transpiration, and may allow penetration of phytotoxic gaseous pollutants (Eller, 1977; Farmer, 1993, 2002). In dry periods when there is limited rainfall to wash dust from leaf surfaces, plants close to working areas of the open cut, up to several hundred meters away, may receive significant loads of dust on plant surfaces. This may cause physiological damage resulting in reduced growth and reproduction (Eller, 1977; Farmer, 1993, 2002), which may in turn result in changes to the composition of plant communities (reviewed by Farmer, 2002). However, these effects are likely to be minor at the Project owing to the relatively high and reliable rainfall (Section 1.4.5).

Dust effects would be mitigated by a rigorous suppression regime through regular watering of roads and soil stockpiles, emplacements and other active areas within the study area (Section 5.7).

4.7 BUSHFIRE RISK

Project activities, including exploration, construction and environmental management and monitoring, may increase the risk of fire ignition (e.g. via increased vehicle traffic through dry vegetation). High frequency fire is listed as a key threatening process in the TSC Act (NPWS, 2000). SCPL would continue to implement strategies to minimise fire risk including the use of diesel vehicles, prohibition of smoking in fire prone areas and rapid response to any outbreak of fire (Section 5.6). The overall risk of increased bush fire frequency due to the Project is likely to be very low.

4.8 HUMAN-CAUSED CLIMATE CHANGE

Human-caused climate change is listed as a key threatening process under the TSC Act (OEH, 2011f). An assessment of this potential impact is addressed in Section 4 in the Main Report in the EIS.

4.9 THREATENED FLORA

The likelihood of the Project significantly affecting threatened flora species, populations or ecological communities or their habitats listed under the TSC Act has been assessed in accordance with Section 5A of the NSW *Environmental Planning and Assessment Act, 1979* and the *Threatened Species Assessment Guidelines: The Assessment of Significance* (NSW Department of Environment and Climate Change [DECC], 2007a).

The following factors are considered to determine the likelihood of a significant impact:

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

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

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

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

(d) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

(e) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

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

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

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

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

4.9.1 Threatened Flora Species

The baseline flora survey targeted eight threatened flora species for field searches. The targeted species included all threatened flora known to occur, or potentially occur, within a 30 × 30 km square centred on the Project area, and that have potential habitat there. Although listed as potentially occurring on the Project area in Table 5, Slaty Red Gum (*Eucalyptus glaucina*) and Magenta Lilly Pilly (*Syzygium paniculatum*) are large conspicuous species that would have been detected by the surveys if they were present. As they were not recorded on the study area they are not considered further.

The assessment in this section is confined to the six remaining species, which are treated in two groups for assessment according to the landscape positions they occupy, since the impacts would differ between the two situations (Table 27).

Table 27
Threatened Flora Species Considered in this Assessment

Scientific Name	Common Name	Broad Landscape Position
Asperula asthenes	Trailing Woodruff	Valley floor
Cynanchum elegans	White-flowered Wax Plant	Valley floor and wooded range to the east
Euphrasia arguta	An Eye-bright	Valley floor
Melaleuca groveana	Grove's Paperbark	Wooded range to the east
Pomaderris queenslandica	Scant Pomaderris	Valley floor
Senna acclinis	Rainforest Senna	Wooded range to the east

Threatened Species Possibly Associated with the Valley Floor – Trailing Woodruff, White-flowered Wax Plant, Euphrasia arguta and Scant Pomaderris

Four threatened flora species: the Trailing Woodruff (*Asperula asthenes*), White-flowered Wax Plant (*Cynanchum elegans*), an Eye-bright (*Euphrasia arguta*) and Scant Pomaderris (*Pomaderris queenslandica*) are considered to have potential habitat on the valley floor within the development footprint of the Project (Table 27). The Trailing Woodruff has some potential to occur in the wetter parts of the study area along drainage lines, although its preferred habitat appears to be river banks closer to the coast (NPWS, 2000).

The White-flowered Wax Plant most commonly occurs in dry, littoral and subtropical rainforests, but may sometimes be found in woodlands (NPWS, 2000). Little is known about *Euphrasia arguta*, except that it has been recorded from grassy habitats beside rivers, and possibly may once have occurred in open grassy sites on the study area. Until recently, *E. arguta* was thought to be extinct. However, several populations were found in 2008 in the Nundle area of the Nandewar Bioregion (SEWPaC, 2011c). The Scant Pomaderris occurs in moist eucalypt forest with a shrubby understorey, and occasionally along creeks (NPWS, 2000). All three species have only a low potential for occurring in the habitats on the valley floor. This is supported by the lack of records for these species on the study area despite several surveys since 1994.

Threats relevant to the Trailing Woodruff include disturbance from grazing animals, invasion by introduced weeds near watercourses and the use of herbicides (NPWS, 2000). Threats to the White-flowered Wax Plant include habitat loss and fragmentation, habitat degradation through weed invasion, grazing, rubbish dumping, landfill, urban runoff, track widening and inappropriate fire regimes, as well as the loss of small populations through natural catastrophes and environmental change (NPWS, 2000). For the Scant Pomaderris, roadworks, timber harvesting, weed invasion, habitat clearance, inappropriate fire regimes and the stochastic loss of small populations have been identified as threats (NPWS, 2000). Actual and potential threats to *E. arguta* include grazing, road works and logging (SEWPaC, 2011c).

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

If populations of the Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* and Scant Pomaderris were to occur on the study area, there is potential for loss of part or all of local populations through the clearance of habitat for open pit development and establishment of waste rock emplacements. However, no populations of these species have been detected on the study area in extensive surveys since 1994.

Questions (b), (c) and (d) are not relevant to these species.

(e) In relation to the habitat of a threatened species, population or ecological community:
- ***(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;***
- ***(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and***
- ***(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.***

The Project would remove remnant areas of native forest that provide possible habitat for the Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* and Scant Pomaderris. However, there is only a low likelihood that the habitats on the study area represent actual habitat for these species because:

- There are no records of these species on the study area despite extensive surveys since 1994.
- The habitats on the study area are not the favoured habitats for these species (NPWS, 2000).

Possible habitats for the Scant Pomaderris on the study area have been isolated historically by clearing of native vegetation for farming and grazing. The removal of additional native vegetation for this project and the development of large contiguous open pits and waste rock emplacements would result in increased isolation of several patches of possible habitat for the Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* and Scant Pomaderris.

Given the lack of records of Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* and Scant Pomaderris on the study area, it is concluded that the habitat proposed to be removed is of low importance for these species.

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

In light of the threats to these species listed above, the relevant Key Threatening Processes (OEH, 2011f) are:

- Clearing of native vegetation.
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition.
- Invasion, establishment and spread of Lantana (*Lantana camara*).

The likely effects of clearing native vegetation on the study area for the Project on Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* and Scant Pomaderris are discussed in the answers to the preceding questions.

The main human-induced fire risks for the Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* and Scant Pomaderris on the Project area are the ignition of dry vegetation by petrol vehicle exhaust pipes and cigarette butts. SCPL personnel and contractors would be required to use diesel vehicles to minimise fire risks, and/or to remain on formed tracks, and to dispose of cigarette butts correctly. These and other protocols for bushfire management would be implemented to manage the behaviour of people in the Project area, making it unlikely there would be an increase in fire frequency resulting from Project related human activities. In addition, the presence of SCPL personnel on the Project area would provide early warning of any fires lit by lightning with rapid suppression activities being implemented.

Lantana has considerable potential to invade habitats on the study area and is already present in moist gullies in the wooded range to the east and to a lesser extent in woodland remnants in the former agricultural lands on the valley floor. SCPL is committed to weed control programs to reduce the occurrence of noxious weeds (Section 5.5). With the continued implementation of these measures, it is considered that the Project is unlikely to significantly increase the incidence of Lantana in the local area.

(g) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No current recovery plans exist for Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* or the Scant Pomaderris. However, recovery actions for each species are listed as follows:

Trailing Woodruff (OEH, 2011e)

- Retain existing native vegetation including roadsides and remnant stands, and particularly along watercourses.
- Fence off areas of known habitat to prevent access by stock.
- Protect streamside vegetation.
- Limit use of herbicides to areas away from significant native vegetation.
- Report any records of Trailing Woodruff to the DEC.

White-flowered Wax Plant (OEH, 2011e)

- Determine and implement appropriate fire management practices.
- Consider off-site impacts in the assessment of nearby developments.
- Prevent inappropriate water runoff entering sites.
- Install fencing to exclude livestock and machinery, and control access where required.
- Protect areas of known and potential habitat from clearing and further fragmentation.
- Restore degraded habitat using bush regeneration techniques (note that it is crucial that workers are able to distinguish the species from the exotic Moth Plant [*Araujia sericifera*]).
- Monitor the health of known populations.
- Monitor the populations for changes.
- Mark sites and potential habitat onto maps used for planning maintenance work.
- Map known sites and conduct searches of potential habitat for new sites.

Euphrasia arguta

No recovery actions for *E. arguta* have been listed as yet on the OEH website since the page is still under construction (as of March 2012). However, the following generic set of recovery actions is listed for *E. arguta* on the SEWPaC website (2011c).

Habitat Loss, Disturbance and Modification

- Monitor known populations to identify key threats.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Identify populations of high conservation priority.
- Ensure there is no disturbance in areas where *Euphrasia arguta* occurs, excluding necessary actions to manage the conservation of the species.
- Investigate formal conservation arrangements, management agreements and covenants on private land, and for Crown and private land investigate inclusion in reserve tenure if possible.

Trampling, Browsing or Grazing

- If livestock grazing occurs in the area, ensure land owners/managers use an appropriate management regime and density that does not detrimentally affect this species.
- Where appropriate, manage total grazing pressure at important/significant sites through exclusion fencing or other barriers.

Conservation Information

- Raise awareness of *Euphrasia arguta* within the local community.
- Frequently engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

Enable Recovery of Additional Sites and/or Populations

- Undertake appropriate seed collection and storage.
- Investigate options for linking, enhancing or establishing additional populations.
- Implement national translocation protocols (Vallee *et al*., 2004) if establishing additional populations is considered necessary and feasible.

Scant Pomaderris (OEH, 2011e)

- Support local Landcare groups.
- Manage fire to maintain populations of Scant Pomaderris.
- Protect known populations from disturbance from logging or roadworks.
- Control introduced weeds.
- Protect areas of moist forest and woodland habitat from clearing and fragmentation.
- Notify the DEC of any new occurrences of the species.

Most of the above recovery actions relate to the management of known populations. Despite survey work by several teams of botanists on the study area, and one in the Offset area, since 1994, no observations of these species have been made. It is reasonable to conclude that they do not occur on the study area. Consequently, the above recovery actions are unnecessary on the study area and the Project is not inconsistent with the recovery actions for these species.

Conclusion

From the above assessment on Trailing Woodruff, White-flowered Wax Plant, *Euphrasia arguta* and Scant Pomaderris, it is concluded the Project would have no adverse impact on these species.

Threatened Species Possibly Associated with the Wooded Range to the East – White-flowered Wax Plant, Grove's Paperbark and Rainforest Senna

Three threatened species are considered to have potential to occur in the wooded range on the eastern side of the study area, *viz*. the White-flowered Wax Plant (*Cynanchum elegans*), Grove's Paperbark (*Melaleuca groveana*) and Rainforest Senna (*Senna acclinis*) (Table 27). Two of these, the White-flowered Wax Plant and Rainforest Senna, are associated with subtropical or dry rainforests. A small linear patch of dry rainforest (Vegetation Type 1) occurs along a westward draining gully in the wooded range to the east (Figure 6) and is potential habitat for both species. There is also some potential for these species to occur as part of the rainforest understorey of Vegetation Type 4 (Tallowwood – Brush Box – Sydney Blue Gum moist shrubby Forest) which occurs on sheltered slopes and gullies in the wooded range to the east.

By contrast with the White-flowered Wax Plant and Rainforest Senna, Grove's Paperbark favours heath and shrubland, often on exposed rocky sites and cliffs. Such areas occur on the higher parts of the wooded range to the east where there are patches of skeletal soils and sparse vegetation.

Threats to the White-flowered Wax Plant include habitat loss and fragmentation, habitat degradation through weed invasion, grazing, rubbish dumping, landfill, urban runoff, track widening and inappropriate fire regimes as well as the loss of small populations through natural catastrophes and environmental change (NPWS, 2000). Grove's Paperbark is considered to be threatened by local extinction of small populations, invasion by introduced weeds and too-frequent fires. Rainforest Senna is thought to be susceptible to clearing of habitat, invasion by weeds (Lantana and exotic vines), timber harvesting and accidental removal in weed control programmes owing to its similarity to some introduced species.

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

If populations of the White-flowered Wax Plant and Rainforest Senna were to occur on the study area, there is a small potential for loss of parts of local populations through construction of the upslope water diversion structures on the lower slopes of the wooded range in the east of the study area. This has some potential to impinge on the margins of occurrences of Tallowwood – Brush Box – Sydney Blue Gum moist shrubby Forest to the east of the Stratford East Open Cut. However, no populations of these species have been detected on or near the study area in extensive surveys since 1994. Consequently, it is considered highly unlikely that an adverse impact on any local population would occur.

Grove's Paperbark has some potential to occur on the higher slopes of the wooded range to the east. However, potential habitat is well above the locations of any Project disturbance areas and adverse impacts on local populations of this species are highly unlikely.

Questions (b), (c) and (d) are not relevant to this species.

(e) In relation to the habitat of a threatened species, population or ecological community:
- ***(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;***
- ***(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and***
- ***(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.***

The potential habitat for White-flowered Wax Plant, Rainforest Senna and Grove's Paperbark is within the naturally vegetated western fall of the wooded range on the eastern side of the study area. Only a very small part of the wooded range on the western margins of the lower slopes would be disturbed for the Stratford East Open Cut. This disturbance area is not considered to be preferred habitat of Rainforest Senna or Grove's Paperbark. Consequently, no habitat of these species is likely to be affected. There is a small likelihood that potential habitat of the Rainforest Senna and White-flowered Wax Plant would be affected by the upslope water diversion channel. However, when the overall amount of habitat potentially available for these species in the wooded range and adjoining areas is considered, it is clear that any loss of habitat through the Project would be a very small proportion of that available locally and in the wider region. For this reason also the importance of the habitat to be removed is to be of low importance to the survival of these species in the locality, if they were to occur.

Because habitat disturbance by the Project is all on the western margins of the potential habitat in the wooded range to the east, there would be no increase in habitat fragmentation.

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

In light of the threats to these species listed above, the relevant Key Threatening Processes (OEH, 2011f) are:

- Clearing of native vegetation.
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition.
- Invasion, establishment and spread of Lantana (*Lantana camara*).
- Invasion and establishment of exotic vines and scramblers

The likely effects of Project clearing of native vegetation on the study area on White-flowered Wax Plant, Rainforest Senna and Grove's Paperbark are discussed in the answers to the preceding questions.

The main human-induced fire risks for the White-flowered Wax Plant, Rainforest Senna and Grove's Paperbark on the Project area are the ignition of dry vegetation by petrol vehicle exhaust pipes and cigarette butts. SCPL personnel and contractors would be required to use diesel vehicles to minimise fire risks, and/or to remain on formed tracks, and to dispose of cigarette butts correctly. These and other protocols for bushfire management would be implemented to manage the behaviour of people in the Project area, making it unlikely there would be an increase in fire frequency resulting from Project related human activities. In addition, the presence of SCPL personnel on the Project area would provide early warning of any fires lit by lightning with rapid suppression activities being implemented.

Lantana has considerable potential to invade habitats on the study area and is already present in moist gullies in the wooded range and to a lesser extent in woodland remnants in the former agricultural lands on the valley floor. SCPL is committed to weed control programmes to reduce the occurrence of noxious weeds (Section 5.5). With the continued implementation of these measures, it is considered that the Project is unlikely to significantly increase the incidence of Lantana in the local area generally. Exotic vines appear to have less potential than Lantana to invade habitats of the White-flowered Wax Plant, Rainforest Senna and Grove's Paperbark on the study area. Few exotic vines were recorded in multiple surveys of the study area and they appear to be uncommon in the district generally. It is considered unlikely that the Project would result in an increase in the incidence of exotic vines in potential habitats of White-flowered Wax Plant, Rainforest Senna and Grove's Paperbark in the wooded range to the east.

(g) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No current recovery plans exist for White-flowered Wax Plant, Rainforest Senna or Grove's Paperbark. However, recovery actions for each species are listed as follows:

White-flowered Wax Plant (OEH, 2011e)

- Determine and implement appropriate fire management practices.
- Consider off-site impacts in the assessment of nearby developments.
- Prevent inappropriate water runoff entering sites.
- Install fencing to exclude livestock and machinery, and control access where required.
- Protect areas of known and potential habitat from clearing and further fragmentation.

- Restore degraded habitat using bush regeneration techniques (note that it is crucial that workers are able to distinguish the species from the exotic Moth Plant [*Araujia sericifera*]).
- Monitor the health of known populations.
- Monitor the populations for changes.
- Mark sites and potential habitat onto maps used for planning maintenance work.
- Map known sites and conduct searches of potential habitat for new sites.

Rainforest Senna (OEH, 2011e)

- Control and remove introduced weeds.
- Ensure correct identification of Senna weed species before removal.
- Protect habitat from clearing and logging.
- Initiate and encourage bush regeneration in habitat areas.

Grove's Paperbark (OEH, 2011e)

- Manage fire to encourage regeneration of Grove's Paperbark.
- Control and remove introduced weeds.
- Encourage regeneration of heath and shrubland habitat.

Most of the above recovery actions relate to the management of known populations. Despite survey work by several teams of botanists on the study area, and one in the Offset area, since 1994, no observations of these species have been made. It is reasonable to conclude that they do not occur on the study area. Consequently, the above recovery actions are unnecessary and the Project is not inconsistent with the recovery actions for these species.

Conclusion

From the above assessment on White-flowered Wax Plant, Rainforest Senna and Grove's Paperbark, it is concluded the Project would have no adverse impact on these species.

4.9.2 Threatened Populations

Database searches indicated that no listed threatened flora populations occur on or near the study area (Section 2.3.2).

4.9.3 Threatened Ecological Communities

Database searches indicated that one listed threatened ecological community, the River-flat Eucalypt Forest on Coastal Floodplains EEC, listed under the TSC Act, may have potential to occur on or near the study area (Section 2.3.3). However, detailed comparison of the Final Determination (DEC, 2004) for the EEC and the landscape, soil, hydrological and floristic characteristics of Community 5 (Cabbage Gum Paperbark Sedge/Grass Forest), showed it does not belong to the EEC (Section 3.6.1). No communities listed under the EPBC Act occur on the study area.

4.10 CUMULATIVE IMPACTS

Loss of Native Vegetation

The clearance of native flora for this Project would continue an historical, albeit fluctuating, trend towards reduction in the area of native vegetation in the region. The most fertile arable land in the lower lying flat to undulating parts of the region is productive agricultural land that has been farmed intensively for a century and a half. The surrounding steeper slopes, hills and ranges, while retaining their natural vegetation cover, have been subject to episodes of logging on public and private land throughout this period. Much of the public land has been dedicated as State Forests for timber extraction or as conservation reserves.

A consequence of the history of land clearing in the Gloucester Valley is that native vegetation types characteristic of the more fertile soils of the valley floor and footslopes have been considerably reduced in the region with only small fragmented remnants remaining, usually on privately-owned land. In contrast, most vegetation types on steeper slopes and skeletal soils are well represented in the conservation reserve system.

The Project would result in the loss of 105 ha of native vegetation. This is in addition to native vegetation that has been removed in previous phases of mining associated with the Stratford Mining Complex (Figures 8a to 8e). In addition to the Project, vegetation clearance is also associated with the nearby Duralie Coal Mine, also on the Permian sediments of the Gloucester Coal Measures. Projected native vegetation losses at the Duralie Extension Project are expected to total 87 ha of native vegetation (Cenwest Environmental Services and Resource Strategies, 2010). However, the total loss is a very small proportion of the area that has been cleared historically and of the amount of native vegetation remaining in the immediate surrounds of the Project area.

The main significance of the losses is that the affected vegetation communities have been the most heavily cleared in the region historically. Consequently, the vegetation to be removed by the Project further depletes these already highly cleared vegetation types.

Offset Strategy

The offset strategy for the Project is described in Section 6.

Threatened Flora

The study area has no threatened flora species, populations, ecological communities or critical habitat listed under the TSC Act or EPBC Act and no cumulative impact is expected to occur on such entities.

5 IMPACT AVOIDANCE AND MITIGATION MEASURES

A number of impact avoidance and mitigation measures applicable to flora have been developed for the Project as listed below and described in Sections 5.1 to 5.7:

- mine design refinements;
- vegetation clearance procedures;
- Stratford Mining Complex Biodiversity Enhancement Area;
- rehabilitation and revegetation of post-mine landforms;
- weed control and prevention;
- bushfire prevention; and
- dust control.

These measures would be described within the *Stratford Mining Complex Biodiversity Management Plan*.

5.1 MINE DESIGN REFINEMENTS

The following refinements to the mine design have resulted in avoiding additional impacts on flora and their habitats:

- Optimising the area of the open cut pit that is backfilled to minimise the overall mine footprint, including complete backfilling of the Stratford Main Pit and BRNOC as well as partial backfilling of the Roseville West Pit Extension and Stratford East Open Cut.
- Continued use of several existing features at the Stratford Mining Complex, including:
  - open cut voids for water and rejects storage;
  - Stratford East Dam for water management;
  - CHPP; and
  - rail facilities.
- Avoiding clearance of large areas of surrounding bushland:
  - between the Stratford Main Pit, the Stratford Waste Emplacement Extension, the proposed Avon North Open Cut and the proposed Northern Waste Emplacement Extension;
  - west of the BRNOC; and
  - south of the Stratford Waste Emplacement and west of the proposed Stratford East Open Cut.
- Avoiding disturbance to Avondale Creek.
- Increasing the maximum height of the existing waste emplacements to be comparable to surrounding landform heights and less than the maximum height of ridge line to the east of the Development Application Area (470 m AHD) to minimise the overall mine footprint.

5.2 VEGETATION CLEARANCE PROCEDURES

Vegetation clearance would be undertaken progressively over the life of the Project with areas progressively rehabilitated. Clearance activities for the Project would include the following related to flora:

- Clear delineation of disturbance areas and restriction of clearing to the minimum area necessary to undertake the approved activities.
- Where practicable, the area cleared in each campaign would be no greater than that required to accommodate the mine's needs for the following 12 months, thereby retaining vegetation for longer.
- Ground cover would be retained and subsequently collected when the topsoil is stripped to improve the viability of the soil when it is used in rehabilitation.
- The collection of seed from select felled trees for seedling propagation on rehabilitated areas.

5.3 STRATFORD MINING COMPLEX – BIODIVERSITY ENHANCEMENT AREA

The mining leases associated with the Stratford Mining Complex are managed to provide a mixed land use – mining, agriculture (grazing livestock) and biodiversity conservation. An area designated as a wildlife corridor through the Stratford Mining Complex was proposed as part of the original EIS (AGC Woodward-Clyde, 1994) for the Stratford Coal Mine. The proposal was intended to link existing areas of vegetation within the mining lease with larger areas of natural vegetation to the east of the Project.

The areas outside of the proposed Project area would continue to be used for both grazing livestock and conservation of biodiversity. To incorporate the proposed Project disturbance areas, the original design of wildlife corridor (here in referred to as the Biodiversity Enhancement Area) has been modified while still maintaining the overall intent for the managed land (i.e. to link existing areas of vegetation).

The modified Biodiversity Enhancement Area covers approximately 240 ha. Tables 28 and 29 compare areas of vegetation types between the previous Biodiversity Enhancement Area and the revised Biodiversity Enhancement Area. The revised Biodiversity Enhancement Area is greater in overall area than the previous Biodiversity Enhancement Area.

Table 28
Previous and Revised Biodiversity Enhancement Area – Vegetation Types

Vegetation Type	Previous Vegetation Management Area (ha)	Revised Vegetation Management Area (ha)
6: Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (HU644)	2	0
9: Grey Box – Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast (HU549)	26	46
11: Smooth-barked Apple – White Stringybark Shrubby Forest	32	55
12: Rough-barked Apple Grassy Open Forest on Valley Flats of the North Coast and Sydney Basin (HU605)	0.7	4
13: Derived Grasslands in Coastal Valleys (HU670)	13	17
15: Artificial Wetlands	15	19
Total	**88.7**	**141**

Table 29
Previous and Revised Biodiversity Enhancement Area – Map Units

Map Unit	Previous Vegetation Management Area (ha)	Current Vegetation Management Area (ha)
Map Unit A: Introduced Pasture with Scattered Native Trees	98	95
Map Unit B: Planted Trees	3	4

The following measures are relevant to the management of the Stratford Mining Complex Biodiversity Enhancement Area:

- planting with suitable tree species currently occurring on the Project area from local seed; and
- exclusion of stock via maintenance of perimeter fencing around the area undergoing revegetation.

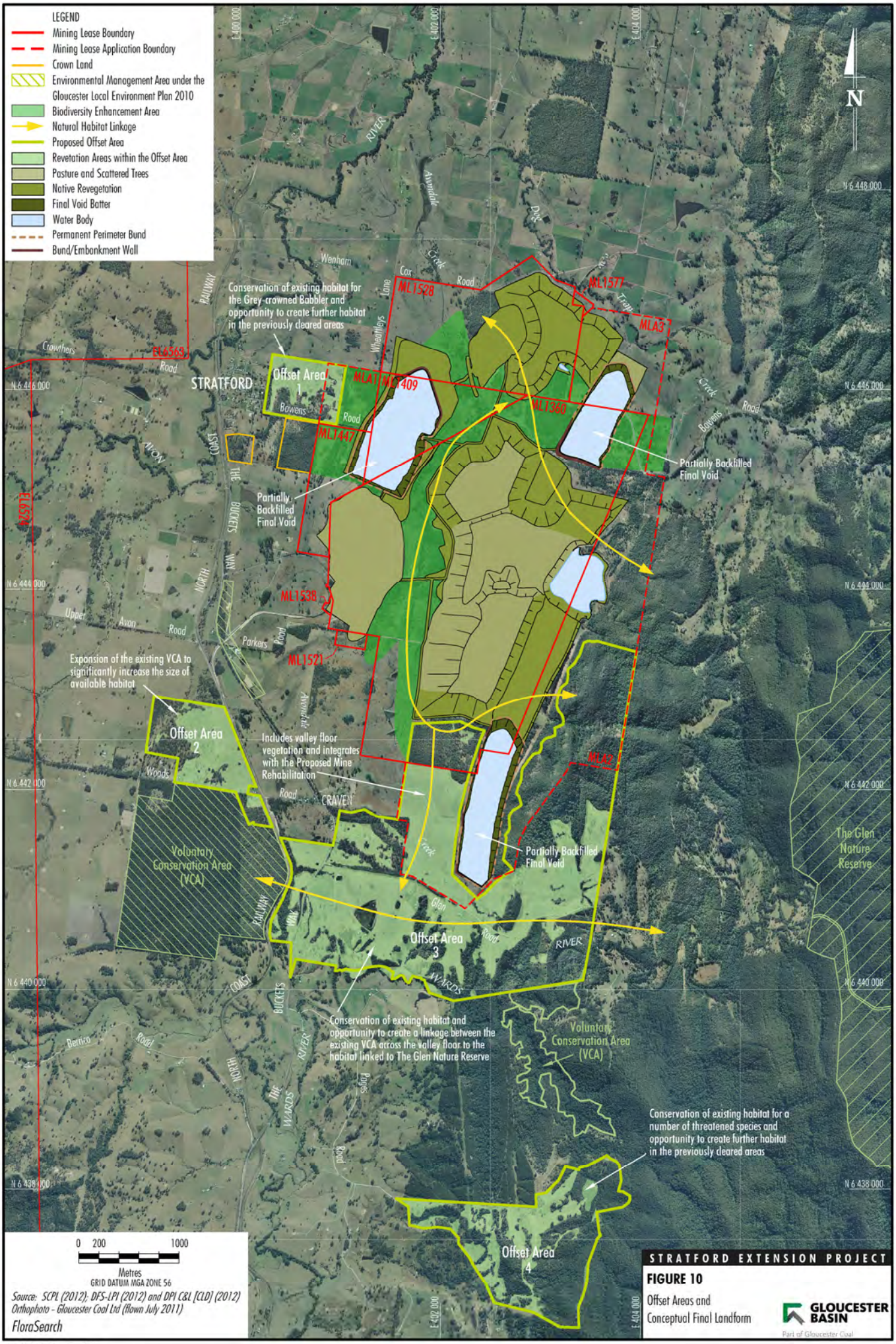
The modified Biodiversity Enhancement Area would be established following finalisation of the *Stratford Mining Complex Biodiversity Management Plan.*

5.4 REHABILITATION AND REVEGETATION OF POST-MINE LANDFORMS

The disturbance areas associated with the Project would be progressively rehabilitated and revegetated with species characteristic of native woodland/open forest (350 ha) and pasture with scattered trees (300 ha) (Figure 10). An objective of the rehabilitation programme is to restore ecosystem function to land affected by the mine development including maintaining or establishing self-sustaining ecosystems (SCPL, 2011).

The revegetation would comprise of the following aspects (Figures 11 and 12):

- Landforms revegetated with woodland would form an expansion of, and be contiguous with, existing woodland areas, where practical.
- The post-mine landforms would be revegetated progressively with species characteristic of the surrounding area. Revegetation species would be selected on one or more of the following criteria:
  - short-lived cover crop (millet or oats);
  - endemic to the area;
  - structural characteristics (e.g. soil stabilisation);
  - potential to offer habitat resources for native wildlife;
  - relatively low maintenance requirements; or
  - found to be suitable based on rehabilitation experience at the Stratford Mining Complex or Duralie Coal Mine.
- Rehabilitation areas would be revegetated via direct seeding or planting of seedlings.



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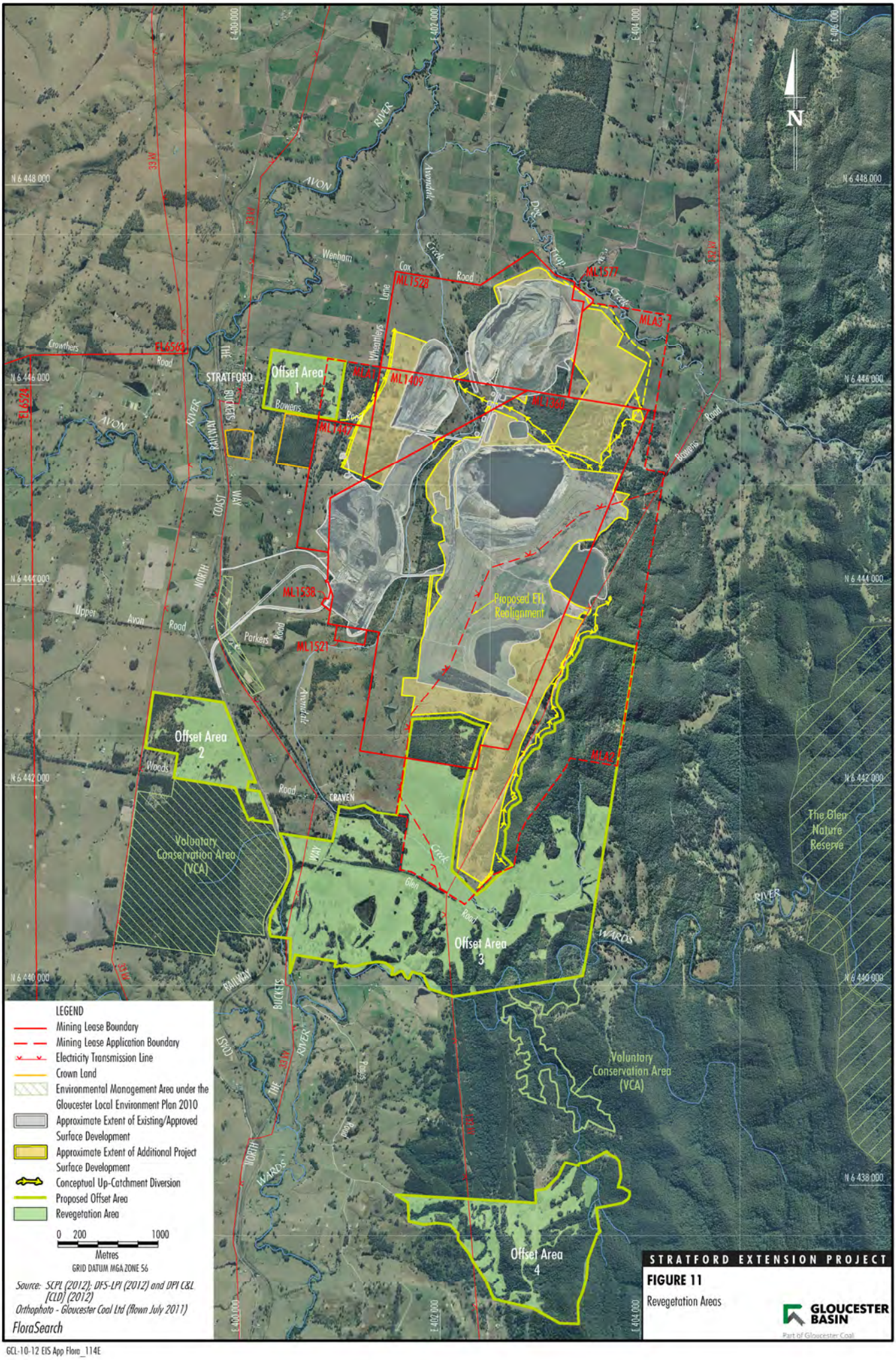

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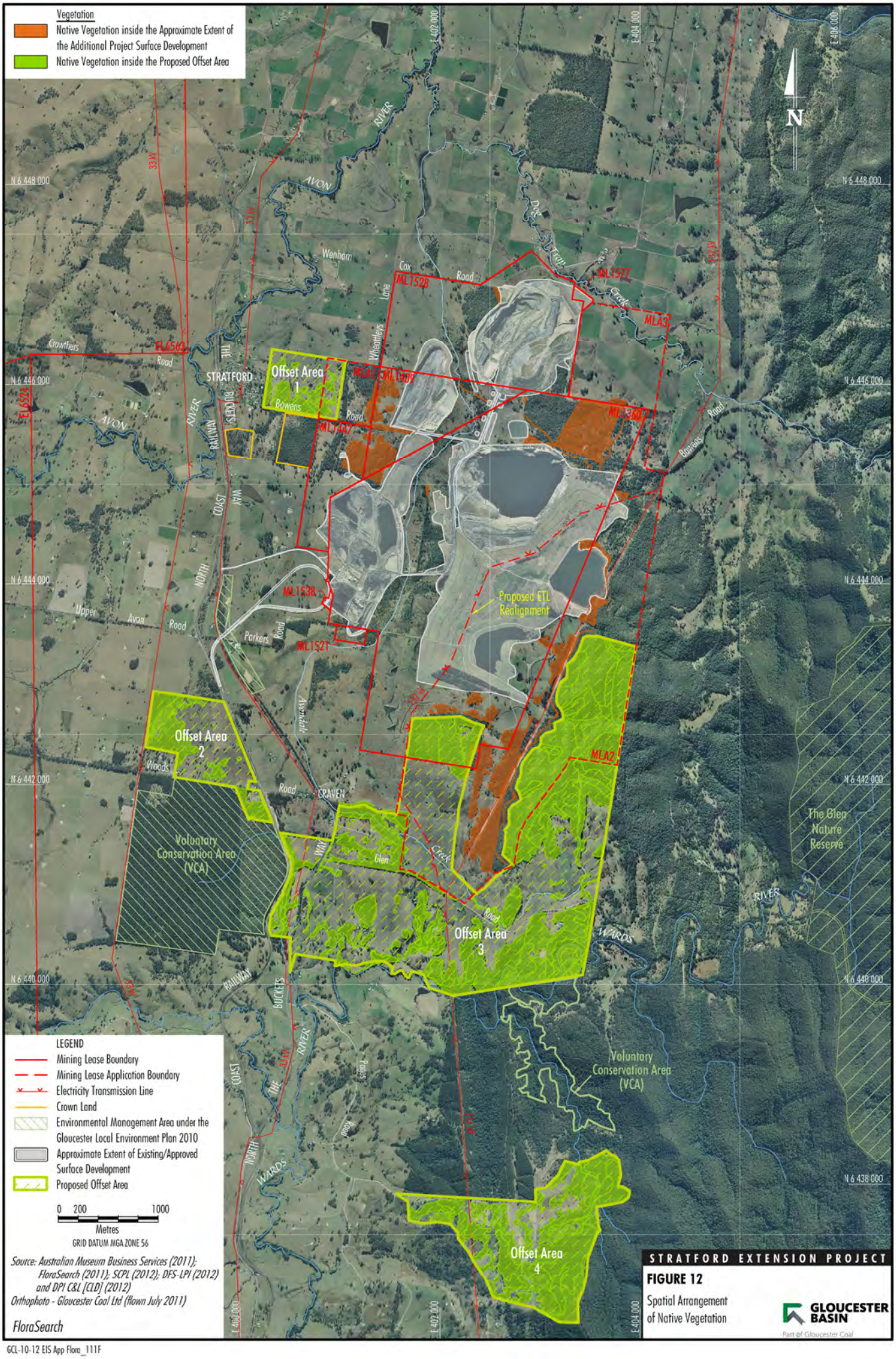

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A range of measures would be used to protect the rehabilitated areas:

- Exclusion of stock via maintenance of a perimeter fencing around the area undergoing rehabilitation.
- Installation of biodegradable plastic or cardboard tree guards around the planted seedlings to protect against wind and cold and rabbit/hare grazing, if required.
- Exotic vertebrate pest (e.g. rabbit/hare) control.
- Restriction of vehicles within revegetated areas.
- Irrigation to promote revegetation.

Revegetation of the post-mine landforms would be under regular review, including annual surveys by appropriately qualified and experienced persons to identify the success of the rehabilitation programme and identify any additional measures to ensure ongoing rehabilitation success.

A monitoring programme would be designed to track the progress of the revegetation programme (in terms of plant growth and species diversity) and to determine the requirement of intervention measures such as ecological thinning to reduce locked-regrowth, or additional plantings that may be required. A detailed monitoring report would be prepared annually that includes a summary of previous monitoring reports. The monitoring results would be reported in the Annual Review.

5.5 WEED CONTROL AND PREVENTION

Weed control measures would include:

- Identification of weeds via regular site inspections and communication with landholders and regulatory authorities.
- Mechanical removal of identified weeds and and/or the application of approved herbicides in authorised areas.
- Follow-up site inspections to determine the effectiveness of eradication programmes.
- Minimisation of seed transport from the site during construction and operation through the use of the vehicle wash bay.
- Specific control of noxious weeds, including these which have been recorded in the area, namely: Crofton Weed (*Ageratina adenophora*), Giant Parramatta Grass (*Sporobolus fertilis*), Lantana (*Lantana camara*), Blackberry (*Rubus fruticosus*) and Basket Willow (*Salix viminalis*) (Section 3.7).

5.6 BUSHFIRE PREVENTION

Management measures that would be implemented by SCPL in consultation with the Rural Fire Service to minimise the potential for fire ignition include:

- Clearing restrictions – clearing would not be undertaken during periods of extreme fire danger as defined by the BoM (2011).
- Controlled grazing – controlled high intensity short-term grazing would be employed to assist in the reduction of vegetative fuel loads on areas on which active mining operations are not occurring and appropriate fencing is available.

- Vehicle movements – all personnel and contractors would be required to use diesel vehicles and/or remain on defined roads or tracks.
- Fire breaks – the establishment and maintenance of a fire break around the perimeter of the mining leases.
- No smoking areas – prohibition of smoking in fire prone areas.
- Fire fighting equipment – provision of fire fighting equipment on-site.
- Training – all mine personnel will receive basic fire control training.

5.7 DUST CONTROL

A range of measures to minimise dust controls would be adopted for the Project, such as:

- Water spraying of internal unsealed haul roads.
- Cleared areas are sprayed regularly with water during any construction activities, where appropriate.
- Progressive rehabilitation of disturbance areas including topsoil and subsoil stockpiles.
- Vegetation clearance ahead of construction is minimised.
- Soil stripping is avoided during periods of high wind and/or low soil moisture as to prevent dust lift-off or water spraying is used to increase the soil moisture if soil stripping occurs during periods of high wind or low soil moisture.

6 OFFSET MEASURES

Measures that are proposed to avoid and mitigate impacts from the Project on flora are described in Section 5. This section describes an offset proposal aimed at addressing the residual impacts. Environmental offsets are defined by the Australian Government as (SEWPaC, 2011d): *measures to compensate for the adverse impacts of an action on the environment*.

The Stratford Mining Complex has an existing Offset area comprising of 29 ha of existing vegetation and cleared land (SCPL, 2010). It is located 20 km south of the Stratford Mining Complex, near the Duralie Coal Mine.

The Director-General's Requirements (DGRs) for the Project state that the EIS must include a description of the measures that would be implemented to maintain or improve the biodiversity values of the surrounding region in the medium to long-term. This report addresses the flora aspects of biodiversity.

The offset proposal for the Project involves conserving an area of land with existing conservation values and providing active management to maintain and enhance the values. The proposal has been prepared considering:

- Specific government advice on the Project:
  - NSW Planning and Infrastructure DGRs; and
  - EPA's input in to the DGRs.
- SCPL consultation with the Gloucester Shire Council and the Hunter-Central Rivers CMA.
- Government guidelines, i.e. the OEH's principles for the use of biodiversity offsets in NSW (OEH, 2011c).
- The approved Duralie Coal Mine offset proposal.

The offset proposal is described in Section 6.1, the characteristics of the proposed Offset areas are described in Section 6.2, a reconciliation of the proposed offset strategy against the OEH Offset Principles is provided in Section 6.3, and the ecological gains of the proposed Offset areas are provided in Section 6.4.

6.1 OFFSET PROPOSAL – MANAGEMENT, SECURITY, MONITORING AND AUDITING

The proposed Offset areas are located in the local area near the Project area (Figure 9). The sub-sections below outline the proposed method of conserving the Offset areas in perpetuity, proposed management, monitoring, independent audits and completion criteria.

Conservation in Perpetuity

An arrangement would be made to ensure long-term protection and management of the Offset areas within 12 months of Project approval. A voluntary conservation agreement pursuant to Section 69B of the *National Parks and Wildlife Act 1974*, would be sought, consistent with contemporary Project approval conditions pertaining to offsets.

Proposed Management and Management Plan

The management of the proposed Offset areas would be described within the *Stratford Mining Complex Biodiversity Management Plan*.

A number of management measures are listed and described below based on detailed flora and fauna surveys of the proposed Offset areas (Australian Museum Business Services, 2012; Attachment B) and an assessment of the measures required to enhance the flora and fauna values of the area, including:

- revegetation of cleared land to substantially increase the amount of vegetation in the area;
- management of livestock grazing;
- control of weeds to enable natural regeneration of native vegetation;
- exotic animal management to benefit native wildlife;
- bushfire management; and
- controlling vehicular access.

Revegetation

The proposed Offset areas provides for a combination of protection and enhancement of existing remnant vegetation as well as active revegetation to increase the overall biodiversity of the area by restoring the internal connectivity of woodland/forest habitats within the proposed Offset area.

A considerable part in the proposed Offset areas are cleared lands (435 ha) comprising predominantly introduced grasses and an additional 10 ha of existing planted trees. These cleared lands are between patches of native remnant vegetation comprising mainly wet sclerophyll forest, grassy woodlands and dry sclerophyll forests. The aim of revegetation would be to establish a range of habitat niches through revegetation (including canopy, understorey and ground cover).

Natural regeneration of woodland/forest is unlikely to readily occur in the cleared lands due to the dominance of introduced flora species. To assist revegetation, the cleared lands would be actively managed as follows:

1. Increase potential for natural regeneration through management of threatening processes that inhibit natural regeneration (e.g. removal of weeds).
2. Management options that cause some disturbance to the grassland could be trialled. For example, slashing or low-intensity controlled burning around paddock trees before seed fall and seasonal rains. In areas with no paddock trees, disturbance could be caused before seasonal rains to encourage regrowth from soil seed stores.
3. Revegetate with appropriate plantings or seeding of species represented in the surrounding native vegetation communities. Local seed sources would be used.

Management of Livestock Grazing

Livestock grazing would be excluded from the Offset areas through the provision of appropriate stock fencing.

Control of Weeds

Four flora species listed as Noxious in the Gloucester Shire and Great Lakes Council under the *Noxious Weeds Act, 1993* were recorded in the proposed Offset areas (Attachment B). Three of these species are listed as Class 4 weeds (Crofton Weed [*Ageratina adenophora*], Blackberry [*Rubus fruticosus*], Lantana [*Lantana camara*], and one is listed as a Class 3 weed, Green Cestrum (*Cestrum parqui*). These and other weeds would be controlled and monitored by an appropriately qualified contractor using standard methods.

Animal Pest Management

Six introduced species were located during the survey of the proposed Offset area, namely the House Mouse (*Mus musculus*), Black Rat (*Rattus rattus*), Red Fox (*Vulpes vulpes*), Feral Cat (*Felis catus*), Brown Hare (*Lepus capensis*) and European Rabbit (*Oryctolagus cuniculus*) (Attachment B). Animal pests would be controlled and monitored by an appropriately qualified contractor using standard methods.

Fire Management

Access tracks throughout the proposed Offset area would be maintained for fire management. The *Stratford Mining Complex Biodiversity Management Plan* would describe fire management procedures applicable to the proposed Offset areas.

Controlling Vehicular Access

Vehicular access would be controlled by fencing and signing the Offset area. Vehicle movements would be predominately on designated vehicle tracks.

Monitoring

A programme would be undertaken to monitor and report on the effectiveness of the measures and the performance of the offset, with summary reporting to be carried out annually and comprehensive reporting following the independent environmental audit. The monitoring would be undertaken by a suitably qualified person(s).

Independent Audits

The proposed Offset areas would be independently audited at intervals agreed with relevant authorities. The audits would be conducted by a suitably qualified person(s) to:

- assess compliance with the management plan;
- assess the performance of the proposed Offset area;
- review the adequacy of the management measures and monitoring programme; and
- recommend actions or measures to improve the performance of the offset, management plan, or monitoring programme.

Completion Criteria

Completion Criteria are presented in Table 30.

Table 30
Proposed Offset Completion Criteria

Component	Completion Criteria
Enhancement Areas (i.e. existing rainforest, riparian forest, wet sclerophyll forest, grassy woodlands, dry sclerophyll forests)	Areas of existing remnant vegetation within the Offset areas (490 ha) have been conserved and enhanced[1].
Revegetation Areas (i.e. derived grasslands and cleared land)	435 ha of revegetated land as a self-sustaining ecosystem[2,3].
Direct links between the Offset areas and Rehabilitation area	Native vegetation has been established which directly links vegetation areas of the Offset areas with the Rehabilitation area.

[1] Plus 10 ha of existing planted trees.

[2] The methodology for determining a self-sustaining ecosystem shall be to the satisfaction of the Director-General.

[3] Woodland/forest would not be restored along the power line easement in accordance with the relevant requirements of the power authority (i.e. groundcover vegetation only).

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6.2 FLORA CHARACTERISTICS OF THE PROPOSED OFFSET AREA

The proposed Offset areas (its size, location and proposed management regime) were selected using a methodology that takes into consideration a range of factors:

1. The location of the proposed disturbance relative to the proposed offset.
2. How the proposed offset could complement the existing reserve system.
3. The regional conservation priorities and vegetation most in need of conservation.
4. The available land tenure on which to locate an Offset area.
5. The vegetation composition of the proposed disturbance area relative to the proposed Offset area.
6. The size of the Offset areas relative to the proposed disturbance area.
7. The shape of the proposed Offset areas in relation to the spatial arrangement of existing vegetation in the landscape.
8. The ecosystem resilience and condition of the proposed Offset area.
9. Existing infrastructure – roads, rail, power lines and houses.
10. A range of fauna considerations (refer to the fauna assessment prepared by Australian Museum Business Services, 2011).

These factors are further discussed below in relation to the proposed Offset area.

6.2.1 Regional Location

The proposed Offset areas are located within the same CMA region as the Project area (i.e. the Hunter-Central Rivers CMA Region) and therefore has the capacity to benefit biodiversity values in the same region as the Project.

Vegetation communities can change in plant composition over distances due to differences in environmental factors. The proposed Offset areas are suitably located because it is local to the area proposed to be disturbed and has a greater chance of maintaining and improving the biodiversity that would be impacted.

6.2.2 Existing Reserve System

The proposed Offset area compliments the existing reserve system in NSW. Part of the offset (Offset areas 2 and 3) expand on two existing areas conserved under a voluntary conservation agreement (Figure 9). The habitat within Offset area 3 is linked through private properties to The Glen Nature Reserve.

The offset area does not link to the Glen Nature Reserve because:

- The proposed Offset areas are more representative (like-for-like) of the vegetation that would be cleared for the Project. The Glen Nature Reserve is located on elevated land of the Wards River Catchment. The composition of the vegetation which occurs higher in the catchment is different to that on the Gloucester Valley floor.
- A vegetated link already exists between the proposed Offset areas and the Glen Nature Reserve. The vegetation between the areas (like all native vegetation in NSW) is protected under the *Native Vegetation Act 1999* and it is less likely to be grazed than the Gloucester Valley floor because it is elevated.

6.2.3 Regional Conservation Priorities

Landscape Corridors

Offset Area 3 is located within an OEH recognised climate change corridor as described and mapped in the *Fauna Corridors For Climate Change – Landscape Selection Process Key Altitudinal, Latitudinal and Coastal Corridors for response to Climate Change Hunter Central Rivers Catchment Management Authority (HCRCMA)* (DECC, 2007b). While the focus of this document was fauna, assisting in the restoration of the once existing linkage is likely to also benefit flora.

Valley Floor Vegetation

As previously identified, Vegetation Type 8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526) which is 70% cleared in the CMA. Even though the Project would involve clearance of approximately 13.5 ha of this vegetation type it would conserve and enhance approximately 30 ha. A further benefit would be that large areas of cleared land adjoining the existing patches would regenerate following stock exclusion and active management.

Watercourses

The Offset areas contain a number of watercourses that would be subject to conservation and enhancement (Figure 9):

- two reaches of the Wards River occur in the proposed Offset area 3 (approximately 0.5 km and 0.65 km);
- upper reach of the Avondale Creek in the proposed Offset area 3 (approximately 4.4 km); and
- other drainage lines.

6.2.4 Tenure of the Proposed Offset Area

The proposed Offset areas are located on the following tenure (lot and DP): *1, 997092; 1, 1082739; 1, 998562; 1, 997290; 1, 116325; 1, 778861; 1, 815045; 1, 855240; 2, 1082739; 2, 737421; 2, 778861; 2, 815045; 5, 722748; 7, 722748; 45, 979859; 64, 979859; 66, 1008585; 70, 979859; 70, 979859; 110, 874013; 392, 876813; 506, 1014670; 508, 1014670; 1221, 806209; A, 116326.*

As previously stated, the land tenure underlying the proposed Offset areas would be secured in perpetuity for wildlife conservation.

6.2.5 Vegetation

The Offset areas contain rainforest, riparian forest, wet sclerophyll forest, grassy woodlands, dry sclerophyll forests and cleared land. Tables 31 and 32 compare the vegetation types/map units within the study area with those in the proposed Offset area.

Attachment H provides a comparison of the vegetation communities within the study area and Offset area.

Table 31
Quantification of Vegetation Types in the Disturbance Area and Offset Area

Vegetation Type	Approximate Area to be Cleared (ha)	Approximate Area to be Offset (ha)
1: Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin.	0	0.7
2: Weeping Lilly Pilly – Water Gum Riparian Rainforest of the Southern North Coast (HU651)	0	8.5
3: River Oak riparian woodland of the North Coast and Northern Sydney Basin	0	0
4: Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast (HU642)	0.2	20
5: Grey Gum – Tallowwood Spotted Gum Forest and Woodland	0	18
6: Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (HU644)	19	194.5
7: Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland	0	16.5
8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526)	13.5	30
9: Grey Box – Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast (HU549)	0	50
10: Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630)	65	142
11: Smooth-barked Apple – White Stringybark Shrubby Forest	0	0
12: Rough-barked Apple Grassy Open Forest on Valley Flats of the North Coast and Sydney Basin (HU605)	0	3.5
13: Derived Grasslands in Coastal Valleys (HU670)	5.5	0
14: Acacia Regeneration	0.5	2
15: Artificial Wetlands	0	8
Total	**103.7 (rounded to 105 ha)**	**493.7 ha (rounded to 490 ha)**

Table 32
Clearance of Each Map Unit within the Study Area

Map Unit Type	Approximate Area to be Cleared	Approximate Area to be Offset
Map Unit A: Introduced Pasture with Scattered Native Trees	190 ha	436.6 ha (rounded to 435 ha)
Map Unit B: Planted Trees	1.3 ha	9.9 ha
Total	**191.3 (rounded to 195 ha)**	**446.5 ha (rounded to 445 ha)**

As would be expected from the close proximity of the Project area and Offset areas, there is a great deal of overlap in vegetation types between the two areas (Tables 31 and 32). However, some differences in topography and geology also mean there are some differences. Five vegetation communities identified in the Offset areas (Attachments B and H) do not occur on the Project area, *viz.*:

1. White Stringybark – Spotted Gum – Red Ironbark Forest and Woodland.
2. Grey Gum – Tallowwood – Spotted Gum Forest and Woodland.
3. Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland.
4. Grey Ironbark – Grey Gum Forest.
5. Rough-barked Apple – Broad-leaved Apple Woodland.

The presence of these communities in the Offset area represents a biodiversity gain from the offset. Further, although the Derived Grasslands in coastal valleys vegetation type is not present in the Offset area, this vegetation type is a derived (disturbed) version of the other vegetation types present in the Offset area. Photographic snapshots of Vegetation Types 5, 6, 7, 8, 9, 12 and Map Units A and B, all present in the Offset area, are shown on Plates 12 to 19.

Plate 12. Vegetation Type 5

Plate 13. Vegetation Type 6

Plate 14. Vegetation Type 7

Plate 15. Vegetation Type 8

Plate 16. Vegetation Type 9

Plate 17. Vegetation Type 12

Plate 18. Map Unit A

Plate 19. Map Unit B

6.2.6 Size

Table 33 provides a summary of the quantity of Offset area in relation to the proposed Project clearance area, while Attachment I provides a detailed quantification. The proposed Offset area for the Project covers approximately 935 ha of land, and comprises approximately 490 ha of existing native vegetation communities, 435 ha of cleared land that would be restored with species characteristic of the surrounding vegetation[3] and 10 ha of existing planted trees that would be retained.

Table 33
Quantification of the Proposed Offset Area

	Project Clearance Area (ha)	**Proposed Offset Area (ha)**
Existing native vegetation	105	490
Cleared land	195	445
Total	300	935

Note: This contains a 170 ha area (Area 4) that has been included in the offset to provide specific threatened fauna habitat (refer to Australian Museum Business Services, 2011).

Cleared land would comprise a combination of mainly wet sclerophyll forest, grassy woodlands and dry sclerophyll forests, expanding from areas of existing vegetation.

[3] Woodland may not be restored along some sections of the power line easement due to maintenance and safety issues.

6.2.7 Shape

The shape of the proposed Offset area takes into consideration the spatial arrangement of existing vegetation in the area and aims to link and expand on the size of the existing patches (Figure 12; Table 34).

Table 34
Strategic Benefit of the Offset Areas

Area	Size (ha)	Description
Offset Area 1	40	• Contains the same vegetation types present within the proposed surface disturbance area. • Contains 8 ha of Vegetation Type 8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526) which is 70% cleared in the CMA. • Contained cleared land that was likely to have contained Vegetation Type 8. • Adds to the overall size of vegetation in the area by expanding the area of vegetation on the opposite side of Bowens Road next to the crown reserve.
Offset Area 2	70	• Contains the same vegetation types present within the proposed surface disturbance area. • Contains 3.5 ha of Vegetation Type 8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526) which is 70% cleared in the CMA. • Contains cleared land that was likely to have contained Vegetation Type 8. • Adds to the overall size of vegetation in the area by expanding the area of vegetation on the opposite side of Woods Road to the existing Voluntary Conservation Agreement area.
Offset Area 3	655	• Contains the same vegetation types present within the proposed surface disturbance area plus four additional vegetation types. • Contains 18.4 ha of Vegetation Type 8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526) which is 70% cleared in the CMA. • Contains cleared land that was likely to have contained Vegetation Type 8.
Offset Area 4	170	• Contains a vegetation type that is also present within the proposed surface disturbance area plus one additional vegetation type.

6.2.8 Ecosystem Resilience and Condition

The vegetation on the agricultural parts of the Offset area is in similar condition to that on the study area, so that when it is removed from agricultural production, the remnant woodland/forest can be expected to begin natural regeneration.

The remnant vegetation communities in the proposed Offset areas are in moderately good condition (Appendix E). The cleared lands are currently rated as poor condition, owing to the lack of native vegetation. A vegetation condition map is provided in Appendix E.

The AMBS describes how no parts of the Offset area could be classed as old growth (Appendix E). However, there are a small number of large and old trees unable to be mapped (Appendix E).

There are some scattered trees (e.g. *Eucalyptus fibrosa* and *Corymbia maculata*) between vegetation patches which would provide a seed source for natural revegetation. Although the cleared lands are predominantly introduced grasses there are also some native species present (e.g. *Themeda triandra*; *Lomandra* spp. and *Poa* spp.) (Appendix E).

6.2.9 Existing Infrastructure – Roads, Rail, Power Lines and Houses

A number of existing infrastructure occurs near the Offset areas:

- Bowens Road – occurs south of Offset area 1.
- Woods Road – occurs south of Offset area 2.
- The Bucketts Way – occurs through Offset area 3.
- The Glen Road – occurs through Offset area 3.
- North Coast Railway – occurs through Offset area 3.
- Powerline – occurs through Offset area 3.
- Residences occur within Offset area 3.

The proposed power line would span a section of the proposed Offset area. Woodland/forest would not be allowed to regenerate within the power line corridor. However, in accordance with current practises, groundcover would be maintained for power line safety.

6.3 RECONCILIATION OF THE PROPOSED OFFSET STRATEGY AGAINST OEH OFFSET PRINCIPLES

Table 35 provides a reconciliation of the proposed offset strategies against the OEH Offset Principles (OEH, 2011c).

Table 35
Reconciliation of the Proposed Offset Strategy against OEH Offset Principles

OEH Offset Principles (OEH, 2011c)	Description of How the Proposed Offset Addresses the OEH Offset Principles
Impacts must be avoided first by using prevention and mitigation measures.	Measures to avoid and mitigate Project impacts on flora are described in Section 5. The proposed offset strategy is proposed to address residual impacts.
All regulatory requirements must be met.	SCPL is required to meet all statutory requirements. The proposed offset strategy is not proposed to substitute other licence/approval requirements.
Offsets must never reward ongoing poor performance.	The proposed offset strategy is proposed to address residual impacts associated with the Project only.
Offsets will complement other government programmes.	An arrangement would be made to ensure long-term protection and management of the Offset area within 12 months of Project approval (e.g. a voluntary conservation agreement pursuant to Section 69B of the *National Parks and Wildlife Act 1974*, as described in contemporary Project approval conditions pertaining to offsets). The proposed Offset areas (part of Offset area 2 and 3) expand on two existing areas conserved under voluntary conservation agreements (Figure 9). Also of note is that: • the habitat within Offset area 3 is linked through private properties to The Glen Nature Reserve; and • the proposed offset area is located within an OEH recognised climate change corridor (DECC, 2007b).
Offsets must be underpinned by sound ecological principles.	The biodiversity offset is underpinned by sound ecological principles such as: • consideration of structure, function and compositional elements of biodiversity through flora surveys (Section 6.1: Appendix E); • enhance biodiversity at a range of scales through a number of proposed management measures (Section 6.1); • measures to protect the long-term viability and functionality of biodiversity (e.g. enhancing the existing habitat as well as securing and managing the land for conservation purposes); and • in the long-term Offset areas will ensure connectivity between valley floor habitats and the Karuah Mountains – this link is poor at present.

Table 35 (Continued)
Reconciliation of the Proposed Offset Strategy against OEH Offset Principles

OEH Offset Principles (OEH, 2011c)	Description of How the Proposed Offset Addresses the OEH Offset Principles
Offsets should aim to result in a net improvement in biodiversity over time.	A net improvement in flora and fauna abundance and diversity is likely because: • 435 ha of cleared land would be revegetated and 10 ha of existing planted trees would be retained, linking many disjunct smaller patches of vegetation; • each vegetation type to be impacted is represented in the Offset area; • additional vegetation types would be conserved to those that would be impacted; • the offset areas (totalling 935 ha) would be conserved in perpetuity; and • measures to monitor and independently audit the biodiversity offset are provided. Ecological gains of the proposed Offset area are discussed in Section 6.4.
Offsets must be enduring. They must offset the impact of the development for the period that the impact occurs.	As mentioned in Section 6.2.4, the land tenure underlying the proposed Offset area would be secured in perpetuity for wildlife conservation.
Offsets should be agreed prior to the impact occurring.	The offset strategy is proposed as part of the Project. The implementation of the biodiversity offset is likely to be a condition of Project Approval.
Offsets must be quantifiable. The impacts and benefits must be reliably estimated.	The flora and in both the proposed disturbance area and Offset area has been extensively surveyed by FloraSearch, Australian Museum Business Services (Appendix F) and EcoBiological (reported in Appendices E and F). This report provides an assessment of both including: • area of the offset and area of impact; • communities/species present and their conservation status; • connectivity and condition of habitat; and • management actions and security for the offset site.
Offsets must be targeted.	As discussed in Section 6.2, the biodiversity offset has been targeted to offset impacts on the basis of a like-for-like or better conservation outcome. The biodiversity offset represents ecological communities with a high conservation status.
Offsets must be located appropriately.	The proposed offset area is located within the same CMA region as the Project area (i.e. the Hunter-Central Rivers CMA Region) and therefore has the capacity to benefit biodiversity values in the same region as the Project. The proposed Offset area is suitably located because it is local to the area proposed to be disturbed and has a greater chance of maintaining and improving the biodiversity that would be impacted.
Offsets must be supplementary.	The implementation of the offset strategy is beyond existing requirements, in that the biodiversity Offset area is not subject to an existing conservation agreement.
Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.	Measures to monitor and independently audit the biodiversity offset are provided. The implementation of the biodiversity offset is likely to be a condition of Project Approval.

6.4 ECOLOGICAL GAINS OF THE PROPOSED OFFSET

It is considered the Project meets the standard in the requirements of the Director-General of the NSW Department of Planning and Infrastructure that flora biodiversity values in the region would be maintained and improved in the long-term. The Offset area contains a very similar array of natural vegetation types (and vegetation communities) to those on the study area, which are also in similar condition.

The Offset area has a number of features that ensure it meets the 'maintain or improve' test. These include:

- Each vegetation type proposed to be cleared by the Project is represented in the Offset area.
- The vegetation on the agricultural parts of the Offset area is in similar condition to that on the study area, so that when it is removed from agricultural production, the remnant woodlands can be expected to begin natural regeneration.
- Cleared paddock areas would be planted strategically to appropriate tree and shrub species to provide habitat for recolonisation by other flora and wildlife.
- The plantings are also designed to link isolated woodland remnants via corridors to facilitate movement of plants and animals between remnants and the large block of forest to the east and south of the study area, thereby re-establishing genetic exchange across the landscape.
- The offset supports samples of all native vegetation communities within the Project disturbance areas and has a greater diversity of vegetation communities than occur on the Project area.
- The offset is bordered to the east and south-east by a very large block of largely undisturbed natural vegetation. Consequently, the offset is not isolated in the landscape and its high connectivity helps to ensure its long-term viability. Conversely, the addition of the offset as a new protected area enhances nature conservation over the whole region.

7 CONCLUSIONS OF THE ASSESSMENT

- The proposal would result in the loss of 105 ha of native vegetation and 195 ha of anthropogenic vegetation.
- The area of native vegetation to be cleared represents a very small proportion of the extant native vegetation in the local area and wider region.
- The Project has been designed to avoid or minimise impacts on the larger remnant woodland patches that do not overlie proposed open cut pits, including vegetation communities that have been heavily impacted by past land use in the Gloucester Valley.
- A temporary loss of habitat connectivity would occur for remnant woodlands isolated by Project works.
- Mitigation strategies are considered adequate to control risks to native flora arising from weed invasion, dust and fires.
- The application of Seven Part Tests of Significance demonstrated the Project is highly unlikely to impact significantly on any threatened flora species, or their habitats that may potentially occur on the Project area.
- The Project would have no impact on threatened populations, threatened ecological communities or critical habitat, as none occurs on the Project area.
- The main cumulative impact on native flora is a further small depletion of vegetation communities that have been heavily cleared historically for agriculture in the region.
- Comprehensive rehabilitation and revegetation plans would ensure post-mine landforms provide a mix of native woodland, wildlife corridors and agricultural land.
- The 105 ha of native vegetation that would be removed for the Project is offset with 490 ha of similar native vegetation in the immediate surrounds. Additionally, the offset includes 435 ha of cleared agricultural land that would be restored to native woodland and 10 ha of planted trees that would be retained.
- All native vegetation types found on the Project disturbance areas also occur in the offset, which has a greater diversity of vegetation types than the Project area.
- It is concluded that the Offset area meets the OEH offset principles and results in a net improvement in regional biodiversity values.

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ATTACHMENT A

FLORA SURVEY REPORT:
STRATFORD COAL MINE, GLOUCESTER, NEW SOUTH WALES
(PREPARED BY ECOBIOLOGICAL)

ecobiological

Flora Survey Report:

Stratford Coal Mine, Gloucester, New South Wales.

Flora Survey Report:

Stratford Coal Mine, Gloucester, New South Wales.

October 2011

Report prepared for Gloucester Coal Limited.

Prepared by:
ecobiological

David Paull
Senior Ecologist
NPWS Scientific Licence S12398

Reviewed by:

Kristy Peters
Senior Ecologist
NPWS Scientific Licence S12398

PO Box 585
64 Medcalf Street
Warners Bay NSW 2282

Tel 1300 881 869
Fax 1300 881 035

www.ecobiological.com.au

ABN 74 114 440 041

ecobiological

Executive Summary

ecobiological was commissioned by Gloucester Coal Limited to conduct flora surveys within and surrounding the Stratford Coal Mine and Bowens Road North Coal Mine. The mines are located approximately 100 kilometres (km) north of Newcastle, New South Wales (NSW).

Field surveys of the study area were conducted between April 2007 and March 2010. The purpose of the surveys was to:

- Survey for threatened, protected and introduced flora utilising recognised survey techniques;
- Conduct targeted surveys for threatened flora species that are considered possible occurrences within the study area or surrounds (i.e. those listed in the Schedules of the NSW *Threatened Species Conservation Act*, 1995 [TSC Act] and the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* [EPBC Act]);
- Compile a list of flora species within the study area.

The study area consists of a current mining operation and surrounding land currently owned and operated by Gloucester Coal Pty Ltd off Bucketts Way, Gloucester, NSW.

Flora within the survey area was sampled by a total of 72 (20 m x 20 m) quadrats. Random meanders were also systematically undertaken around each quadrat sampled within the same vegetation unit as the quadrat. In addition, targeted searches were undertaken for potentially occurring threatened flora species.

The floristic survey conducted across the study area identified a total of 450 species, comprising of 393 native flora species and 57 introduced flora species. No threatened flora species were observed during the flora surveys across the study area.

Definitions

Abundance – a quantification of the population of the species or community.

Distribution – the overall area in which a species is known to occur. It is not implied, and is very rarely the case, that a species occurs in all parts of the area defined by its distribution.

Diurnal – pertaining to the day. An animal that is active by day is said to be diurnal.

Habitat – an area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community and includes any biotic or abiotic component. The habitat of a species is usually far less in extent than distribution indicated on a map.

Relative Abundance – the number of individuals of each species assessed in relation to the numbers of other within each group taxa (i.e. plants, frogs, reptiles etc.).

Riparian – pertaining to the banks of a river or stream.

Sclerophyll – pertaining to plants with tough leaves. Here used mainly to distinguish between two major types of eucalypt forest: *dry sclerophyll* forest which is open and *wet sclerophyll* forest which has a closed canopy. The two types intergrade.

Subspecies – an interbreeding population within a species, differing measurably from one or more other populations and usually geographically separate from these.

Abbreviations

DECCW Department of Environment and Climate Change and Water (now the Office of Environment & Heritage)

EPBC Act *Environment Protection and Biodiversity Conservation Act* 1999

GIS Geographic Information System

GPS Global Positioning System

ha hectares

km kilometres

NPWS National Parks and Wildlife Service

ROTAP Rare or Threatened Australian Plants

SEWPaC Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (formerly DEWHA)

sp Species (singular)

spp Species (plural)

subsp subspecies

TEC Threatened Ecological Community

TSC Act *Threatened Species Conservation Act* 1995

var. variety

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1. Introduction

1.1. Scope

ecobiological was commissioned by Gloucester Coal Limited to conduct flora surveys within and surrounding the Stratford Coal Mine and Bowens Road North Coal Mine. The mines are located approximately 100 kilometres (km) north of Newcastle, New South Wales (NSW) (Figure 1).

The flora surveys were conducted within the study area shown in Figure 2. The purpose of the surveys was to:

- Survey for threatened, protected and introduced flora utilising recognised survey techniques;
- Conduct targeted surveys for threatened flora species that are considered possible occurrences within the study area or surrounds (i.e. those listed in the Schedules of the NSW *Threatened Species Conservation Act, 1995* [TSC Act] and the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* [EPBC Act]);
- Compile a list of flora species within the study area.

The flora surveys were conducted in 2007, 2008 and 2010. This report outlines the result of field investigations.

1.2. Regional and Local Context

The study area consists of a current mining operation [the Stratford Coal Mine and the Bowens Road North Coal Mine] and surrounding land currently owned and operated by Stratford Coal Pty Ltd off Bucketts Way, Gloucester, NSW.

The study area is approximately 2,081.7 ha in size and is surrounded in all directions by a combination of cleared paddocks and stands of remnant forest and regrowth. The extent of vegetation and infrastructure within and adjacent to the study area is shown in Figure 2.

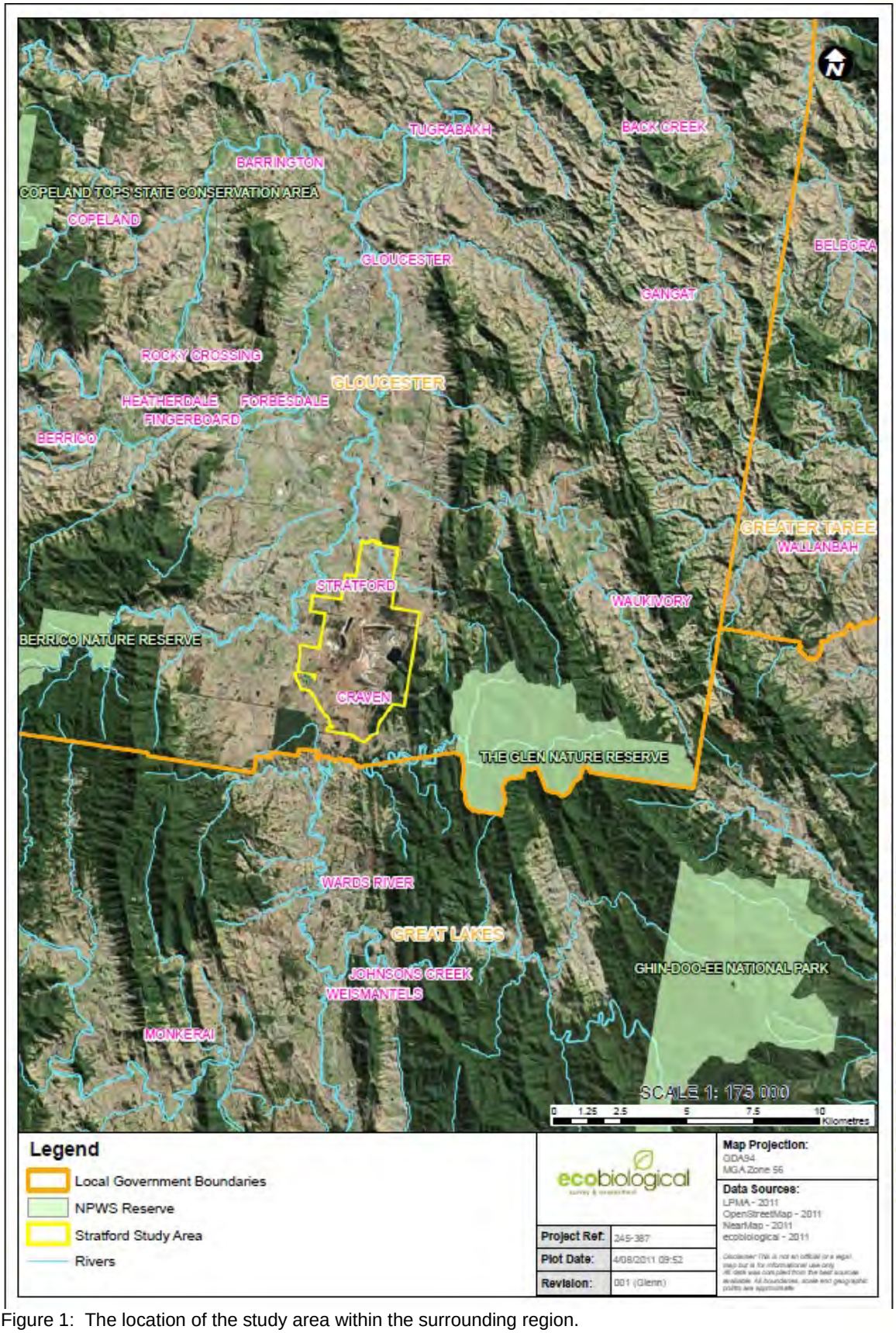

Figure 1: The location of the study area within the surrounding region.

Figure 2: Aerial photograph showing the study area and surrounding landscape.

1.3. Climate

The study area is located within the temperate region of NSW which typically has wet summers and low winter rainfall, with the majority of the rainfall occurring from December through to March. The mean annual maximum temperature is 23.4 °C (range 16.4 – 29.4 °C) and the mean annual minimum temperature is 12.1 °C (range 6.5 – 17.3 °C), with peak temperatures occurring in January and February and the coolest month being June (Bureau of Meteorology, 2010).

1.4. Geology, Topography and Soils

The study area is comprised of five soil landscapes (not including variants) forming two broad groups, alluvial / transferral and upslope areas (Henderson, 2000).

Alluvial / transferral landscapes include:

(a) Gloucester River (gu). The Gloucester River alluvial landscape consists of broad level alluvial plains in the Stroud-Gloucester Basin region in the northern section of the study area. Relief is <1m and slopes are <2%. Occasional small swamps and swampy oxbows occur. Soils consist of deep, imperfectly drained Yellow Chromosols (Soloths) on plains with deep, very poorly drained Redoxic Hydrosols (Gleyed Podzolic Soils) on small swampy oxbows. Regolith consists predominately of alluvial deposits derived from the surrounding Permian sedimentary and volcanic rocks.

(b) Craven (cn) and two variants (cna) and (cnb). The Craven soil landscape is a transferral landscape, occurring in low, wide drainage depressions on Quaternary alluviums and dominates the central low lying sections of the study area. Relief is generally < 2 m, with slopes between 2-5%. It is characterised by deeply eroded gullies and cleared and remnant forest vegetation. Soils are typically Yellow Sodoliths. The variant (cna) consist of low gradient alluvial fans, while the variant (cnb) is characterised as having narrow, elongated swamps in its natural condition. This landscape and its variants are prone to erosional pressures.

The upslope landscapes are comprised of:

(a) Gloucester (go). This erosional soil landscape dominates much of the northern and western sections of the study area and is characterised as undulating low hills on Permian sediments. Relief is generally <50 m, with slopes <10% with little or no rock outcropping and cleared or remnant forest. The soils are generally various types of Yellow Soloths on side-slopes and crests with Lithosols on crest and steeper side-slopes. There is a moderate sheet and gully erosional risk with this landscape.

(b) Wards River (wd). The Wards River erosional soil landscape is found throughout the eastern sections of the study area and is characterised by rolling low hills on sediments of the Gloucester Coal Measures in the Stroud-Gloucester Basin region. Relief is from 30 – 100m and slopes are <25%. Soils are moderately deep, imperfectly drained Brown Kurosols on well to imperfectly drained side-slopes. Moderately deep, moderately well-drained Yellow and Grey Kurosols occur on well to imperfectly drained ridges and side-slopes. Shallow to moderately deep, well drained Bleached-Leptic Tenosols on mid-slopes and crests on conglomerate. Moderately deep, well drained Brown Kurosols on upper slopes and steep mid-slopes on siltstone. This landscape has a high erosional risk with rock outcrops. It is prone to seasonal waterlogging.

(c) Gloucester Bucketts (gb). This colluvial soil landscape occupies the highest elevation section of the study area consisting of rolling to deep hills on a Permian basic with volcanics and sediments. Relief varies considerably (60-350m) with slopes of 35 to >50%. Soils are moderately deep, well-drained lithosols with rapidly draining lithosols on upper slopes and ridges. Steep basaltic slopes have moderately deep, well-drained lithosols and unclassified soils and are characterises by rocky terrain. Hazards include mass movement and sheet erosion.

2. Survey Methods

2.1. Review of Databases and Literature

A list of threatened flora, endangered populations and ecological communities recorded, or considered likely to occur, in the wider area was compiled from a number of databases and literature sources, including:

- OEH's Atlas of NSW Wildlife (DECCW, 2010a);
- Sydney Royal Botanical Gardens (RBG&DT, 2010);
- SEWPaC's Protected Matters search tool (DEWHA 2010); and
- Past ecological reports carried out in the general area (AGC Woodward Clyde 1994; Alison Hunt & Associates 2009; and, Dowling 2000).

A 20 x 20 km search area centred on the study area was used as a basis for the database searches.

A series of field surveys were then conducted using the compiled list of threatened species as a guide to species potentially likely to occur in the study area. The survey was not, however, limited to the species compiled from database extracts and past consultant records. Searches were carried out in order to compile a comprehensive species list for the study area.

2.2. Survey design

In order to meet the requirements for effort and techniques in order to undertake the survey work required within the existing Stratford study area, the following sources were used:

- DEC Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities, Working Draft November 2004; and
- DECC Field Survey Methods – Introduction (DECC 2009a).

2.3. Floristic Diversity

2.3.1. Stratification Units

In order to determine the amount of survey effort required for the survey area the following process was undertaken:

(a) initial aerial photographic interpretation;
(b) ground-truthing field surveys; followed by
(c) identification of stratification units.

The survey area was stratified into relatively homogenous vegetation types based on Keith (2004) (Table 1), also consideration was given to the DECC Biometric vegetation type database in relation to survey method and effort (after DECC 2009b).

Table 1: Vegetation formations and effort

Group	Area (ha)	Vegetation Formation	Vegetation Class (Keith, 2004)	Effort
Group 1	377.62	Dry Sclerophyll Forest (Shrub / grass sub-formation)	Hunter-Macleay Dry Sclerophyll Forests	42 plots
Group 2	121.88	Grassy Woodland	Coastal Valley Grassy Woodlands	13 plots
Group 3	3.79	Dry Sclerophyll Forest (Shrubby Formation)	North Coast Dry Sclerophyll Forests	3 plots
Group 4	28.24	Wet Sclerophyll Forests (Shrubby sub-formation)	North Coast Wet Sclerophyll Forests	4 plots
Group 5	0.82	Rainforest	Subtropical Rainforests	1 plot
Group 6	26.04	Freshwater Wetland	Coastal Freshwater Lagoons	4 plots
Group 7	15	Secondary Native Grasslands	Coastal Valley Grassy Woodlands	2 plots
Group 8	8.39	Mine Rehabilitation	N/A	1 plot
Group 9	919	Cleared Agricultural Lands	N/A	10 plots

2.3.2. Flora Survey Techniques

In order to describe the diversity and distribution of flora in the study area, systematic surveys were stratified according to the vegetation types listed in Table 1 and were undertaken according to the following steps as described below. Methods used were based on DEC (2004).

Quadrats

The floristic content and threatened species targeted surveys were conducted through surveys of 0.04 ha (20 m x 20 m) quadrats and meandering transects. Nineteen quadrats were set out in the areas pre-determined in the 2007 survey period. In 2008, an additional 21 quadrats were surveyed in the forested areas east of the initial surveyed area. To complete the detailed surveys of the Stratford site, another 32 quadrats were surveyed in 2010. The locations of these plots are shown in Figure 3.

Species within a quadrat are identified and the modified Braun-Blanquet scale (Poore 1955) was applied to describe the cover abundance. Cover abundance scores used were as follows:

1	<5% cover, less than 5 individuals
2	<5% cover, more than 5 individuals
3	5 – 25% cover
4	26 – 50% cover
5	51 – 75% cover
6	76 – 100% cover

Where any species was not able to be identified in the field, samples were taken and identified at a later date. Surveys would continue until no additional species were being observed. The location and dates of all flora quadrats are listed in Appendix 1.

Random Meanders

Random meanders around each transect were undertaken in 2007, 2008 and 2010 and are depicted in Figure 3. A minimum of 30 minutes was spent for each quadrat sampled within the same vegetation unit as the quadrat. This data has been included within the floristic list for each quadrat.

To complement the flora species data recorded using quadrats and specifically target potential habitat for threatened flora species, meandering walks between quadrats and in surrounding native and modified vegetation areas was undertaken in 2010 and added to the overall species list (Appendix 2).

Section 2.3.3 provides an overview of the threatened flora species targeted during the survey.

Floristic Identification and Nomenclature

Floristic identification and nomenclature was based on Harden (1992, 1993, 2000 and 2002) with subsequent revisions as published on PlantNet (RBG&DT, 2010).

2.3.3. Targeted Surveys and Habitat Assessment for Threatened Flora Species

Targeted surveys and habitat assessment were undertaken for the threatened flora species listed in Table 2, based on the database and literature review (Section 2.1).

The survey timing was based on flowering time for each species; this information was sourced from PlantNet (RBG&DT, 2010).

Table 2: Targeted surveys for threatened flora species

Scientific Name	Common Name	Conservation Status		Survey Method
		TSC Act[1]	EPBC Act[2]	
Allocasuarina defungens	Dwarf Heath Casuarina	E	E	Quadrats and random meanders involving targeted searches.
Asperula asthenes	Trailing Woodruff	V	V	Quadrats and random meanders involving targeted searches.
Callistemon viminalis	Weeping Bottlebrush	-	V	Quadrats and random meanders involving targeted searches.
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	Quadrats and random meanders involving targeted searches.
Cynanchum elegans	White-flowered Wax Plant	E	E	Quadrats and random meanders involving targeted searches.
Eucalyptus glaucina	Slaty Red Gum	V	V	Quadrats and random meanders involving targeted searches.
Euphrasia arguta	-	-	Ex	Quadrats and random meanders involving targeted searches.
Grevillea obtusiflora	Grey Grevillea	E	E	Quadrats and random meanders involving targeted searches.
Senna acclinis	Rainforest Cassia	E	-	Quadrats and random meanders involving targeted searches.
Syzygium paniculatum	Magenta Lilly Pilly	E	V	Quadrats and random meanders involving targeted searches.
Melaleuca groveana	Grove's Paperbark	V	-	Quadrats and random meanders involving targeted searches.
Owenia cepiodora	Onion Cedar	V	V	Quadrats and random meanders involving targeted searches.
Pomaderris queenslandica	Scant Pomaderris	E	-	Quadrats and random meanders involving targeted searches.

[1] Threatened species status under the NSW *Threatened Species Conservation Act, 1995 (current as of the 16 August 2010)*

[2] Threatened species status under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999 (current as of the 16 August 2010)*

2.3.4. Vegetation Condition Assessment

The condition of the native vegetation was assessed at each of the vegetation quadrat sites using attributes as used in the BioBanking Assessment Methodology (DECC, 2009a). These criteria are outlined in Table 3.

Each site was subsequently were categorised into a 'low', 'moderate' or 'good' condition rating based onto what extent the attributes of each site were found to be below, within or above benchmark condition as per Biometric condition benchmarks (DECC 2009b).

Table 3: Attributes for vegetation condition assessment.

Attribute	Definition
Native plant species richness	The number of plants within the 20x20 quadrat
% foliage cover – over-storey	Mean percent (%) cover of ground by the foliage of the uppermost vegetation layer; trees or tall shrubs (>1m) estimated at 10 points along a 50 m transect
% foliage cover – mid-storey	Mean percent (%) cover of ground by the foliage of the uppermost vegetation layer; trees or tall shrubs (>1m) estimated at 10 points along a 50 m transect
% foliage cover – ground cover (grasses)	Number of hits at each metre point along a 50 m transect given as a percentage (%).
% foliage cover – ground cover (shrubs)	Number of hits at each metre point along a 50 m transect given as a percentage (%).
% foliage cover – ground cover (other)	Number of hits at each metre point along a 50 m transect given as a percentage (%).
% foliage cover – exotics	Number of hits at each metre point along a 50 m transect given as a percentage (%).
Abundance of Hollow Bearing Trees	All living and dead standing trees containing hollows with their centres in a 50x20m area at each quadrat. Hollows are defined as tree holes >5 cm in diameter, having depth, and > 1m above the ground
Regeneration	Whether overstorey tree species on the quadrat are regenerating
Length of Fallen Timber	The length of fallen logs >10 cm in diameter and >0.5 m long in a 50x20 m area

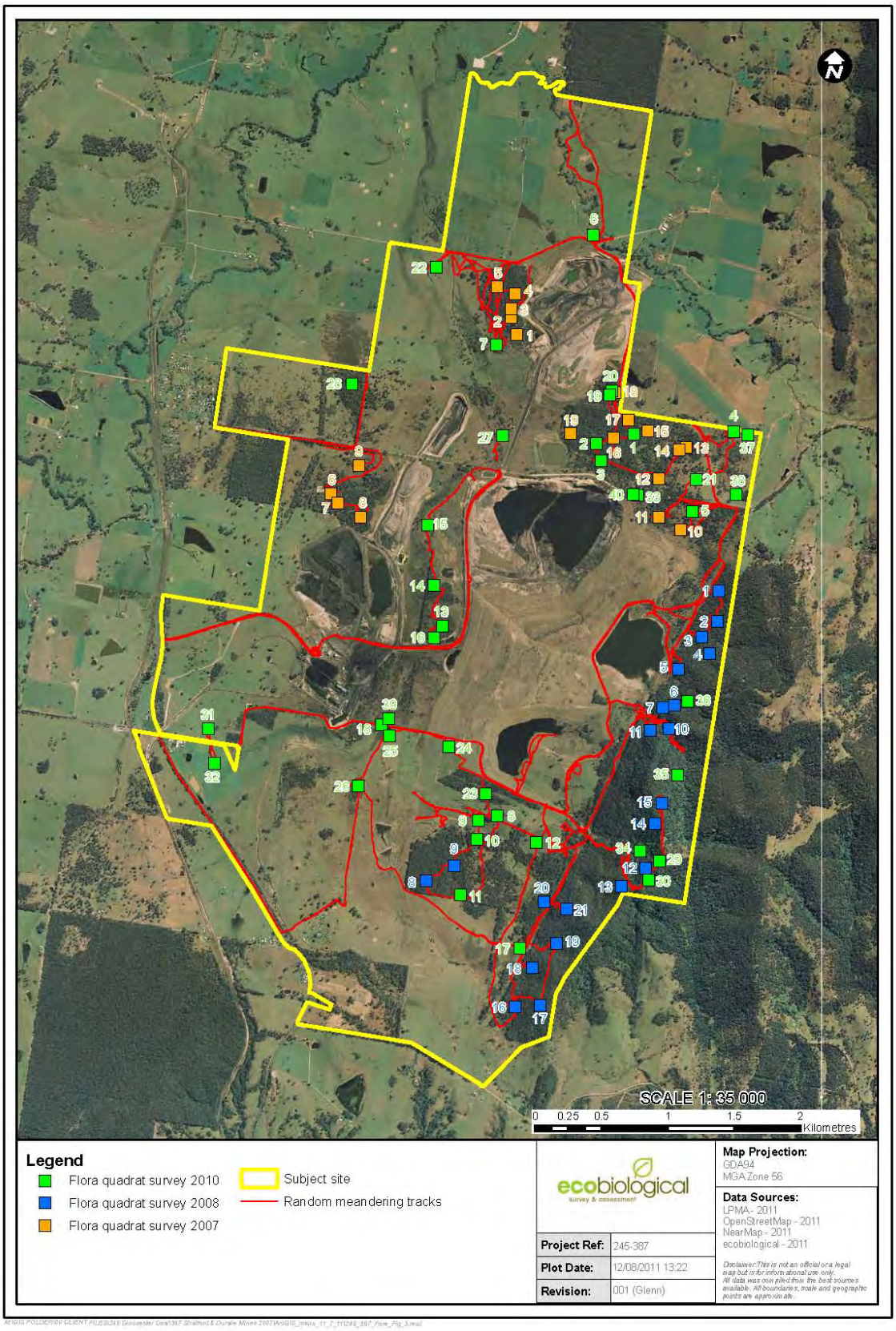

Figure 3: Aerial photograph of the study area showing the location of flora survey quadrats and random meandering tracks.

3. Results

3.1. Database and literature search

3.1.1. Database Search

A list of known threatened flora, endangered populations and ecological communities was obtained from relevant databases for a 20 km radius of the study area. In addition, a Protected Matters Search of the SEWPaC database was conducted for the same area.

Thirteen (13) threatened flora species were previously recorded or modelled to occur within a 20-kilometre radius of the study area (Table 4). No threatened flora species have previously been recorded within the Stratford Mine study area.

An EPBC Act Protected Matters Search indicated that two species, the Dwarf Heath Casuarina *Allocasuarina defungens* and the Leafless tongue-orchid *Cryptostylis hunteriana* are modelled to occur in the area, but neither has been previously recorded within 20 km of the study area. Further, habitat for these species does not occur in the study area.

Table 4: Threatened species recorded within a 20-kilometre radius of the study area.

Scientific Name	Common Name	Conservation Status		EPBC Act Protected Matters Search[3]	Species Records		Previous Survey Records
		TSC Act[1]	EPBC Act[2]		DECCW Atlas of NSW Wildlife[4]	SRBG[5]	
FLORA							
Apocynaceae							
Cynanchum elegans	White-flowered Wax Plant	E	E	●	●	●	-
Casuarinaceae							
Allocasuarina defungens	Dwarf Heath Casuarina	E	E	●	-	-	-
Fabaceae - Caesalpinioideae							
Senna acclinis	Rainforest Cassia	E	-	-	●	●	-
Meliaceae							
Owenia cepiodora	Onion Cedar	V	V	-	-	●	-
Myrtaceae							
Callistemon viminalis	Weeping Bottlebrush	-	V	-	●	-	-
Eucalyptus glaucina	Slaty Red Gum	V	V	●	●	●	-
Euphrasia arguta	-	-	Ex	●	-	-	-
Melaleuca groveana	Grove's Paperbark	V	-	-	●	-	-
Syzygium paniculatum	Magenta Lilly Pilly	E	V	-	●	-	-
Orchidaceae							
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	●	-	-	-
Proteaceae							
Grevillea obtusiflora	Grey Grevillea	E	E	-	●	-	-
Rhamnaceae							
Pomaderris queenslandica	Scant Pomaderris	E	-	-	●	●	-
Rubiaceae							
Asperula asthenes	Trailing Woodruff	V	V	-	●	●	-

Nomenclature consistent with CSIRO (2006) *CSIRO List of Australian Vertebrates A Reference with Conservation Status.*

[1] Threatened species status under the NSW *Threatened Species Conservation Act, 1995* (current as at 16 August 2010).

[2] Threatened species status under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (current as at 16 August 2010).

[3] Department of the Environment, Water, Heritage and the Arts (2010) *EPBC Act Protected Matters Search*. Search for co-ordinates: -31.94879, 151.7527; -31.94879, 152.1725; -32.31309, 152.1725; -32.31309, 151.7527.

[4] DECCW (2010a) *Threatened Species - DECCW Atlas Database Records for the Following Search Area: -31.94, 152.17; -31.94, 151.75; -32.31, 152.17; -32.31, 151.75.* Date Received: 24 March 2010.

[5] TRBG&DT (2010) *Database Records within the Following Search Area: 382116.8853, 6464557.0731; 422116.8853, 6464557.0731; 422116.8853, 6424557.0731; 382116.8853, 6424557.0731.* Data Received: 26 March 2010.

3.1.2. Literature Search

A study of the flora at Stratford Mine area was conducted in 1994 (AGC Woodward-Clyde Pty Ltd 1994). It identified seven vegetation mapping units stratified according to structural sub-formation, i.e. Closed Forest: Sub-Tropical Rainforest. The most extensive type identified in the study area was 'Induced Woodlands' and 'Grasslands'. In this study, these classifications are broken into various natural and man-made floristic associations. A total of 132 flora species were identified. No flora species detected in the 1994 surveys are currently listed as threatened species.

An additional plant survey north of Bowens Road was conducted by Dowling (2000). A total of 103 species from 40 families were recorded during the survey. Of these, 18 species were introduced exotics and two of these were gazetted noxious plants within Gloucester Shire. No flora species listed as threatened under the TSC Act or EPBC Act were found within the study area. Further to this, no species considered to be rare or threatened by Briggs and Leigh (1996) were recorded within the study area.

3.2. Flora Surveys

The floristic survey conducted across the study area identified a total of 450 species. The species list includes all species recorded in 80 quadrats. All flora species, their locations and their site cover / abundance ratings are given in Appendix 2.

The surveys identified 57 introduced, exotic or weed species. These species were more commonly found in the cleared and disturbed areas which were not surveyed as intensively as the areas having natural vegetation. Two species listed under the *Noxious Weeds Act 1993* were identified, Lantana *Lantana camara* and Blackberry *Rubus fruticosus* which have made significant penetration into the local native vegetation.

No threatened flora species were observed during the flora surveys across the Stratford study area. One ROTAP species, Craven Grey Box (*Eucalyptus largeana*), was detected during random meanders in the northern section of the study area.

3.2.1. Vegetation Condition Assessment

Comparison of the site condition data was compared to benchmarks for each Biometric vegetation Keith Class (DECC 2009b) encountered across the study area. This data is located in Appendix 3.

The most widely distributed vegetation class in the study area is "Hunter-Macleay Dry Sclerophyll Forests" with 42 floristic quadrats falling into this category. The condition within this class varied considerably across the site with 16 quadrats found to be in a 'good' condition (generally within or above condition benchmarks), 14 found to be 'moderate' (generally within benchmark condition) and 12 found to be in "low" condition. It was found that areas of low condition were located within the valley and lower slopes of the study area where agricultural and other anthropogenic factors have resulted in higher levels of weeds and simplified vegetation structure.

The next most widespread Keith Class was found to be "Coastal Valley Grassy Woodlands" with 12 quadrats falling into this category. Again these woodlands were found to be widely variable in condition, with six in a 'good' condition, three in a 'moderate' condition and four in a 'low' condition. Again the distribution of sites with a low condition was found to be in the lower slopes of the study area.

The Keith Class 'North Coast Dry Sclerophyll Forests' was only represented by three floristic quadrats in the study area, these were found to be in a low to moderate condition. "North Coast Wet Sclerophyll Forests" represented by four quadrat were found to in a 'moderate' to 'high' benchmark condition, while the one site falling into the "Subtropical Rainforest" category was found to be in good condition or above benchmark.

Wetlands of the Keith Class "Coastal Freshwater Lagoons" were sampled by four quadrats, three were found to be in a good condition while another was found to be in a low condition. The derived grasslands in the study area were found to be derivatives of the "Coastal Valley Grassy Woodlands" having a similar groundstorey floristic composition to this woodland vegetation but has been cleared of its over- and mid-storey. When compared to the benchmarks of this class, both quadrats located within derived grasslands were found to be in a low condition.

The two man-made vegtation communities were not assessed for their condition values as they do not conform to any particular Keith Class.

4. Conclusions

Field surveys of the study area were conducted between April 2007 and March 2010. Contributions, qualifications and licensing details of all staff member involved in the surveys are provided in Appendices 4 and 5.

A total of seven native vegetation formations were recorded in the study area. An additional two man-made vegetation communities, Cleared Agricultural Land and Mine Rehabilitation, were also identified in the study area.

Vegetation condition in the native communities ranged from moderate to good with areas of low condition vegetation in the lower slopes and valleys.

The floristic survey conducted across the study area identified a total of 450 species, comprising of 393 native flora species and 57 introduced flora species. No threatened flora species were observed during the flora surveys across the study area.

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Appendix 1: Flora survey site data

Quadrat / Year	Latitude	Longitude
1 - 2007	151.9666	-32.1141
2 - 2007	151.9662	-32.1129
3 - 2007	151.9662	-32.1123
4 - 2007	151.9665	-32.1113
5 - 2007	151.9651	-32.1108
6 - 2007	151.9516	-32.1247
7 - 2007	151.9522	-32.1254
8 - 2007	151.954	-32.1263
9 - 2007	151.9539	-32.1228
10 - 2007	151.9795	-32.1274
11 - 2007	151.9778	-32.1265
12 - 2007	151.9779	-32.1239
13 - 2007	151.9801	-32.1219
14 - 2007	151.9794	-32.122
15 - 2007	151.977	-32.1207
16 - 2007	151.9742	-32.1212
17 - 2007	151.9754	-32.1199
18 - 2007	151.9744	-32.1181
19 - 2007	151.9708	-32.1208
1 - 2008	151.9826	-32.1315
2 - 2008	151.9824	-32.1336
3 - 2008	151.9812	-32.1347
4 - 2008	151.9817	-32.1358
5 - 2008	151.9793	-32.1368
6 - 2008	151.9789	-32.1393
7 - 2008	151.978	-32.1394
8 - 2008	151.959	-32.151
9 - 2008	151.9612	-32.15
10 - 2008	151.9784	-32.1408
11 - 2008	151.9769	-32.1409
12 - 2008	151.9765	-32.1503
13 - 2008	151.9745	-32.1515
14 - 2008	151.9773	-32.1473
15 - 2008	151.9778	-32.1459
16 - 2008	151.966	-32.1596
17 - 2008	151.968	-32.1595
18 - 2008	151.9673	-32.157
19 - 2008	151.9693	-32.1553
20 - 2008	151.9683	-32.1525
21 - 2008	151.9701	-32.153
1 - 2010	151.9759	-32.1209
2 - 2010	151.9729	-32.1215
3 - 2010	151.9732	-32.1227

Quadrat / Year	Latitude	Longitude
4 - 2010	151.9838	-32.1208
4 - 2010	151.9838	-32.1208
5 - 2010	151.9805	-32.1261
6 - 2010	151.9728	-32.1074
7 - 2010	151.965	-32.1147
8 - 2010	151.9646	-32.1466
9 - 2010	151.9632	-32.147
10 - 2010	151.963	-32.1482
11 - 2010	151.9616	-32.152
12 - 2010	151.9678	-32.1485
13 - 2010	151.9604	-32.1338
14 - 2010	151.9597	-32.131
15 - 2010	151.9593	-32.1269
16 - 2010	151.9597	-32.1345
17 - 2010	151.9664	-32.1556
18 - 2010	151.9555	-32.1404
19 - 2010	151.9741	-32.118
20 - 2010	151.974	-32.1182
21 - 2010	151.9808	-32.124
22 - 2010	151.9602	-32.1095
23 - 2010	151.9638	-32.1452
24 - 2010	151.9608	-32.1419
25 - 2010	151.9561	-32.1411
26 - 2010	151.9536	-32.1445
27 - 2010	151.9654	-32.1209
28 - 2010	151.9534	-32.1173
29 - 2010	151.9776	-32.1498
30 - 2010	151.9767	-32.1511
31 - 2010	151.9416	-32.1406
32 - 2010	151.9421	-32.1429
33 - 2010	151.976	-32.125
34 - 2010	151.976	-32.149
35 - 2010	151.979	-32.144
36 - 2010	151.980	-32.139
37 - 2010	151.985	-32.121
38 - 2010	151.984	-32.125
39 - 2010	151.956	-32.140
40 - 2010	151.976	-32.125

Appendix 2: Flora species and cover abundance in floristic quadrats

Cover Abundance Scale calculated as: 1 = few individuals / less than 1% cover; 2 = cover between 1-5%; 3 = cover between 6-25%; 4 = cover between 26-50%; 5 = cover between 51-75%; 6 = cover between 76-100%
* - denotes an introduced species
^ - denotes a ROTAP species

(a) 2007-2008 floristic quadrat data

Family	Scientific Name	Common Name	2007																			2008																						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	0	2	2	2	0	0	1	1	0	0	2	2	2	1	2	1	2
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Adiantaceae	*Adiantum formosum*	Black Stem Maidenhair	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0
Adiantaceae	*Adiantum hispidulum*	Rough Maidenhair Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	2	0	0
Adiantaceae	*Cheilanthes sieberi* subsp. *sieberi*	Mulga Fern	0	2	4	0	2	0	0	0	2	0	0	0	0	0	0	0	2	0	2	0	2	1	1	1	2	1	1	1	0	0	0	0	0	2	2	2	0	0	1	2
Adiantaceae	*Pellaea paradoxa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	0	0	2	0	0	0	1	0	0
Anthericaceae	*Arthropodium milleflorum*	Pale Vanilla-lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0
Anthericaceae	*Caesia parviflora* var. *parviflora*	Pale Grass-lily	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthericaceae	*Laxmannia gracilis*	Slender Wire Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aphanopetalaceae	*Aphanopetalum resinosum*	Gum Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	3	0	0
Apiaceae	*Daucus glochidiatus*	Native Carrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Apiaceae	*Hydrocotyle peduncularis*		2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0
Apocynaceae	*Gompholobium pinnatum*	Pinnate Wedge Pea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apocynaceae	*Marsdenia rostrata*	Common Milk Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Apocynaceae	*Marsdenia suaveolens*	Scented Marsdenia	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	0	0	0	2	1	0	0	1	1	0	0	0	0	0	0
Apocynaceae	*Parsonsia straminea*	Monkey Rope	0	0	0	0	0	0	0	0	0	2	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	1	1	0	0
Apocynaceae	*Parsonsia velutina*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Araceae	*Gymnostachys anceps*	Settler's Twine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0
Araliaceae	*Polyscias sambucifolia*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	0	0	0	0	0	2	0	0	0	2	2	1	2	2	1	0	1
Aspleniaceae	*Asplenium australasicum*	Bird's Nest Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0
Asteraceae	**Ageratina adenophora*	Crofton Weed	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0
Asteraceae	**Ageratina riparia*	Creeping Crofton Weed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Bidens pilosa*	Cobbler's Pegs	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Cirsium vulgare*	Black Thistle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Asteraceae	**Facelis retusa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Gamochaeta spicata*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Asteraceae	**Hypochaeris radicata*	Catsear	2	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	0	0	0	0	0
Asteraceae	**Senecio madagascariensis*	Fireweed	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Asteraceae	**Sonchus oleraceus*	Common Sowthistle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Asteraceae	*Asteraceae* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0	0	0	1
Asteraceae	*Coronidium elatum*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Asteraceae	*Euchiton gymnocephalus*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Asteraceae	*Lagenophora stipitata*	Blue-bottle Daisy	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	0	2	2	0	0	0	0	0	0	0	2	2	1	0	1	0
Asteraceae	*Ozothamnus diosmifolius*	White Dogwood	0	2	0	0	0	0	3	2	0	0	0	1	3	0	0	0	2	2	2	0	1	1	0	0	0	0	2	0	0	0	0	0	0	0	1	2	1	0	0	0
Asteraceae	*Vernonia cinerea* var. *cinerea*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	0	0
Asteraceae	*Vittadinia cuneata*	Fuzzweed	0	2	2	2	2	0	2	2	0	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bignoniaceae	*Pandorea pandorana* subsp. *pandorana*	Wonga Wonga Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	1	2	2	0	0	2	2	0	2	1	1	0	1	0	2	0	2
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0

Family	Scientific Name	Common Name	2007																		2008																				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Blechnaceae	*Doodia aspera*	Prickly Rasp Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	4	2	0	0	0	6	0	0
Campanulaceae	*Wahlenbergia gracilis*	Australian Bluebell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Caryophyllaceae	*Stellaria flaccida*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak	0	0	0	0	0	0	0	0	0	4	0	0	6	0	0	0	0	0	0	3	4	2	3	2	3	2	0	0	0	1	0	2	2	1	3	3	4	0	3	4
Celastraceae	*Maytenus silvestris*	Orange Bark	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	1	2	0	0	0	2	0	0	0	0	0	0
Chenopodiaceae	*Einadia trigonos* subsp. *leiocarpa*	Fishweed	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clusiaceae	*Hypericum gramineum*	St John's Wort	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	0
Convolvulaceae	*Dichondra repens*	Kidney Weed	2	0	2	2	2	0	0	2	0	0	0	2	0	0	0	0	0	0	2	2	2	2	0	1	0	2	2	2	0	0	2	3	2	2	2	2	0	0	2	0
Convolvulaceae	*Polymeric calycina*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	2	0
Cunoniaceae	*Caldcluvia paniculosa*	Soft Corkwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Cyperaceae	*Carex appressa*	Tall Sedge	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Carex breviculmis*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Gahnia radula*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Lepidosperma concavum*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Cyperaceae	*Lepidosperma laterale*		0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	2
Cyperaceae	*Ptilothrix deusta*	Ptilothrix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Schoenoplectus mucronatus*		0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Schoenus apogon*	Common Bog-rush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	2	0	2	0	1	0	0	0	2	0	3	0	0	0	3	0	0	0	1	0	0	1	3	0	2
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	4	0	0
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	2	0	2	0	0	0	0	0	0	0	0	1	0	2	0	1	0
Dilleniaceae	*Hibbertia dentata*	Trailing Guinea Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0
Dilleniaceae	*Hibbertia diffusa*		0	2	6	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	2	2	2	0	2	2	0	0	0	2	0	2	0	0	1	2	1	0	0	0
Dilleniaceae	*Hibbertia pedunculata*		0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	1	0	0	0	0	1	1	2	2	0	1	0	0	1	0
Dioscoreaceae	*Dioscorea transversa*	Native Yam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	2	0	0
Droseraceae	*Drosera auriculata*	Sundew	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Elaeocarpaceae	*Elaeocarpus obovatus*	Blueberry Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ericaceae - Styphelioideae	*Leucopogon juniperinus*	Beard Heath	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	2	2	2	0	1	0
Ericaceae - Styphelioideae	*Monotoca scoparia*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbiaceae	*Claoxylon australe*	Brittlewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Eupomatiaceae	*Eupomatia laurina*	Bolwarra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0
Fabaceae - Faboideae	*Daviesia ulicifolia*	Gorse Bitter Pea	1	2	0	2	1	0	0	2	0	0	0	0	3	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Desmodium rhytidophyllum*		0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	2	2	2	2	2	0	2	0	0	1	1	2	2	0	1	1	0	0	1	2
Fabaceae - Faboideae	*Desmodium varians*	Slender Tick-trefoil	2	2	2	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	1	2	2	1	2	2	0	0	0	2	2	2	0	2	2	0	0	0	0	1
Fabaceae - Faboideae	*Dillwynia retorta*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Glycine clandestina*	Twining Glycine	2	0	2	0	0	0	0	0	0	0	1	2	0	0	2	0	2	0	2	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0
Fabaceae - Faboideae	*Glycine microphylla*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	1	0	2	2	0	0	0	1	2	0	0	0	1	0	0	1	0
Fabaceae - Faboideae	*Hardenbergia violacea*	Purple Coral Pea	0	2	0	2	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	0	0	2	2	2	2	2	0	2	0	0	0	2
Fabaceae - Faboideae	*Jacksonia scoparia*	Dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	1	0	0	0	2

Family	Scientific Name	Common Name	2007																		2008																				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Fabaceae - Faboideae	*Kennedia rubicunda*	Dusky Coral Pea	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Platylobium formosum* subsp. *parviflorum*		0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Podolobium ilicifolium*	Prickly Shaggy Pea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	3	4	3	0	0	0	3	0	2	2	3	2	2	2	0	0	2
Fabaceae - Faboideae	*Pultenaea euchila*	Orange Pultenaea	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Pultenaea retusa*	Notched Bush-pea	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Pultenaea villosa*	Hairy Bush-pea	0	4	0	2	1	2	2	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia falcata*		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia floribunda*	White Sally Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Fabaceae - Mimosoideae	*Acacia implexa*	Hickory Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	1	0	3	0	1	0	0	0	0
Fabaceae - Mimosoideae	*Acacia irrorata* subsp. *irrorata*	Green Wattle	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia longifolia*	Sydney Golden Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia longissima*	Long-leaf Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	2	1	1	1	1	0	1	0	0	1	2
Fabaceae - Mimosoideae	*Acacia maidenii*	Maidens Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Fabaceae - Mimosoideae	*Acacia myrtifolia*	Red-stemmed Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia ulicifolia*	Prickly Moses	1	2	0	0	0	3	2	2	1	0	0	1	2	2	2	2	0	2	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	0	2	0	1	0	0	0
Flacourtiaceae	*Scolopia braunii*	Flintwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Gentianaceae	**Centaurium erythraea*	Common Centaury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0
Geraniaceae	*Geranium homeanum*	Cranesbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Geraniaceae	*Geranium potentilloides*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Geraniaceae	*Geranium solanderi* var. *solanderi*	Native geranium	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Goodeniaceae	*Goodenia heterophylla* subsp. *heterophylla*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	2	0	0	0	0	0	0	0	1	2	1	0	0	0
Haloragaceae	*Gonocarpus teucrioides*	Raspwort	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	2	0	1	0	0	0	2	0	0	0	0	0	0	2	0	2	0	1	0
Iridaceae	*Patersonia glabrata*	Purple Flag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Iridaceae	*Patersonia sericea*	Silky Purple Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Lamiaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	2	0	0	0	2	0	0
Lamiaceae	*Plectranthus argentatus*	Silver Plectranthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	1	0	0	0	0
Lauraceae	*Cryptocarya microneura*	Murrogun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Lauraceae	*Neolitsea dealbata*	White Bolly Gum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0
Lindsaeaceae	*Lindsaea linearis*	Screw Fern	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lindsaeaceae	*Lindsaea microphylla*	Lacy Wedge Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Lobeliaceae	*Pratia purpurascens*	Whiteroot	2	0	2	2	2	3	0	2	3	2	0	0	0	0	2	2	2	0	3	2	2	2	2	2	2	2	2	2	0	2	2	1	2	0	1	2	2	0	2	0
Loganiaceae	*Logania albiflora*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Lomandraceae	*Lomandra confertifolia* subsp. *rubiginosa*		0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	1	1	2	0	0	1	0	0	0	0	4
Lomandraceae	*Lomandra cylindrica*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*	Wattle Mat-rush	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandraceae	*Lomandra glauca*	Pale Mat-rush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	0	0	0	0	0	0	0	0	0	3	4	0	0	0	1	0	0	0	0	2	1	0	2	1	0	2	1	1	0	1	0	1	2	2	2	1	1	2	1	0
Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush	0	0	1	0	0	0	1	2	2	0	0	0	0	0	0	0	2	0	0	2	0	1	1	0	2	0	1	0	0	1	0	2	0	1	1	0	2	0	1	0

Family	Scientific Name	Common Name	2007																		2008																				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	0	0	0	2	0	0	1	0	0	0	0	0	0	0
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1	1	0	0	2	0	0	0	2	0	0
Malvaceae	**Sida rhombifolia*	Paddy's Lucerne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Malvaceae	*Hibiscus heterophyllus*	Native Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Meliaceae	*Synoum glandulosum*	Scentless Rosewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Menispermaceae	*Sarcopetalum harveyanum*	Pearl Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
Menispermaceae	*Stephania japonica*	Snake Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Monimiaceae	*Hedycarya angustifolia*	Native Mulberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Monimiaceae	*Wilkiea huegeliana*	Veiny Wilkiea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Moraceae	*Ficus coronata*	Sandpaper Fig	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Moraceae	*Ficus rubiginosa*	Port Jackson Fig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Moraceae	*Maclura cochinchinensis*	Cockspur Thorn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Moraceae	*Streblus brunonianus*	Whalebone tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Myrsinaceae	**Anagallis arvensis*	Scarlet Pimpernel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrsinaceae	*Myrsine howittiana*	Brush Muttonwood	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrsinaceae	*Myrsine variabilis*	Muttonwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	3	0	0	3	2	0	0	0	2	0	0
Myrtaceae	*Angophora subvelutina*	Broad-leaved Apple	0	0	0	0	0	0	4	0	0	3	0	0	0	0	6	6	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	4	0	0	0
Myrtaceae	*Backhousia sciadophora*	Shatterwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Callistemon salignus*	White Bottlebrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Corymbia maculata*	Spotted Gum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	4	0	0	0	5	0	4	3	4	2	5	3	2	2	4
Myrtaceae	*Eucalyptus acmenoides*	White Mahogany	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0
Myrtaceae	*Eucalyptus amplifolia* subsp. *amplifolia*	Cabbage Gum	4	0	0	0	0	0	0	0	5	0	0	5	0	0	2	2	0	0	5	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus canaliculata*	Large-fruited Grey Gum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	2	4	0	0	0	0	0	0
Myrtaceae	*Eucalyptus carnea*	Thick-leaved Mahogany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	3	4	2	2	0	0	2	0	3	3	3	2	4	5	2	5	4
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	3	0	3	2	3	0	2	0	0	0	0
Myrtaceae	*Eucalyptus fibrosa*	Red Ironbark	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus globoidea*	White Stringybark	0	5	2	5	5	0	2	4	0	5	0	0	0	0	0	0	5	5	0	5	2	5	0	3	0	0	5	0	0	0	0	0	0	0	5	0	3	0	0	0
Myrtaceae	*Eucalyptus microcorys*	Tallow Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	2	5	0	0	4	0	0	0	2	0	0	4	3	0	2	0	2	0	2
Myrtaceae	*Eucalyptus moluccana*	Grey Box	0	2	2	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus propinqua*	Small-fruited Grey Gum	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus saligna*	Sydney Bluegum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0
Myrtaceae	*Eucalyptus siderophloia*	Grey Ironbark	0	0	0	0	0	5	3	3	4	2	0	0	5	6	0	0	0	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0	0	0	2	0	0	1	2	2
Myrtaceae	*Eucalyptus tereticornis*	Forest Redgum	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	1	0	0	0
Myrtaceae	*Leptospermum polygalifolium* subsp. *cismontanum*	Tantoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Myrtaceae	*Leptospermum polygalifolium* subsp. *polygalifolium*	Tantoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Lophostemon confertus*	Brush Box	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	4	0	0
Myrtaceae	*Melaleuca decora*		3	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Melaleuca linariifolia*	Flax-leaved Paperbark	0	0	0	0	0	0	0	0	0	3	6	5	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Melaleuca nodosa*	Prickly-leaved Paperbark	0	0	2	6	5	0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Melaleuca sieberi*		0	0	2	2	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Family	Scientific Name	Common Name	2007																		2008																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Myrtaceae	*Rhodamnia rubescens*	Scrub Terpentine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Myrtaceae	*Syncarpia glomulifera*	Turpentine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	2	3	0	0	0	0	0	0	0	0	2	1	3	0	3	0	2	0
Oleaceae	**Ligustrum sinense*	Small-leaved Privet	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Oleaceae	*Notelaea longifolia*	Large Mock Olive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0
Oleaceae	*Notelaea venosa*	Veined Mock Olive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Onagraceae	*Ludwigia peploides* subsp. *montevidensis*	Water Primrose	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orchidaceae	*Acianthus fornicatus*	Pixie Caps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	2	0	2	1	0	0	0
Orchidaceae	*Cymbidium suave*	Snake Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Orchidaceae	*Pterostylis grandiflora*	Cobra Greenhood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orchidaceae	*Pterostylis nutans*	Nodding Greenhood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Orchidaceae	*Pterostylis* sp. 1		0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orchidaceae	*Pterostylis* sp. 2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Orchidaceae	*Sarcochilus hillii*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Oxalidaceae	*Oxalis exilis*		0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Oxalidaceae	*Oxalis perennans*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0
Philydraceae	*Philydrum lanuginosum*	Woolly Frogmouth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Phormiaceae	*Dianella caerulea*	Blue Flax-lily	0	0	2	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2	2	2	0	1	2	1	0	0	2	1	2	2	2	1	2	1	2	1	1
Phormiaceae	*Dianella longifolia* var. *longifolia*	Flax Lily	0	2	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phormiaceae	*Dianella revoluta* var. *revoluta*	Flax Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	2
Phormiaceae	*Dianella tasmanica*	Tasman Flax Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	2	1	0	0	2	2	1	2	1	1	2	0	0	0	2	1	1	3	2	1	3	1	2	2	1
Phyllanthaceae	*Glochidion ferdinandi* var. *ferdinandi*	Cheese Tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Phyllanthaceae	*Phyllanthus gunnii*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	1	2	0	0	0	0	1	0
Phyllanthaceae	*Phyllanthus hirtellus*		0	0	0	2	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Phyllanthaceae	*Poranthera microphylla*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Pittosporaceae	*Billardiera scandens* var. *scandens*	Hairy Apple Berry	0	2	2	2	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2	2	0	2	1	0	0	0	1	2	1	1	2	1	2	0	2	0
Pittosporaceae	*Bursaria spinosa* subsp. *spinosa*	Blackthorn	0	2	0	0	2	0	0	0	0	0	0	0	2	4	0	0	1	0	0	0	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Pittosporaceae	*Hymenosporum flavum*	Native Frangipani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0
Pittosporaceae	*Pittosporum multiflorum*	Orange Thorn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Pittosporaceae	*Pittosporum revolutum*	Hairy Pittosporum	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	1	1	0	0	0	0	0	0	2	0	2		
Plantaginaceae	**Plantago lanceolata*	Lamb's Tongue	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	**Andropogon virginicus*	Whiskey Grass	2	0	0	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	3	0	0	0	0	0	0	2	0	0	0	0	0
Poaceae	**Axonopus fissifolius*	Narrow-leaved Carpet Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Poaceae	**Chloris virgata*	Feathertop Rhode's Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Poaceae	**Paspalum dilatatum*	Paspalum	2	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	**Sporobolus africanus*	Parramatta Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Poaceae	*Aristida vagans*	Threeawn Speargrass	0	3	0	0	3	2	2	3	0	2	0	4	4	4	3	3	4	0	3	1	3	1	2	2	0	0	2	0	0	0	0	1	0	0	2	2	2	0	1	0
Poaceae	*Cymbopogon refractus*	Barbed-wire Grass	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	5	1	1	0	1	0	2	2	0	0	0	0	0	3	0	2	0	2	0	0	3	0
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0
Poaceae	*Digitaria parviflora*	Small Flowered Finger Grass	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Digitaria ramularis*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	2	0	0	0	1	0	0	1	0
Poaceae	*Echinopogon caespitosus*	Tufted Hedgehog Grass	0	0	0	0	0	0	0	0	2	2	2	2	2	0	0	0	2	0	2	2	2	1	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Poaceae	*Entolasia marginata*	Bordered Panic	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	2	2	1	0	0	0	0	0	5	0	0	0	0	0	2	1	2	0	0	0	0
Poaceae	*Entolasia stricta*	Wiry Panic	0	3	2	4	4	0	3	3	0	0	0	0	3	4	0	0	0	4	0	3	2	3	3	3	3	3	3	3	0	2	0	2	0	0	1	1	2	0	2	2

Family	Scientific Name	Common Name	2007																		2008																					
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Poaceae	*Eragrostis brownii*	Browns Lovegrass	2	0	0	0	0	0	2	0	0	0	0	2	2	0	0	0	2	0	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Poaceae	*Imperata cylindrica*	Blady Grass	6	0	0	0	0	3	2	0	3	4	2	0	0	0	4	3	2	0	0	3	3	5	3	5	2	3	2	4	0	2	3	0	2	2	2	3	0	0	2	0
Poaceae	*Joycea pallida*	Silvertop Wallaby Grass	0	2	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	4	0	2	2	0	0	0	0	0	3	0	2	0	3	0	2	3
Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Grass	0	2	0	0	0	5	2	0	4	0	0	2	0	0	0	4	2	0	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Oplismenus aemulus*	Basket Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Poaceae	*Oplismenus imbecillis*	Basket Grass	0	0	0	0	0	0	0	0	0	2	4	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	2	1	1	0	1	2	0	2	0	0	0	0
Poaceae	*Panicum simile*	Two-colour Panic	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	3	0
Poaceae	*Poa affinis*		0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Poa labillardierei* var. *labillardierei*	Tussock Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0
Poaceae	*Themeda australis*	Kangaroo Grass	3	5	0	0	0	3	5	3	5	3	0	4	5	4	4	4	3	0	4	3	5	0	5	4	5	4	2	0	0	4	5	5	2	4	3	6	0	0	3	3
Polygonaceae	*Persicaria hydropiper*	Water pepper	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polypodiaceae	*Microsorum scandens*	Fragrant Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polypodiaceae	*Platycerium bifurcatum*	Elkhorn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0
Polypodiaceae	*Pyrrosia confluens*	Horse-shoe Felt Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Polypodiaceae	*Pyrrosia rupestris*	Rock Felt Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0
Proteaceae	*Banksia spinulosa* var. *collina*	Hairpin Banksia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proteaceae	*Lomatia silaifolia*	Crinkle Bush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	2	0	1	2	2	2	2	2	2	0	0	0	3	0	2	0	0	1	2	2	0	0	2
Proteaceae	*Stenocarpus salignus*	Beef Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Proteaceae	*Xylomelum pyriforme*	Woody Pear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculaceae	*Clematis aristata*	Old Man's Beard	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0
Ranunculaceae	*Clematis glycinoides*	Headache Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculaceae	*Ranunculus inundatus*	Water Buttercup	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculaceae	*Ranunculus plebeius*	Water Buttercup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhamnaceae	*Alphitonia excelsa*	Red Ash	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhamnaceae	*Pomaderris lanigera*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1
Rosaceae	*Rubus moluccanus* var. *trilobus*	Molucca Bramble	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rosaceae	*Rubus parvifolius*	Native Raspberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	0	0	0	1	2	0	2	2	0	0	0	0	0	0
Rubiaceae	*Galium binifolium*	Bedstraw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubiaceae	*Galium propinquum*	Maori Bedstraw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rubiaceae	*Galium* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Rubiaceae	*Opercularia diphylla*		0	2	2	0	2	2	2	0	2	0	0	2	2	2	0	0	0	0	0	1	0	1	1	0	0	0	2	0	0	1	0	2	0	1	0	1	0	0	1	2
Rubiaceae	*Pomax umbellata*	Pomax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0
Rutaceae	*Boronia polygalifolia*	Dwarf Boronia	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
Rutaceae	*Citrus x taitensis*	Bush Lemon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rutaceae	*Correa reflexa*	Common Correa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rutaceae	*Geijera salicifolia* var. *latifolia*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rutaceae	*Melicope micrococca*	Hairy-leaved Doughwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Rutaceae	*Sarcomelicope simplicifolia*	Big Yellow Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Rutaceae	*Zieria smithii*	Sandfly Zieria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	1	2	0	0
Santalaceae	*Exocarpos cupressiformis*	Native Cherry	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2	1	0	1	1	0	0	1	1	0	0	1	1	1	1	0	0	1
Santalaceae	*Exocarpos strictus*	Dwarf Cherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Sapindaceae	*Alectryon subcinereus*	Native Quince	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Sapindaceae	*Diploglottis cunninghamii*	Native Tamarind	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop-bush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	2	2

Family	Scientific Name	Common Name	2007																		2008																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Sapindaceae	*Dodonaea viscosa* subsp. *angustifolia*	Sticky Hop-bush	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sapindaceae	*Elattostachys nervosa*	Beetroot Tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sapindaceae	*Guioa semiglauca*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0
Scrophulariaceae	*Veronica plebeia*	Trailing Speedwell	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smilacaceae	*Smilax australis*	Lawyer Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	2	1	0	1	1	1	0	0	0	2	0	0
Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0
Solanaceae	**Solanum mauritianum*	Wild Tobacco	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanaceae	*Solanum prinophyllum*	Forest Nightshade	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanaceae	*Solanum stelligerum*	Devil's Needles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Sterculiaceae	*Brachychiton populneus*	Kurrajong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sterculiaceae	*Commersonia fraseri*	Brush Kurrajong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Sterculiaceae	*Heritiera actinophylla*	Black Booyong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Thymelaeaceae	*Pimelea linifolia* subsp. *linifolia*	Slender Rice Flower	0	0	0	0	0	0	2	0	2	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
Typhaceae	*Typha orientalis*	Broadleaf Cumbungi	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ulmaceae	*Aphananthe philippinensis*	Rough-leaved Elm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Urticaceae	*Dendrocnide excelsa*	Giant Stinging Tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Uvulariaceae	*Tripladenia cunninghamii*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Verbenaceae	**Lantana camara*	Lantana	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	0	0	1	0	3	2	3	2	1	1	0	2	1	0
Verbenaceae	**Verbena bonariensis*	Purple Top	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbenaceae	**Verbena rigida*	Purple Top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Violaceae	*Hybanthus monopetalus*	Slender-violet Bush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Violaceae	*Viola betonicifolia*	Native Violet	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0
Violaceae	*Viola hederacea*	Ivy-leaved Violet	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Vitaceae	*Cissus antarctica*	Water Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0	1	3	0	0
Vitaceae	*Cissus hypoglauca*	Five-leaf Water Vine	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0
Xanthorrhoeaceae	*Xanthorrhoea glauca*		0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total species/quadrat		**17**	**26**	**23**	**16**	**24**	**15**	**20**	**29**	**21**	**33**	**23**	**21**	**18**	**13**	**15**	**15**	**27**	**21**	**18**	**65**	**57**	**46**	**45**	**50**	**36**	**49**	**40**	**31**	**59**	**47**	**40**	**45**	**59**	**55**	**61**	**57**	**44**	**52**	**43**	**33**

(b) 2010 floristic quadrat data

Family	Scientific Name	Common Name	2010																																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Acanthaceae	*Brunoniella australis*	Blue Trumpet	2	0	0	0	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0	0	1
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0
Adiantaceae	*Adiantum formosum*	Black Stem Maidenhair	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0
Adiantaceae	*Adiantum hispidulum*	Rough Maidenhair Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
Adiantaceae	*Cheilanthes sieberi* subsp. *sieberi*	Mulga Fern	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	2
Adiantaceae	*Pellaea falcata*	Sickle Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Adiantaceae	*Pellaea paradoxa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	2	2	0	0	0	0
Amaranthaceae	*Alternanthera denticulata*	Lesser Joy Weed	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthericaceae	*Arthropodium milleflorum*	Pale Vanilla-lily	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Anthericaceae	*Tricoryne simplex*	Yellow Rush Lily	0	2	2	0	0	0	0	0	0	1	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aphanopetalaceae	*Aphanopetalum resinosum*	Gum Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0
Apiaceae	**Cyclospermum leptophyllum*	Slender Celery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Apiaceae	*Centella asiatica*	Swamp Pennywort	0	0	2	2	2	0	2	0	0	1	2	2	2	0	2	2	1	0	0	0	0	0	0	0	0	2	2	2	0	1	0	0	1	0	0	0	0	0	0	0
Apiaceae	*Daucus glochidiatus*	Native Carrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Family	Scientific Name	Common Name	2010																																										
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Apiaceae	*Hydrocotyle laxiflora*		0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apiaceae	*Hydrocotyle peduncularis*		0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	2	2	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Apocynaceae	**Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Apocynaceae	*Gompholobium pinnatum*	Pinnate Wedge Pea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apocynaceae	*Parsonsia straminea*	Monkey Rope	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	1	0	0	0	0
Araceae	*Gymnostachys anceps*	Settler's Twine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
Araliaceae	*Polyscias sambucifolia*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Aspleniaceae	*Asplenium australasicum*	Bird's Nest Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0
Asteraceae	**Ageratina adenophora*	Crofton Weed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Ageratina riparia*	Creeping Crofton Weed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Asteraceae	**Aster subulatus*	Wild Aster	0	0	1	0	1	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Bidens pilosa*	Cobbler's Pegs	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Cirsium vulgare*	Black Thistle	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Conyza bonariensis*	Flaxleaf Fleabane	0	0	0	2	2	0	2	2	0	0	1	2	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Conyza* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0
Asteraceae	**Gamochaeta calviceps*	Cudweed	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Hypochaeris glabra*	Smooth Catsear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	**Hypochaeris radicata*	Catsear	0	0	0	2	0	0	2	1	0	0	2	2	0	0	2	2	2	0	0	0	2	2	2	2	2	0	2	0	1	0	0	0	1	0	0	0	2	0	0	1
Asteraceae	**Senecio madagascariensis*	Fireweed	0	0	2	2	2	2	0	2	0	1	1	2	0	0	0	0	0	0	0	0	2	2	0	2	0	0	2	0	1	0	1	2	1	0	0	0	0	2	0	0
Asteraceae	**Tagetes minuta*	Stinking Roger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Cassinia quinquefaria*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Eclipta platyglossa*		0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Euchiton gymnocephalus*		0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Euchiton involucratus*	Star Cudweed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Lagenophora stipitata*	Blue-bottle Daisy	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Ozothamnus diosmifolius*	White Dogwood	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Sigesbeckia orientalis* subsp. *orientalis*	Indian Weed	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
Asteraceae	*Vernonia cinerea* var. *cinerea*		1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Bignoniaceae	*Pandorea pandorana* subsp. *pandorana*	Wonga Wonga Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	1	2	0	0	0	0
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Blechnaceae	*Doodia aspera*	Prickly Rasp Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	3	0	0	0	0
Brassicaceae	**Capsella bursa-pastoris*	Shepard's Purse	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Campanulaceae	*Wahlenbergia gracilis*	Australian Bluebell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0		1	
Celastraceae	*Elaeodendron australe* var. *australe*	Red Olive Plum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Celastraceae	*Maytenus silvestris*	Orange Bark	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Chenopodiaceae	*Einadia trigonos* subsp. *leiocarpa*	Fishweed	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clusiaceae	*Hypericum gramineum*	St John's Wort	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Commelinaceae	*Commelina cyanea*	Scurvy Weed	0	0	0	0	0	0	0	2	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	2	0	0	0	0	0	0
Commelinaceae	*Murdannia graminea*		0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulaceae	*Dichondra repens*	Kidney Weed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	2	2	2	0	0	2	0	0	0	0	0	0	2
Convolvulaceae	*Polymeria calycina*		0	2	2	1	1	0	2	0	0	2	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Cyperaceae	**Cyperus brevifolius*		0	0	0	0	0	1	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	0	2	0	0	1	1	2	0	0	0	0	0	0	0	0	0

Family	Scientific Name	Common Name	2010																																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Cyperaceae	**Cyperus congestus*		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	**Cyperus eragrostis*		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	**Cyperus sesquiflorus*		0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Baumea articulata*	Jointed Twig-rush	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Carex gaudichaudiana*	Tufted Sedge	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Carex appressa*	Tall Sedge	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Cyperaceae	*Carex inversa*		0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Carex longebrachiata*		0	0	2	0	1	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Carex* sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1		0	0	0	0
Cyperaceae	*Cyperus difformis*		0	0	0	0	0	0	0	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Cyperus enervis*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Cyperus gracilis*	Slender Flat Sedge	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Cyperus polystachyos*		0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Cyperus rotundus*	Nutgrass	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Cyperus sphaeroideus*		0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Eleocharis dietrichiana*		0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Eleocharis sphacelata*		0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge	0	0	2	0	2	0	2	0	0	0	2	2	2	0	0	2	1	0	0	0	2	2	0	1	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0
Cyperaceae	*Gahnia radula*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Lepidosperma laterale*		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Ptilothrix deusta*	Ptilothrix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Schoenoplectus mucronatus*		0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperaceae	*Schoenoplectus validus*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Cyperaceae	*Schoenus apogon*	Common Bog-rush	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	3	0	0	2
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Dilleniaceae	*Hibbertia diffusa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Dilleniaceae	*Hibbertia obtusifolia*	Hoary guinea flower	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Dioscoreaceae	*Dioscorea transversa*	Native Yam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0
Ebenaceae	*Diospyros australis*	Black Plum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1		0	0	0
Ericaceae - Styphelioideae	*Leucopogon juniperinus*	Beard Heath	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Ericaceae - Styphelioideae	*Monotoca scoparia*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eupomatiaceae	*Eupomatia laurina*	Bolwarra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Fabaceae - Faboideae	**Trifolium repens*	White Clover	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Daviesia ulicifolia*	Gorse Bitter Pea	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Desmodium brachypodum*	Large Tick-trefoil	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Desmodium gunnii*	Slender tick trefoil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Desmodium rhytidophyllum*		0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	0	0	0	0	0	1	0	0	0	0
Fabaceae - Faboideae	*Desmodium varians*	Slender Tick-trefoil	2	2	0	0	0	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Dillwynia retorta*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Glycine clandestina*	Twining Glycine	2	0	0	2	2	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1		0	0	1
Fabaceae - Faboideae	*Glycine microphylla*		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1		0	0	1

Family	Scientific Name	Common Name	2010																																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Fabaceae - Faboideae	*Glycine tabacina*		1	2	0	0	0	0	0	2	0	2	0	1	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	2	2	2	0	0	1	0	0	0	1	0	0	0
Fabaceae - Faboideae	*Hardenbergia violacea*	Purple Coral Pea	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	1	0	0	0	0
Fabaceae - Faboideae	*Jacksonia scoparia*	Dogwood	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Mirbelia platylobioides*		0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Faboideae	*Podolobium ilicifolium*	Prickly Shaggy Pea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Fabaceae - Faboideae	*Pultenaea villosa*	Hairy Bush-pea	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia brownii*	Heath Wattle	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia falcata*		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia implexa*	Hickory Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0
Fabaceae - Mimosoideae	*Acacia irrorata* subsp. *irrorata*	Green Wattle	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	2	0	0	0	0	0	1	0	0	0	0
Fabaceae - Mimosoideae	*Acacia longifolia*	Sydney Golden Wattle	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia longissima*	Long-leaf Wattle	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia maidenii*	Maidens Wattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fabaceae - Mimosoideae	*Acacia ulicifolia*	Prickly Moses	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	2	0	2	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Flacourtiaceae	*Scolopia braunii*	Flintwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Gentianaceae	**Centaurium erythraea*	Common Centaury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geraniaceae	*Geranium solanderi* var. *solanderi*	Native geranium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0	0	0
Goodeniaceae	*Dampiera stricta*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodeniaceae	*Goodenia heterophylla* subsp. *heterophylla*		0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Goodeniaceae	*Goodenia paniculata*	Branched Goodenia	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragaceae	*Gonocarpus oreophilus*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Haloragaceae	*Gonocarpus tetragynus*	Raspwort	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragaceae	*Gonocarpus teucrioides*	Raspwort	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2
Hydrocharitaceae	*Ottelia ovalifolia* subsp. *ovalifolia*	Swamp Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypoxidaceae	*Hypoxis hygrometrica*	Golden Weather Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Juncaceae	**Juncus cognatus*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Juncaceae	*Juncus continuus*		0	0	0	0	0	0	2	0	2	0	2	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncaceae	*Juncus prismatocarpus*		0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncaceae	*Juncus usitatus*	Common Rush	0	0	2	0	1	0	0	2	0	0	0	2	0	2	0	0	0	1	0	0	0	2	0	0	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Lamiaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
Lamiaceae	*Mentha satureioides*	Creeping Mint	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Lamiaceae	*Plectranthus argentatus*	Silver Plectranthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Lamiaceae	*Plectranthus parviflorus*	Cockspur Flower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0
Lamiaceae	*Prostanthera incana*	Velvet Mint-bush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Lauraceae	*Cassytha glabella*	Devil's Twine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lauraceae	*Cryptocarya microneura*	Murrogun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0
Lauraceae	*Neolitsea dealbata*	White Bolly Gum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Lindsaeaceae	*Lindsaea linearis*	Screw Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lobeliaceae	*Pratia purpurascens*	Whiteroot	2	2	2	2	1	0	2	0	0	2	2	0	3	0	0	2	2	0	0	0	0	0	2	2	0	2	0	2	0	2	0	0	2	0	0	0	1	0	0	2
Lomandraceae	*Lomandra cylindrica*		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandraceae	*Lomandra filiformis* subsp. *coriacea*	Wattle Mat-rush	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*	Wattle Mat-rush	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Lomandraceae	*Lomandra glauca*	Pale Mat-rush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	1	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	2	0	0	0	1

Family	Scientific Name	Common Name	2010																																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush	1	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0	2	0	0	0	0
Malvaceae	*Hibiscus heterophyllus*	Native Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0
Menispermaceae	*Sarcopetalum harveyanum*	Pearl Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
Menispermaceae	*Stephania japonica*	Snake Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Monimiaceae	*Wilkiea huegeliana*	Veiny Wilkiea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Moraceae	*Ficus coronata*	Sandpaper Fig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Moraceae	*Ficus rubiginosa*	Port Jackson Fig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Moraceae	*Maclura cochinchinensis*	Cockspur Thorn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Moraceae	*Streblus brunonianus*	Whalebone tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	0	0	0	0	0
Myrsinaceae	**Anagallis arvensis*	Scarlet Pimpernel	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Myrsinaceae	*Myrsine howittiana*	Brush Muttonwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Myrsinaceae	*Myrsine variabilis*	Muttonwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0
Myrtaceae	*Acmena smithii*	Lilly Pilly	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0
Myrtaceae	*Angophora costata*	Smooth-barked Apple	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Angophora subvelutina*	Broad-leaved Apple	4	4	0	0	0	0	2	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0
Myrtaceae	*Callistemon rigidus*	Stiff Bottlebrush	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Corymbia maculata*	Spotted Gum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0	0	0	0	0
Myrtaceae	*Eucalyptus amplifolia* subsp. *amplifolia*	Cabbage Gum	2	3	3	0	0	0	4	0	0	2	3	0	2	3	0	3	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus canaliculata*	Large-fruited Grey Gum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus carnea*	Thick-leaved Mahogany	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0	0
Myrtaceae	*Eucalyptus globoidea*	White Stringybark	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	4
Myrtaceae	*Eucalyptus microcorys*	Tallow Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus moluccana*	Grey Box	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus propinqua*	Small-fruited Grey Gum	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus punctata*	Grey Gum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Myrtaceae	*Eucalyptus resinifera* subsp. *resinifera*	Red Mahogany	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Myrtaceae	*Eucalyptus saligna*	Sydney Bluegum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus siderophloia*	Grey Ironbark	0	0	0	3	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	3	2	2	0	0	2	0	0	0	0	0	0	0
Myrtaceae	*Eucalyptus tereticornis*	Forest Redgum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Leptospermum polygalifolium* subsp. *cismontanum*	Tantoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Leptospermum polygalifolium* subsp. *polygalifolium*	Tantoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Myrtaceae	*Leptospermum trinervium*	Slender Tea-tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Lophostemon confertus*	Brush Box	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0	0	0	0	0
Myrtaceae	*Melaleuca decora*		0	0	4	0	0	0	0	0	0	3	2	0	0	0	0	5	0	0	3	3	0	0	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0	0	1	0
Myrtaceae	*Melaleuca linariifolia*	Flax-leaved Paperbark	0	0	0	0	0	0	0	0	1	0	4	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0	0	0	0
Myrtaceae	*Melaleuca nodosa*	Prickly-leaved Paperbark	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Melaleuca thymifolia*	Thyme Honey-myrtle	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrtaceae	*Syncarpia glomulifera*	Turpentine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	
Oleaceae	**Ligustrum sinense*	Small-leaved Privet	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0

Family	Scientific Name	Common Name	2010																																										
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Oleaceae	*Notelaea longifolia*	Large Mock Olive	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		2	1	0	0	0	0
Oleaceae	*Notelaea venosa*	Veined Mock Olive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0	0	0	0	0
Onagraceae	*Ludwigia peploides* subsp. *montevidensis*	Water Primrose	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orchidaceae	*Dendrobium gracilicaule* var. *howeanum*	Bush Orchid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Orchidaceae	*Dendrobium schoeninum*	Pencil Orchid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Oxalidaceae	*Oxalis exilis*		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalidaceae	*Oxalis perennans*		0	0	0	0	0	0	0	1	0	2	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
Philydraceae	*Philydrum lanuginosum*	Woolly Frogmouth	0	0	0	0	0	0	2	0	2	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phormiaceae	*Dianella caerulea*	Blue Flax-lily	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0
Phormiaceae	*Dianella caerulea* var. *producta*	Blue Flax Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Phormiaceae	*Dianella longifolia* var. *longifolia*	Flax Lily	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Phormiaceae	*Dianella revoluta* var. *revoluta*	Flax Lily	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phormiaceae	*Dianella tasmanica*	Tasman Flax Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Phormiaceae	*Stypandra glauca*	Nodding Blue Lily	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush	2	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2	0	0	1	0	1	1	0	0	0	2
Phyllanthaceae	*Glochidion ferdinandi* var. *ferdinandi*	Cheese Tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	1	0	0	0	0
Phyllanthaceae	*Phyllanthus hirtellus*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthaceae	*Poranthera microphylla*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Pittosporaceae	*Billardiera scandens* var. *scandens*	Hairy Apple Berry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1
Pittosporaceae	*Bursaria spinosa* subsp. *spinosa*	Blackthorn	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Pittosporaceae	*Pittosporum multiflorum*	Orange Thorn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0
Pittosporaceae	*Pittosporum revolutum*	Hairy Pittosporum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Plantaginaceae	**Plantago lanceolata*	Lamb's Tongue	0	0	0	0	1	0	0	2	0	2	0	0	0	0	2	2	0	0	0	0	0	0	2	1	0	2	0	0	0	0	0	0	2	0	0	0	2	2	0	0
Poaceae	**Andropogon virginicus*	Whiskey Grass	0	0	2	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	6	0	2
Poaceae	**Axonopus fissifolius*	Narrow-leaved Carpet Grass	0	0	4	2	4	5	5	3	0	2	3	6	3	3	4	2	2	0	0	0	4	5	2	3	3	3	2	0	0	0	4	0	0	0	0	0	0	0	0	0
Poaceae	**Chloris gayana*	Rhode's Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	1	0	2	0	0	0	0	0	0	0
Poaceae	**Chloris virgata*	Feathertop Rhode's Grass	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	**Digitaria ciliaris*	Summer Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Poaceae	**Eragrostis cilianensis*	Stinkgrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	**Eragrostis curvula*	African Lovegrass	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	**Paspalum dilatatum*	Paspalum	0	0	3	2	3	4	5	2	2	0	5	0	0	2	4	2	2	0	0	0	4	2	2	2	2	2	4	0	0	0	5	0	0	0	0	0	0	3	0	0
Poaceae	**Pennisetum clandestinum*	Kikuyu	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
Poaceae	**Setaria parviflora*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Poaceae	**Setaria sphacelata*	South African Pigeon Grass	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Poaceae	**Sporobolus africanus*	Parramatta Grass	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Poaceae	*Aristida ramosa* var. *ramosa*	Purple Wiregrass	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Aristida vagans*	Threeawn Speargrass	2	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Poaceae	*Austrodanthonia racemosa* var. *racemosa*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Austrodanthonia tenuior*		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Austrostipa setacea*	Corkscrew Grass	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Austrostipa setacea*	Corkscrew Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Bothriochloa macra*	Red Grass	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Family	Scientific Name	Common Name	2010																																									
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Poaceae	*Capillipedium parviflorum*	Scented-top Grass	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0
Poaceae	*Cymbopogon refractus*	Barbed-wire Grass	0	2	0	0	2	0	0	2	0	2	0	0	0	0	0	2	0	0	0	0	2	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Poaceae	*Cynodon dactylon*	Couch	0	0	0	0	0	0	3	4	0	0	0	0	0	3	3	0	0	0	0	0	0	0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Poaceae	*Digitaria ramularis*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Echinopogon caespitosus*	Tufted Hedgehog Grass	2	2	0	2	0	0	0	2	0	2	0	0	2	0	0	2	0	0	2	0	2	0	1	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0	0	0
Poaceae	*Entolasia marginata*	Bordered Panic	0	0	2	0	0	0	0	0	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Poaceae	*Entolasia stricta*	Wiry Panic	2	3	0	2	0	0	0	2	0	4	0	0	5	0	0	0	0	0	4	4	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	2	0	0	0	0
Poaceae	*Eragrostis brownii*	Browns Lovegrass	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1
Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	0	2	2	0	2	1	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Hemarthria uncinata* var. *uncinata*	Matgrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Imperata cylindrica*	Blady Grass	2	4	4	4	2	0	3	2	0	2	2	0	2	0	0	3	3	0	0	0	3	0	2	0	2	0	0	2	2	4	0	0	3	0	0	2	5	0	0	4
Poaceae	*Isachne globosa*	Swamp Millet	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Grass	2	2	0	2	0	0	0	2	0	2	0	0	3	0	3	3	0	0	2	2	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Oplismenus aemulus*	Basket Grass	0	0	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	0	0	2	0	0	0	0	0	0	0
Poaceae	*Oplismenus imbecillis*	Basket Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0
Poaceae	*Panicum effusum*	Hairy Panic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0
Poaceae	*Panicum simile*	Two-coloured Panic	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Poaceae	*Paspalidium distans*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Paspalum distichum*	Water Couch	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Poa affinis*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Poaceae	*Poa labillardierei* var. *labillardierei*	Tussock Grass	3	2	0	2	2	0	0	3	0	2	0	0	1	0	0	3	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Sporobolus creber*	Western Rat-tail Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae	*Themeda australis*	Kangaroo Grass	4	3	2	5	5	0	3	1	0	1	0	1	2	1	0	0	5	0	0	0	2	0	0	0	0	0	0	2	3	3	0	0	0	0	0	2	0	0	0	3
Polygonaceae	**Rumex conglomeratus*	Clustered Dock	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonaceae	**Rumex crispus*	Curled Dock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
Polygonaceae	*Muehlenbeckia gracillima*	Slender Lignum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polygonaceae	*Persicaria decipiens*	Slender Knot-weed	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonaceae	*Persicaria hydropiper*	Water pepper	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonaceae	*Rumex brownii*	Swamp Dock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polypodiaceae	*Platycerium bifurcatum*	Elkhorn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Polypodiaceae	*Pyrrosia rupestris*	Rock Felt Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Proteaceae	*Banksia spinulosa* var. *collina*	Hairpin Banksia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Ranunculaceae	*Clematis aristata*	Old Man's Beard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0
Ranunculaceae	*Clematis glycinoides*	Headache Vine	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculaceae	*Ranunculus inundatus*	Water Buttercup	0	0	3	0	0	0	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0
Ranunculaceae	*Ranunculus lappaceus*	Common Buttercup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhamnaceae	*Alphitonia excelsa*	Red Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rosaceae	**Rubus fruticosus*	Blackberry	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosaceae	*Rubus parvifolius*	Native Raspberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	1	0	0	1
Rubiaceae	*Galium binifolium*	Bedstraw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rubiaceae	*Galium propinquum*	Maori Bedstraw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Family	Scientific Name	Common Name	2010																																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Rubiaceae	*Opercularia diphylla*		2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Rutaceae	*Acronychia oblongifolia*	White Aspen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Rutaceae	*Boronia polygalifolia*	Dwarf Boronia	2	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santalaceae	*Exocarpos cupressiformis*	Native Cherry	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Sapindaceae	*Alectryon subcinereus*	Native Quince	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0
Sapindaceae	*Diploglottis cunninghamii*	Native Tamarind	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop-bush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Sapindaceae	*Elattostachys nervosa*	Beetroot Tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Sapindaceae	*Guioa semiglauca*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1	0	0	0	0
Scrophulariaceae	*Veronica plebeia*	Trailing Speedwell	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	1	0	0	1	0	0	0	0	0	0	0
Smilacaceae	*Smilax australis*	Lawyer Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0
Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Solanaceae	**Solanum mauritianum*	Wild Tobacco	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Solanaceae	**Solanum nigrum*	Black-berry Nightshade	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Solanaceae	*Solanum brownii*	Violet Nightshade	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanaceae	*Solanum prinophyllum*	Forest Nightshade	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Sterculiaceae	*Brachychiton acerifolius*	Flame Tree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Sterculiaceae	*Commersonia fraseri*	Brush Kurrajong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Thymelaeaceae	*Pimelea linifolia* subsp. *linifolia*	Slender Rice Flower	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Typhaceae	*Typha orientalis*	Broadleaf Cumbungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
Uvulariaceae	*Tripladenia cunninghamii*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0
Verbenaceae	**Lantana camara*	Lantana	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	3	0	0	2	5	6	1	0	0	0	1
Verbenaceae	**Verbena bonariensis*	Purple Top	0	0	2	0	3	2	2	2	0	0	2	3	0	0	3	2	2	0	0	0	2	2	2	2	0	2	0	0	1	2	1	1	1	0	0	0	0	2	0	0
Verbenaceae	**Verbena rigida*	Purple Top	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Violaceae	*Viola betonicifolia*	Native Violet	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Violaceae	*Viola hederacea*	Ivy-leaved Violet	2	2	2	0	0	0	0	3	0	3	0	0	3	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vitaceae	*Cissus antarctica*	Water Vine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	0
Vitaceae	*Tetrastigma nitens*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Xanthorrhoeaceae	*Xanthorrhoea glauca*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
			44	**31**	**37**	**28**	**31**	**9**	**24**	**41**	**16**	**51**	**25**	**14**	**38**	**19**	**18**	**35**	**22**	**9**	**30**	**29**	**22**	**12**	**32**	**21**	**13**	**38**	**20**	**40**	**56**	**54**	**11**	**6**	**52**	**46**	**34**	**68**	**12**	**8**	**5**	**30**

(c) Species identified in 2010 random meander surveys

Family	Scientific Name	Common Name
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair
Anthericaceae	*Caesia parviflora* var. *parviflora*	Pale Grass-lily
Anthericaceae	*Laxmannia gracilis*	Slender Wire Lily
Apocynaceae	*Marsdenia rostrata*	Common Milk Vine
Apocynaceae	*Marsdenia suaveolens*	Scented Marsdenia
Apocynaceae	*Parsonsia velutina*	
Asteraceae	**Euchiton sphaericus*	
Asteraceae	**Facelis retusa*	
Asteraceae	**Gamochaeta spicata*	
Asteraceae	**Sonchus oleraceus*	Common Sowthistle
Asteraceae	**Taraxacum officinale*	Dandelion
Asteraceae	*Asteraceae* sp.	
Asteraceae	*Brachyscome angustifolia* var. *heterophylla*	
Asteraceae	*Brachyscome multifida* var. *multifida*	Cut-leaf Daisy
Asteraceae	*Calotis dentex*	
Asteraceae	*Coronidium elatum*	
Asteraceae	*Vittadinia cuneata*	Fuzzweed
Campanulaceae	*Wahlenbergia planiflora*	
Campanulaceae	*Wahlenbergia stricta* subsp. *stricta*	Tall Bluebell
Capparaceae	*Capparis arborea*	Native Pomegranate
Caryophyllaceae	*Stellaria flaccida*	
Caryophyllaceae	**Cerastium glomeratum*	Mouse Ear Chickweed
Casuarinaceae	*Casuarina cunninghamiana*	River Oak
Commelinaceae	*Tradescantia fluminensis*	Wandering Jew
Cunoniaceae	*Caldcluvia paniculosa*	Soft Corkwood
Cunoniaceae	*Schizomeria ovata*	Crab Apple
Cyperaceae	*Carex breviculmis*	
Cyperaceae	*Gahnia aspera*	Swamp Sword Rush
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Cyperaceae	*Gahnia sieberiana*	Red-fruited Saw Sedge
Cyperaceae	*Lepidosperma concavum*	
Dennstaedtiaceae	*Hypolepis glandulifera*	Downy Ground Fern
Dilleniaceae	*Hibbertia dentata*	Trailing Guinea Flower
Dilleniaceae	*Hibbertia linearis*	
Dilleniaceae	*Hibbertia pedunculata*	
Droseraceae	*Drosera auriculata*	Sundew
Elaeocarpaceae	*Elaeocarpus obovatus*	Blueberry Ash
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash
Elaeocarpaceae	*Tetratheca thymifolia*	
Euphorbiaceae	*Baloghia inophylla*	Brush Bloodwood
Euphorbiaceae	*Claoxylon australe*	Brittlewood

Family	Scientific Name	Common Name
Fabaceae - Faboideae	**Trifolium dubium*	Yellow Suckling Clover
Fabaceae - Faboideae	**Trifolium fragiferum*	Strawberry Clover
Fabaceae - Faboideae	*Kennedia rubicunda*	Dusky Coral Pea
Fabaceae - Faboideae	*Platylobium formosum* subsp. *parviflorum*	
Fabaceae - Faboideae	*Pultenaea euchila*	Orange Pultenaea
Fabaceae - Faboideae	*Pultenaea retusa*	Notched Bush-pea
Fabaceae - Faboideae	*Viminaria juncea*	Golden Spray
Fabaceae - Mimosoideae	*Acacia floribunda*	White Sally Wattle
Fabaceae - Mimosoideae	*Acacia linifolia*	White Wattle
Fabaceae - Mimosoideae	*Acacia melanoxylon*	Blackwood
Fabaceae - Mimosoideae	*Acacia myrtifolia*	Red-stemmed Wattle
Geraniaceae	*Geranium homeanum*	Cranesbill
Geraniaceae	*Geranium potentilloides*	
Iridaceae	*Patersonia glabrata*	Purple Flag
Iridaceae	*Patersonia sericea*	Silky Purple Flower
Lamiaceae	**Stachys arvensis*	Stagger Weed
Lamiaceae	*Plectranthus graveolens*	
Lauraceae	*Cryptocarya glaucescens*	Jackwood
Lauraceae	*Litsea australis*	Brown Bolly Gum
Lauraceae	*Neolitsea australiensis*	Green Bolly Gum
Liliaceae	**Lilium formosanum*	Formosan Lily
Lindsaeaceae	*Lindsaea microphylla*	Lacy Wedge Fern
Loganiaceae	*Logania albiflora*	
Lomandraceae	*Lomandra confertifolia* subsp. *rubiginosa*	
Loranthaceae	*Amyema miquelii*	
Malvaceae	**Sida rhombifolia*	Paddy's Lucerne
Meliaceae	*Dysoxylum rufum*	Hairy Rosewood
Meliaceae	*Melia azedarach*	White Cedar
Meliaceae	*Synoum glandulosum*	Scentless Rosewood
Meliaceae	*Toona ciliata*	Red Cedar
Monimiaceae	*Doryphora sassafras*	Sassafras
Monimiaceae	*Hedycarya angustifolia*	Native Mulberry
Moraceae	*Ficus macrophylla*	Moreton Bay Fig
Moraceae	*Trophis scandens* subsp. *scandens*	Burny Vine
Myoporaceae	*Eremophila debilis*	Winter Apple
Myrtaceae	*Backhousia sciadophora*	Shatterwood
Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush
Myrtaceae	*Callistemon salignus*	White Bottlebrush
Myrtaceae	*Eucalyptus acmenoides*	White Mahogany
Myrtaceae	*Eucalyptus agglomerata*	Blue-leaved Stringybark
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark
Myrtaceae	*Eucalyptus fibrosa*	Red Ironbark

Family	Scientific Name	Common Name
Myrtaceae	^*Eucalyptus largeana*	Craven Grey Box
Myrtaceae	*Melaleuca sieberi*	
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree
Myrtaceae	*Rhodamnia rubescens*	Scrub Terpentine
Myrtaceae	*Syzygium australe*	Brush Cherry
Oleaceae	*Jasminum volubile*	Stiff Jasmine
Orchidaceae	*Acianthus fornicatus*	Pixie Caps
Orchidaceae	*Chiloglottis diphylla*	Bird Orchid
Orchidaceae	*Cymbidium suave*	Snake Flower
Orchidaceae	*Dipodium variegatum*	
Orchidaceae	*Pterostylis curta*	Blunt Greenhood
Orchidaceae	*Pterostylis grandiflora*	Cobra Greenhood
Orchidaceae	*Pterostylis nutans*	Nodding Greenhood
Orchidaceae	*Pterostylis* sp. 1	
Orchidaceae	*Pterostylis* sp. 2	
Orchidaceae	*Sarcochilus hillii*	
Orchidaceae	*Spiranthes australis*	Ladies' Tresses
Passifloraceae	*Passiflora cinnabarina*	Red Passionflower
Phyllanthaceae	*Phyllanthus gunnii*	
Pittosporaceae	*Hymenosporum flavum*	Native Frangipani
Poaceae	**Setaria pumila*	Pale Pigeon Grass
Poaceae	*Austrodanthonia fulva*	Wallaby Grass
Poaceae	*Dichelachne crinita*	Longhair Plumegrass
Poaceae	*Digitaria parviflora*	Small Flowered Finger Grass
Poaceae	*Joycea pallida*	Silvertop Wallaby Grass
Polygonaceae	*Persicaria lapathifolia*	
Polygonaceae	*Persicaria praetermissa*	
Polypodiaceae	*Microsorum scandens*	Fragrant Fern
Polypodiaceae	*Pyrrosia confluens*	Horse-shoe Felt Fern
Proteaceae	*Lomatia silaifolia*	Crinkle Bush
Proteaceae	*Stenocarpus salignus*	Beef Wood
Proteaceae	*Xylomelum pyriforme*	Woody Pear
Ranunculaceae	*Ranunculus plebeius*	Water Buttercup
Rhamnaceae	*Pomaderris lanigera*	
Ripogonaceae	*Ripogonum album*	White Supplejack
Ripogonaceae	*Ripogonum fawcettianum*	Small Supplejack
Rosaceae	*Rubus moluccanus* var. *trilobus*	Molucca Bramble
Rosaceae	*Rubus rosifolius*	Forest Bramble
Rubiaceae	**Richardia humistrata*	
Rubiaceae	*Galium* sp.	
Rubiaceae	*Morinda jasminoides*	Sweet Morinda
Rubiaceae	*Pomax umbellata*	Pomax

Family	Scientific Name	Common Name
Rutaceae	*Citrus x taitensis*	Bush Lemon
Rutaceae	*Correa reflexa*	Common Correa
Rutaceae	*Geijera salicifolia* var. *latifolia*	
Rutaceae	*Melicope micrococca*	Hairy-leaved Doughwood
Rutaceae	*Sarcomelicope simplicifolia*	Big Yellow Wood
Rutaceae	*Zieria smithii*	Sandfly Zieria
Santalaceae	*Exocarpos strictus*	Dwarf Cherry
Sapindaceae	*Dodonaea viscosa* subsp. *angustifolia*	Sticky Hop-bush
Sapindaceae	*Rhysotoechia bifoliolata* subsp. *bifoliolata*	Two-leaf Tuckeroo
Solanaceae	*Duboisia myoporoides*	Corkwood
Solanaceae	*Solanum stelligerum*	Devil's Needles
Stackhousiaceae	*Stackhousia viminea*	Slender Stackhousia
Sterculiaceae	*Brachychiton populneus*	Kurrajong
Sterculiaceae	*Heritiera actinophylla*	Black Booyong
Thelypteridaceae	*Christella dentata*	Binung
Ulmaceae	*Aphananthe philippinensis*	Rough-leaved Elm
Ulmaceae	*Trema tomentosa* var. *viridis*	Native Peach
Urticaceae	*Dendrocnide excelsa*	Giant Stinging Tree
Urticaceae	*Urtica urens*	Small Nettle
Violaceae	*Hybanthus monopetalus*	Slender-violet Bush
Vitaceae	*Cayratia clematidea*	Native Grape
Vitaceae	*Cissus hypoglauca*	Five-leaf Water Vine

Appendix 3: Vegetation Condition Assessment Data

Legend:	Value
Above benchmark	0
Within benchmark	1
Below benchmark	2

Condition	
Low	Majority below benchmark
Moderate	Majority within benchmark
High	Majority above benchmark

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Dry Sclerophyll Forests(Shrub/grass sub-formation)	**38**	**15**	**40**	**4**	**40**	**30**	**60**	**3**	**15**	**10**	**25**	**1.2**	**10**				
	Keith Class (2004): Hunter-Macleay Dry Sclerophyll Forests														**Below**	**Within**	**Above**	**Condition**
2007	1	12		15		5		90		2		10	0	13				
		2		1		1		0		2		2	2	0	4	2	2	Low
	2	26		37		0		70		10		30	0	70				
		2		1		2		0		1		1	2	0	3	3	2	Moderate
	3	23		13.5		31.5		30		10		20	2	59				
		2		1		1		1		1		1	0	0	1	5	2	Moderate
	4	26		24		28.5		40		20		20	0	86				
		2		1		1		1		1		1	2	0	2	5	1	Moderate
	5	24		26		2.5		86		14		36	0	5				
		2		1		2		0		1		1	2	2	4	3	1	Low
	6	12		21		10		90		50		50	0	6				
		2		1		1		0		0		0	2	2	3	2	3	Moderate
	7	19		41.5		0		90		50		30	0	0				
		2		0		2		0		0		0	2	2	4	0	4	Moderate
	8	29		27		16		30		20		30	1	123				
		2		1		1		1		1		1	0	0	1	5	2	Moderate
	9	16		30		0		70		20		20	0	0				
		2		1		2		0		0		1	2	2	4	2	2	Low
	12	20		32		15.5		56		0		54	0	0				
		2		1		1		0		2		0	2	2	4	2	2	Low
	13	18		42		11.5		20		15		40	0	2				
		2		0		1		2		1		0	2	2	4	2	2	Low
	14	13		45.5		7		50		20		30	0	29				
		2		0		1		1		0		0	2	0	2	2	4	High
	15	15		34		0		94		4		52	0	7.5				
		2		1		2		0		2		0	2	2	5	1	2	Low
	16	15		43.5		5		90		2		25	0	39				

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Dry Sclerophyll Forests(Shrub/grass sub-formation)	**38**	**15**	**40**	**4**	**40**	**30**	**60**	**3**	**15**	**10**	**25**	**1.2**	**10**				
	Keith Class (2004): Hunter-Macleay Dry Sclerophyll Forests cont.														**Below**	**Within**	**Above**	**Condition**
		2		0		1		0		2		1	2	0	3	2	3	Moderate
	17	27		23.5		4		50		15		50	0	0				
		2		1		1		1		1		0	2	2	3	4	1	Moderate
	19	17		37		4.5		62		0		30	1	0				
		2		1		2		0		2		1	2	2	5	2	1	Low
2008	1	61		14.5		18		50		34		14	0	13				
		0		2		1		1		0		1	2	0	2	3	3	High
	2	54		46.5		9		98		16		62	0	70				
		0		0		1		0		0		0	2	0	1	1	6	High
	3	45		30.5		2		98		56		76	2	59				
		0		1		2		0		0		0	0	0	1	1	6	High
	4	44		20		5		62		16		18	0	86				
		0		1		1		0		0		1	2	0	1	3	4	High
	6	35		26.5		6		40		46		14	0	93.5				
		2		1		1		1		0		1	2	0	2	4	2	Moderate
	7	48		19		11		46		30		20	0	45				
		0		1		1		1		0		1	2	0	1	4	3	Moderate
	8	35		41.5		6		60		20		50	0	135				
		0		0		1		0		1		0	2	0	1	2	5	High
	11	47		27		0		58		26		34	0	15				
		0		1		2		1		0		0	2	0	2	2	4	High
	13	44		28.5		7		58		16		68	0	107				
		0		1		1		1		0		0	2	0	1	3	4	High
	14	55		28		22.5		50		14		60	0	53.5				
		0		1		1		1		1		0	2	0	1	4	3	Moderate
	15	53		30		1		68		34		58	0	24				
		0		1		2		0		0		0	2	0	2	1	5	High
	16	58		29.5		3		78		14		40	0	72				
		0		1		2		0		1		0	2	0	2	2	4	High
	17	54		41.5		6		70		40		40	2	6				
		0		0		1		0		0		0	0	2	1	1	6	High
	18	43		28.5		2.5		64		24		36	1	30.5				
		0		1		2		0		0		0	2	0	2	1	5	High
	20	41		11.5		18.5		70		8		16	0	20				
		0		2		1		0		1		1	2	0	2	3	3	High
	21	33		33		14		34		20		44	0	0				
		2		1		1		1		0		0	2	2	3	3	2	Moderate

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Dry Sclerophyll Forests(Shrub/grass sub-formation)	**38**	**15**	**40**	**4**	**40**	**30**	**60**	**3**	**15**	**10**	**25**	**1.2**	**10**				
	Keith Class (2004): Hunter-Macleay Dry Sclerophyll Forests cont.														**Below**	**Within**	**Above**	**Condition**
2010	1	44		46.5		1		90		10		60	1	16				
		0		0		2		0		1		0	2	0	2	1	5	High
	2	31		48		6		90		20		40	0	6.5				
		2		0		1		0		0		1	2	2	3	2	3	Moderate
	4	23		11		13		96		30		20	0	0				
		2		2		1		0		0		1	2	2	4	2	2	Low
	8	28		28.5		0		20		0		70	0	9				
		2		1		2		1		2		0	2	2	5	2	1	Low
	10	39		41		0		50		10		40	0	53.5				
		0		0		2		1		1		1	2	0	2	3	3	High
	13	32		48.5		0		90		4		60	0	30				
		2		0		2		0		2		0	2	0	4	0	4	Moderate
	26	30		23.5		0		4		5		25	1	13.5				
		2		1		2		2		1		1	2	0	4	3	1	Low
	21	16		0		0		60		0		34	0	0				
		2		2		2		0		2		1	2	2	6	1	1	Low
	28	39		25		0		84		62		62	1	59				
		0		1		2		0		0		0	2	0	2	1	5	High
	40	27		37.5		1		86		0		4	0	2.5				
		2		1		2		0		2		2	2	2	6	1	1	Low

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Grassy Woodlands	**41**	**15**	**40**	**5**	**20**	**30**	**50**	**5**	**10**	**20**	**40**	**3**	**5**				
	Keith Class (2004): Coastal Valley Grassy Woodlands														**Below**	**Within**	**Above**	**Condition**
2007	10	28		21.5		17.5		40		20		40	1	2				
		2		1		1		1		0		1	2	2	3	4	1	Moderate
	11	16		0		22.5		78		0		44	0	5				
		2		2		0		0		2		0	2	0	4	0	4	Moderate
2008	5	47	15		0		100		22		36		0	5				
		0	1		2		0		0		0		2	0	2	1	5	High
	9	23		15.5		21		88		0		66	0	10				
		2		1		0		0		2		0	2	0	3	1	4	High

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Grassy Woodlands	**41**	**15**	**40**	**5**	**20**	**30**	**50**	**5**	**10**	**20**	**40**	**3**	**5**				
	Keith Class (2004): Coastal Valley Grassy Woodlands cont.														**Below**	**Within**	**Above**	**Condition**
2008	12	30		13.5		10.5		78		0		48	0	9.5				
		2		2		1		0		2		0	2	0	4	1	3	Low
2010	3	128		24.5		29.5		96		1		74	3	72				
		0		1		0		0		2		0	0	0	1	1	6	High
	7	18		25		3		40		0		20	0	0				
		2		1		2		1		2		1	2	2	5	3	0	Low
	11	17		20.5		16		10		0		50	0	35				
		2		1		1		2		2		0	2	0	4	2	2	Low
	16	23		22		34		65		0		40	0	52				
		2		1		0		0		2		1	2	0	3	2	3	Moderate
	27	11		12		0		4		62		44	0	0				
		2		2		2		2		0		0	2	2	6	0	2	Low
	29	44		14.4		18.5		74		12		56	0	10				
		0		2		1		0		0		0	2	0	2	1	5	High
	30	45		21		9		56		24		40	0	24.5				
		0		1		1		0		0		1	2	0	1	3	4	High
	33	43		24		22		58		4		12	0	14				
		0		1		0		0		2		2	2	0	3	1	4	High

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Dry Sclerophyll Forests (Shrubby sub-formation)	**31**	**10**	**40**	**5**	**45**	**0**	**50**	**10**	**60**	**5**	**40**	**1.5**	**10**	**Below**	**Within**	**Above**	**Condition**
	Keith Class (2004): North Coast Dry Sclerophyll Forests																	
2007	18	20		2		0		0		0		0	0	0				
		2		2		2		1		2		2	2	2	7	1	0	Low
2010	19	30		33.5		7.5		95		70		25	0	3				
		2		1		1		0		0		1	2	2	3	3	2	Moderate
	20	29		20.5		11.5		80		75		40	0	0				
		2		1		1		0		0		1	2	2	3	3	2	Moderate

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Wet Sclerophyll Forests (Shrubby sub-formation)	**50**	**24**	**55**	**10**	**55**	**5**	**20**	**1**	**15**	**5**	**40**	**1**	**10**	**Below**	**Within**	**Above**	**Condition**
	Keith Class (2004): North Coast Wet Sclerophyll Forests																	
2008	19	50		41		80		0		8		64	0	4				
		1		1		0		2		1		0	2	2	3	3	2	Moderate
2010	34	43		20.5		51		0		36		50	2	10.5				
		2		2		1		2		0		0	0	0	3	1	4	High
	35	32		21		31		0		6		20	1	14.5				
		2		2		1		2		1		1	1	0	3	4	1	Moderate
	36	62		21.5		33.5		8		16		24	4	26.5				
		0		2		1		1		0		1	0	0	1	3	4	High

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Rainforests	**40**	**60**	**90**	**40**	**65**	**1**	**5**	**1**	**5**	**10**	**60**	**0**	**0.5**				
	Keith Class (2004): Subtropical Rainforests														**Below**	**Within**	**Above**	**Condition**
2008	10	55		59.5		37		6		82		86	0	15				
		0		2		2		0		0		0	0	0	2	0	6	High

	Site	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of hollows	Length of fallen timber (m)	Rating			
		Richness	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**						
	Freshwater Wetlands	**7**	**3**	**90**	**0**	**5**	**1**	**5**	**0**	**0**	**60**	**95**	**0**	**0**				
	Keith Class (2004): Coastal Freshwater Lagoons														**Below**	**Within**	**Above**	**Condition**
2010	9	14		0		10		10		0		70	0	0				
		2		2		1		2		2		0	0	0	4	1	3	Low
	14	16		30		40		30		0		60	0	0				
		2		1		0		1		2		0	0	0	2	2	4	High
	18	10		0		10		5		0		70	0	0				
		0		2		0		1		0		1	0	0	1	2	5	High
	39	4		0		0		0		0		68	0	2				
		2		2		0		0		0		0	0	0	2	0	6	High

Appendix 4: Contributions and qualifications of ecobiological staff

Name	Qualification	Title/Experience	Contribution
David Paull	M.Res. Sc.	Senior Ecologist 20 years experience in field ecology and assessment.	Data analysis, Report writing,
Kristy Peters	B. Park Mgt (Hons)	Senior Ecologist (Ornithologist)	Report review.
Dan Pedersen	B. Sc.	Senior Botanist 6 years - Botany, vegetation classification and mapping, bushfire consultant.	Flora survey and species ID, vegetation community mapping.
Dianna Brettschneider	B. App. Sc (Env)	GIS Manager 3 years - georeferencing, processing, analysis and display of spatial data in GIS.	Preparation of map layouts for report.

Appendix 5: Licensing matters relating to the survey

ecobiological and employees involved in the current study are licensed or approved under the *National Parks and Wildlife Act* 1974 (License Number: S12398, Expiry: 30 November 2011) and the *Animal Research Act* 1985 to harm / trap / release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.

ATTACHMENT B

STRATFORD SURROUNDS FLORA SURVEY
(PREPARED BY AUSTRALIAN MUSEUM BUSINESS SERVICES)

Stratford Surrounds Flora Survey

Prepared by Australian Museum Business Services
For Stratford Coal Pty Ltd.

Final Report

December 2011

AMBS Reference 110621

AMBS
Australian Museum Business Services - 6 College Street, Sydney NSW 2010, Ph (02) 9320 6311, Fax (02) 9320 6428
australianmuseum.net.au/AMBS ambs@austmus.gov.au

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Recipient:	Tony Dwyer, Stratford Coal Pty Ltd
Authors:	Dr John T. Hunter, James Bevan
Reviewer:	Belinda Pellow

Executive Summary

Australian Museum Business Services was commissioned by Stratford Coal Pty Ltd to undertake a baseline flora survey over 1,044 hectares (ha), near the Stratford Coal Mine at Stratford, New South Wales. The study area is located approximately 50 kilometres inland of Forster, between Barrington Tops National Park and The Glen Nature Reserve.

This survey was intended to quantify all floristic attributes of the study area relevant to NSW and Commonwealth Environmental Legislation. The survey consisted of:

- the compilation of previous records of threatened flora from the locality;
- mapping of vegetation types and their condition;
- determination of threatened flora with the potential to occur within the study area and targeted searches for threatened one flora species detectable during winter; and
- assessment of the study area for potential Koala Habitat.

Threatened flora database searches were conducted on 4 July 2011. Stratified randomised flora surveys were conducted during July and August 2011 by Dr John Hunter and James Bevan. Surveys consisted of 130 full floristic 20 x 20 metre plots and 64 rapid data assessment plots to assess the floristics and vegetation condition throughout the study area. Targeted searches for potentially occurring species were conducted at each survey plot.

Background database searches revealed 14 threatened flora species which could potentially occur within the study area, nine of these species were identifiable during the survey period. None of the nine species identifiable during the survey period were recorded during targeted searches of the study area.

A total of 420 taxa were recorded across 10 vegetation communities, including 77 introduced, and four noxious taxa. Vegetation within the study area consisted of wet and dry sclerophyll forests, rainforest, grassy woodlands and cleared land. Vegetation condition was generally correlated with the degree of disturbance. Approximately 40 percent (%) of the study area was assessed to be in poor condition and 60% of the study area was in good condition. Poor condition areas included cleared land and vegetation surrounding cleared land, whereas areas of contiguous, largely undisturbed vegetation were in moderate to good condition. Current threatening processes include invasion of exotic weeds and pest animals, grazing by stock and land clearing.

The study area was estimated to contain 164.5 ha of Potential Koala Habitat according to the koala feed trees listed under *State Environmental Planning Policy No. 44 – Koala Habitat Protection*.

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1 Introduction

1.1 Background

Australian Museum Business Services (AMBS) was commissioned by Stratford Coal Pty Ltd to undertake a baseline flora survey over 1,044 hectares (ha), near the Stratford Coal Mine at Stratford, New South Wales (NSW).

1.2 Statutory Context

The following legislation was considered during this study:

- NSW *Threatened Species Conservation Act 1995* (TSC Act);
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and
- NSW *Noxious Weeds Act 1993*.

1.3 Survey Objectives

This baseline flora survey of the Stratford Surrounds study area included the following objectives:

- determination of threatened species, threatened communities, threatened populations and critical habitat (listed under the TSC Act and/or EPBC Act) that potentially occur in the study area, from a review of relevant databases and previous survey reports;
- vegetation community mapping of the entire study area including the identification of any listed vegetation communities;
- identification of koala food trees and estimation of their percentage canopy cover for a State Environmental Planning Policy (SEPP) assessment of koala habitat in the study area under the *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP44);
- comprehensive listing of flora species within the study area according to vegetation community;
- targeted searches for potentially occurring threatened plant species and mapping of any occurrences, including estimation of population sizes; and
- identification of any critical habitat for threatened plant species.

1.4 Regional Setting and General Description of the Study Area

The study area lies within the Gloucester Shire and Great Lakes Council local government areas (LGAs), approximately 50 kilometres (km) inland from the NSW coastal town of Forster (Figure 1 and 2). The study area consists of approximately 1,044 ha of undulating agricultural land and moderate to steeply sloping terrain between 60 and 300 metres (m) above sea level. The area forms the watershed between the Wards and Mammy Johnsons Rivers, which form part of the Karuah River catchment between Berrico Nature Reserve and the Glen Nature Reserve.

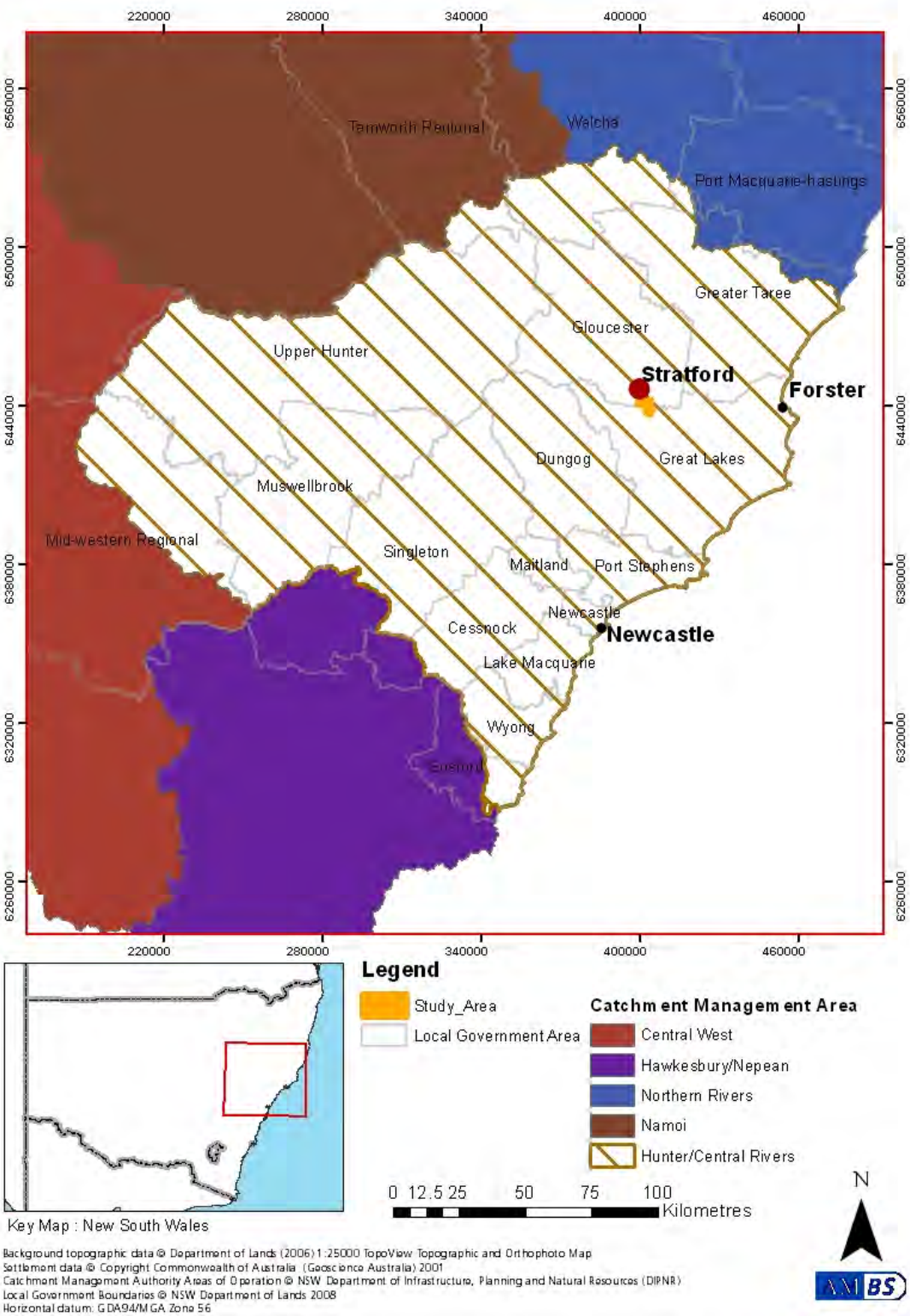


Figure 1 - The geographic position of the study area.

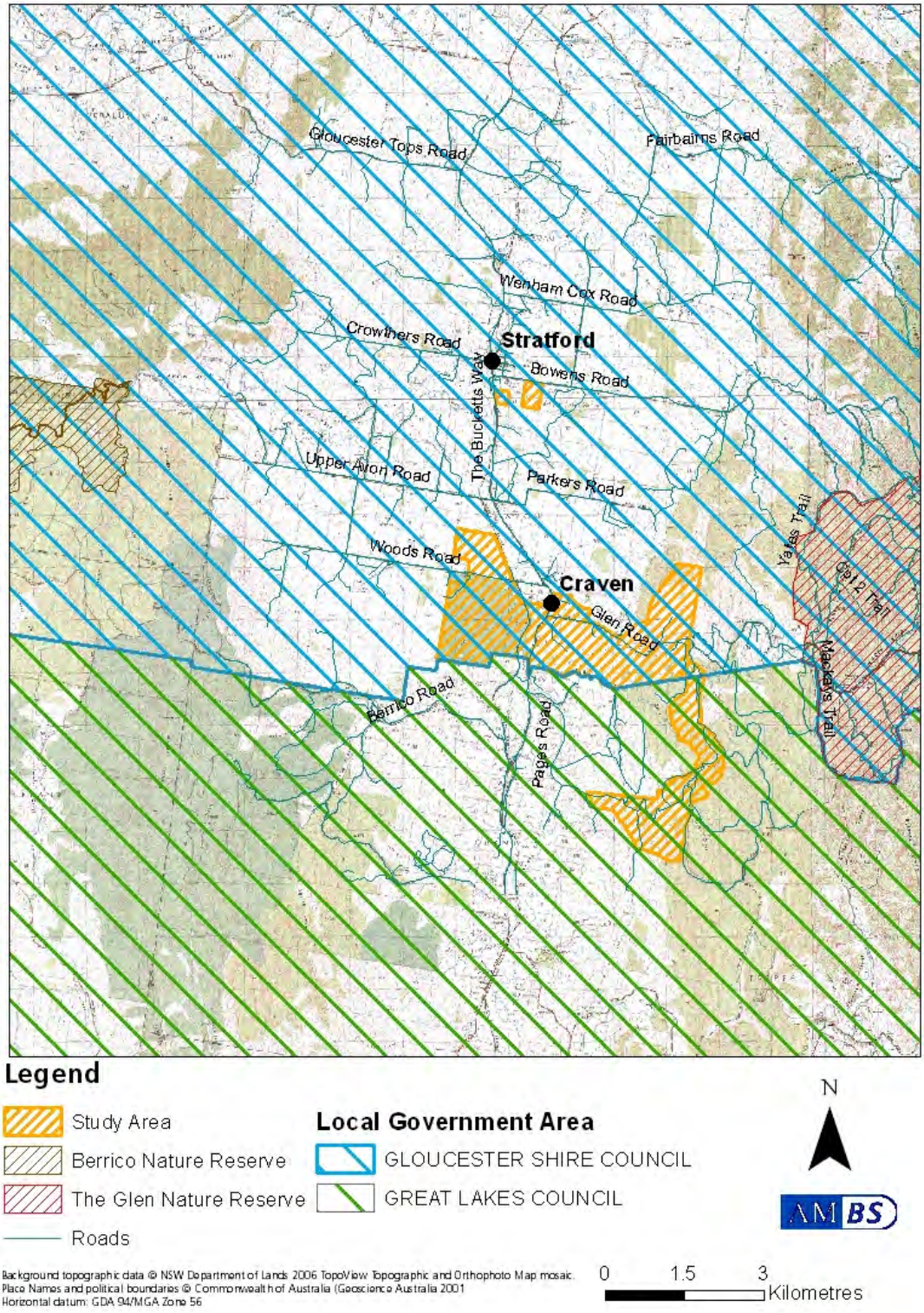


Figure 2 - Topographic map showing the study area in a local context.

2 Methods

2.1 NSW Wildlife Atlas and EPBC Protected Matters Database Assessments

Background data searches for potentially occurring threatened flora were undertaken prior to the field assessment using the NSW Office of Environment and Heritage (OEH) Wildlife Atlas (OEH 2011a) and the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) Protected Matters Search Tool (SEWPaC 2011).

NSW Wildlife Atlas (OEH 2011a) threatened flora records within the broad locality of the study area were mapped using ArcGIS. Habitat requirements and appropriate survey times for flora known to occur within the locality were identified using the Threatened Species Profile Database (OEH 2011b). Where the database did not contain habitat requirements, information for that taxon was obtained from PlantNET (National Herbarium of NSW, Royal Botanic Gardens, Sydney, Australia 2011) and the Threatened Species Profiles provided by the OEH (2011c). Vegetation mapping from the initial field survey was used to determine potential threatened flora habitat.

2.2 Survey Design

2.2.1 Desktop Stratification

The study area was stratified and survey sites randomly placed to sample and replicate the major environmental changes across the study area according to current NSW survey guidelines (NSW Department of Environment and Conservation [DEC] 2004; Sivertson 2009). Strata used included soil landscapes (Henderson 2000), aspect, topography and previous disturbance history. Replication of all strata was attempted. Trees in largely cleared areas were considered using aerial photography. Predominantly introduced grasslands were not part of the initial stratification and sampling design. A total of 50 full floristic sites were allocated using the stratification technique. A further 10 randomly placed sites were assigned to capture unusual species associations.

2.2.2 Field Survey Techniques

The field surveys comprised the following in accordance with current NSW survey guidelines (DEC 2004; Sivertson 2009):

- flora survey plots (20 x 20 m);
- Rapid Data Points (RDPs); and
- vegetation condition analysis.

Field surveys were completed in two stages:

- an initial survey to map the vegetation types and condition (6-8 and 11-13 July 2011); and
- following preliminary vegetation mapping, a second survey was conducted of areas requiring further sampling effort (20-22 July, 15-19 August 2011).

The initial survey contained two components: full floristic survey sites and RDPs (n = 64). Full floristic (20 x 20 m) sites were sampled to provide data amenable to statistical multivariate analysis required for community circumscription and mapping. RDPs are a comparatively new method designed to assist in the accuracy and spatial delineation of community distribution: RDPs were selected at regular locations to fill gaps in the vegetation across the study area not surveyed by full floristic survey sites. At each RDP, the three most dominant species in decreasing order of importance were recorded for the canopy layer, shrub layer and ground layer. Location was recorded using a Global Positioning System (GPS). Broad condition was also assessed as described below. Underlying the collection of RDPs is the acknowledgement that the accuracy of predicted distribution of communities within a landscape falls logarithmically away from each survey site placed (Keith & Bedward 1999). Hence, accuracy is increased significantly through every direct on ground observation point. RDPs increase the accuracy of mapping and involve less survey time than full floristic survey quadrats. RDP data was used to increase the accuracy of the final mapping product and was not incorporated into the statistical analysis.

Full floristic sites were sampled to provide data amenable to statistical multivariate analysis required for community circumscription and mapping. Individual taxon data for each quadrat was recorded. Species were scored in accordance with a modified Braun-Blanquet (1982) cover abundance ranking scale (Table 1). Vegetation structure was derived using the system developed by Walker and Hopkins (1990). This method uses growth form, height and crown cover of the dominant taxa in each of the strata layers that are identifiable. Altitude, slope, aspect and horizontal elevation were also recorded. Slope and horizontal elevation were measured using a 'SUUNTO Optical Reading Clinometer'. Horizontal elevation was measured at eight equidistant compass bearings. Aspect was measured using a compass with reference to magnetic north. Information on soil, fires and other disturbances was also collected in a form amenable to the site survey data sheets (Appendix A). Site location and altitude was derived from a Garmin GPSMap60CS with reference to topographic maps. Datum used was AMG94.

Table 1 - Modified Braun-Blanquet cover abundance scale.

Cover Code	Projected Canopy Cover
1	<5% few individuals
2	<5% any number of individuals
3	6-25%
4	26-50%
5	51-75%
6	>75%

The condition of the vegetation at every site was scored on a scale of 1 to 3 as follows:

- A score of 1 indicated the highest condition with predominately native tree, shrub and canopy layers, low weed cover and abundance and little or no recognisable disturbance.
- A score of 2 indicated significant and continuing disturbance, but with largely original canopy layer species and a predominantly native shrub or ground layer.
- A score of 3 indicated significant overstorey removal, a predominantly modified understorey and continued disturbance.

2.2.3 Data Management

'Paradox 12 for Windows' (Corel 2003), a relational database, was used for data management, validation, storage and retrieval. 'Parent' tables were created with verified information that was used for data entry in 'Child' tables allowing consistency in data entry (for example the spelling of species names) (Campbell 1984; McKenzie 1991; McKenzie *et al.* 1991). Three 'Parent' tables were created to store information with six 'Child' tables used for referential integrity, validation and data entry. The three primary tables stored information relating to the taxa found and the quadrats placed. The region number and site number were the relational fields used to link the three main tables. These three record values are unique and duplicate values were not accepted by the database. The system was designed to minimise the number of keystrokes, and allow for subsequent specimen determinations and results of analyses to be incorporated later without disruption. Data collected were added as soon as possible during each field trip to address and resolve any discrepancies. Sorted data was exported to EXCEL spreadsheets prior to analysis.

2.3 Vegetation Community Delineation and Mapping

Identification of vegetation communities and delineation of community boundaries involved the following steps:

- identification of plant communities using a multivariate statistical analysis of full floristic survey data following initial field surveys;
- incorporation of RDPs with full floristic data points to delineate the boundaries of vegetation communities and vegetation condition classes; and
- fine scale delineation to incorporate data from the second field survey.

2.3.1 Multivariate Analysis

Initial exploratory analysis of sites was conducted using classification and ordination techniques available in PATN: Pattern Analysis Package (Belbin 2004). PATN was developed for manipulation, analysis and display of patterns in multivariate biological data (Belbin 1995a). Both classification and ordination were performed on data as each technique is complimentary and the use of both highlights anomalies produced by the other (Gauch 1982). Ordination will detect natural clusters if they are present and highlight overall trends clarifying relationships alluded to with classification (Belbin 1991, 1995a). However, strong discontinuities in survey data can affect the way ordination techniques display continuous variation (Faith 1991). Classification techniques will impose groups on continuous data even if they are not present (Belbin 1991,1995a; Faith 1991). In such situations 'chaining' may occur, whereby samples grow by accretion one by one rather than by fusion with other clusters (Goodall 1980). Even in such situations utility can be found in imposed divisions (Gauch 1982). Classification is useful in detecting outliers that may affect ordination procedures (strong discontinuity). This technique also aids in the detection of smaller groupings or trends within the data that may be difficult to see from an ordination where groupings may be less obvious (Faith 1991).

Site classification was achieved using the Kulczynski association measure that has proven to be a superior measure of association with ecological data (Faith *et al.* 1987; Belbin 1995b). Agglomerative hierarchical clustering using flexible UPGMA (Unweighted Pair Group arithMetic Averaging) was used for group joining, this optimises the hierarchy and not the groups. UPGMA gives equal weight to objects not groups in the fusion process thereby groups are weighted proportionally to the number of objects contained (Belbin 1995b).

This method has been widely tested and is the most frequently used classification technique (Gauch 1982; Belbin 1995b) and it provides the best fit between the association measure and the distances implied from the dendrogram (Belbin 1991). Flexible UPGMA enables the value of β, which ranges from –0.1 to 1.0 to be changed, this controls the amount of space dilation during the fusion process (Belbin 1991, 1995b). A β value of –0.1 was used to enable slight dilation to occur; this has been shown to better recover known partitions (Belbin 1995b). Homogeneity analysis was used to assist in the appropriate level of dissimilarity at which circumscription of vegetation entities should occur. Only the results of classification are presented within this document.

2.3.2 Initial Mapping and Survey Site Stratification

The results of the multivariate analyses were used to initially delineate vegetation communities. The identity of each defined vegetation assemblage was tagged to the full floristic and RDP survey site within the database. Data from the 64 RDP sites improved the accuracy of initial vegetation type and condition mapping prior to allocation of survey sites.

Locations of the identified communities and their condition score were then re-projected onto aerial images within ArcMap 9.3. These sites, notes taken on traverses, structural characterisitcs seen on aerial images and projected topographical information were used to delineate vegetation communities for mapping. This methodology follows the guidelines for vegetation mapping provided within the *Native Vegetation Interim Type Standard* (Sivertson 2009). For final mapping the mapped vegetation units were further divided into two disturbance classes based on the scores obtained at each field site. Disturbance scores of 1 or 2 were combined and mapped as moderate or good condition and a score of 3 was mapped as the vegetation unit being in poor condition. Additional entities not defined by analysis were also mapped including man made dams, derived grasslands and remnant isolated tree stands within grasslands. This intial vegetation/condition map was used to assess the number and spatial placement of survey sites across the study area.

Areas of the same vegetation type and condition were mapped. Plots were established randomly within each vegetation zone consistent with the methods provided by DECC (2009a) and survey site data was collected consistent with the field data sheets provided by DECC (2009b). Full floristics were recorded within the 20 x 20 m quadrat at each survey site for incorporation with other full floristic data to improve the accuracy of the vegetation mapping product.

2.3.3 Final Mapping Product

To maximise the accuracy of the final vegetation mapping product, the final map presented incorporates the following data and refinements. Firstly, full floristic data collected at each survey site was incorporated into the overall vegetation mapping dataset for the study area. Secondly, RDP sites were added to the aerial map to enhance the mapping accuracy by delineating fine-scale details. Thirdly, groundtruthing of the draft mapping was conducted during the placement of survey sites across the study area and any amendments were incorporated into the final mapping product. In total, the final mapping product incorporates 130 full floristic and 64 rapid survey sites. The location of each full floristic site is shown in Figure 3.

2.4 Potential Koala Habitat Assessment

During initial surveys across the study area two species were identified that are listed under Schedule 2 of SEPP 44 as koala feed trees, namely: *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus microcorys* (Tallowwood). Potential Koala Habitat is defined in Part 1 of SEPP 44 as:

> *areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.*

Potential Koala Habitat across the study area was sampled simultaneously using the stratified random sampling design for the assessment. An assessment of Potential Koala Habitat was conducted at sites that contained a listed Koala feed tree using the following method:

1. From within the 20 x 20 m quadrat a koala feed tree greater than 10 centimetres (cm) diameter at breast height (DBH) was chosen at random.
2. The distance between the central (first) individual and the 15 closest individuals to the central tree was recorded.
3. All individuals (16) had their species identity recorded.

The area sampled at selected sites, the number of koala feed trees within that area and the area of each plant community was used to derive the predicted area of Potential Koala Habitat within the study area.

2.5 Species Listing and Targeted Searches for Threatened Species

Of the 14 threatened flora species identified as having the potential to occur within the study area (Appendix D), nine species were potentially able to be identified during the timing of the field surveys. Targeted searches were conducted in communities containing potential habitat using a stratified sampling design, according the NSW Threatened Species Survey Guidelines (DEC 2004). Searches consisted of thirty minute searches by one person within and in the immediate vicinity of the area of each survey plot.

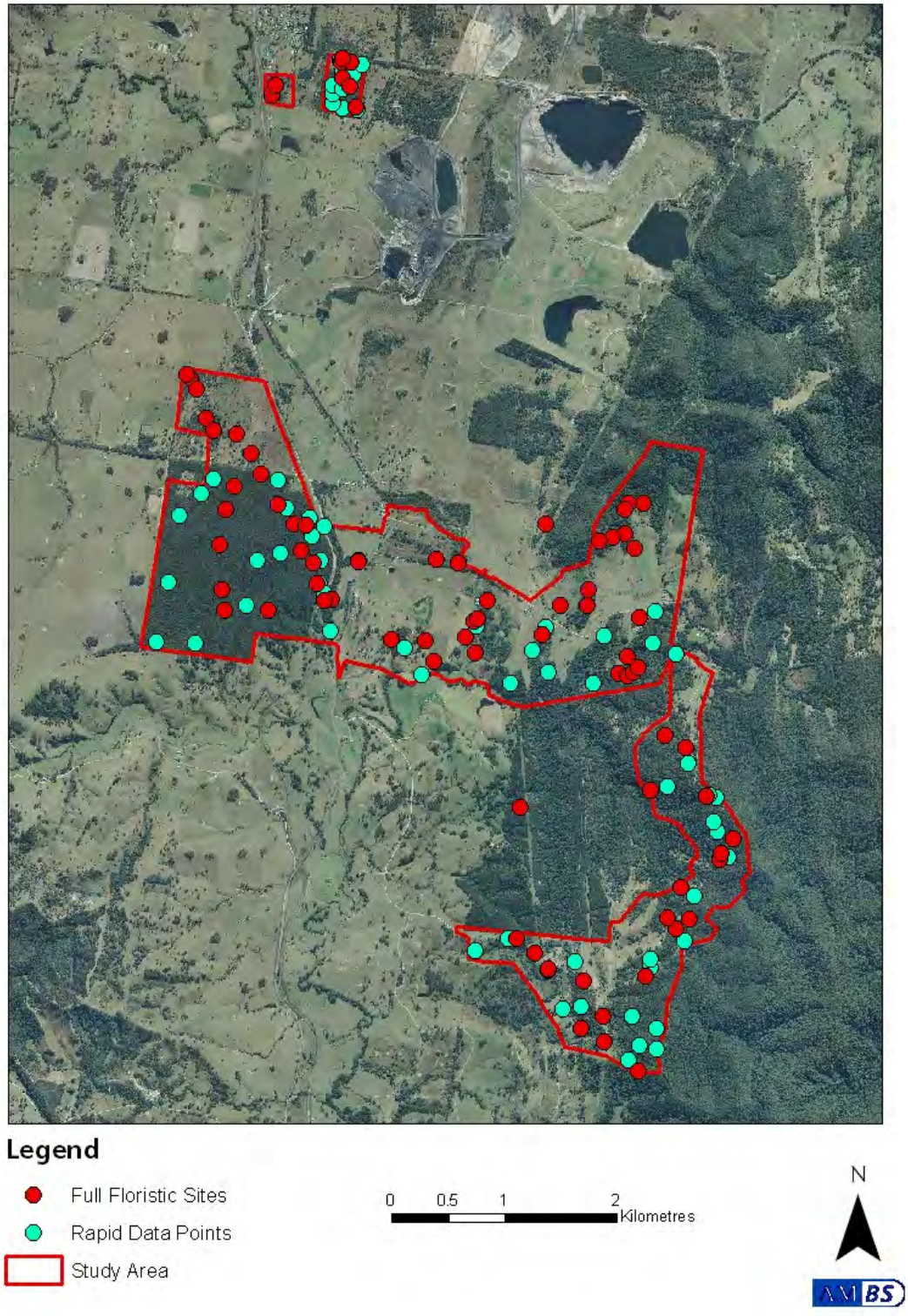


Figure 3 - Location of survey sites

3 Results

3.1 Potential Threatened Flora Species, Populations, Communities and Critical Habitat

Nine species of the 14 species identified as potentially occurring in the study area were searched for during the survey period (Appendix D) and none were recorded. Targeted searches for the other five species would require further surveys of potential habitat during spring or summer when features enabling plant identification are likely to be present (Appendix D).

3.2 Flora Species

A total of 420 taxa were found within the study area (Appendix B). This constitutes a high alpha diversity richness and a regional diversity index (RDI=S/log [area]) of 1.40 (Keith & Bedward 1999). Such a regional diversity score suggests that the land within the study area is highly diverse. The 420 species were found within 92 families and 257 genera and included 77 introduced taxa (18%).

The previous survey conducted by EcoBiological (2011) and Flora Search (2011) found a similarly high number of taxa (511; 102 introduced), despite each survey not deriving completely complementary taxon lists.

3.3 Description of Plant Communities

3.3.1 Results of Analysis

Nine native communities were recognised based on analysis of the 72 full floristic survey sites from the initial survey and 59 full floristic survey sites (total of 130 sites) (Figure 4 and 5). In addition, one introduced community (community 10) and two map units (map units A and B) are also shown on Figure 5.

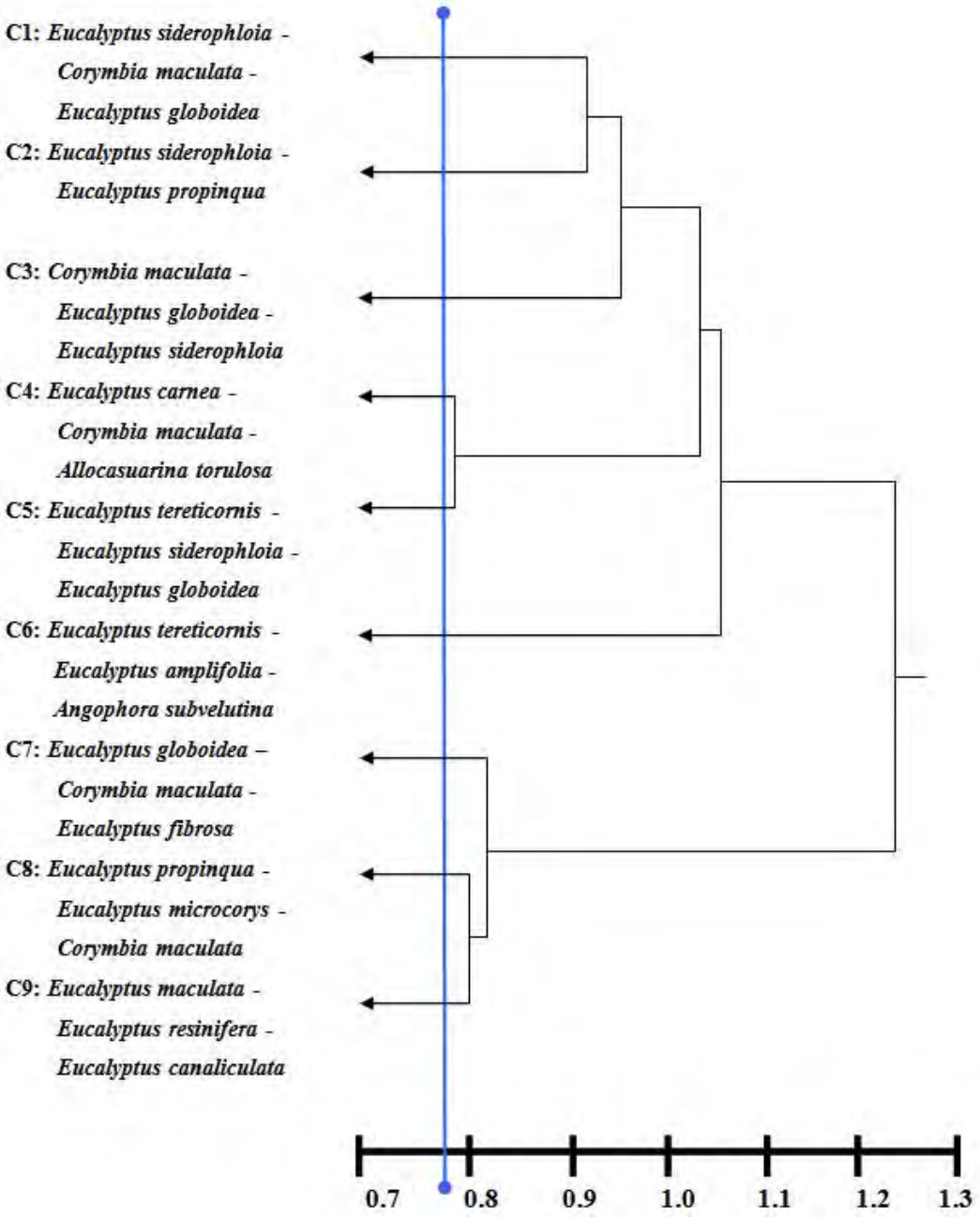


Figure 4 - Summary dendrogram of dataset sites surveyed during this investigation using Kulczynski association and flexible UPGMA fusion strategy. Communities are described at a dissociation of *c.* 0.78.

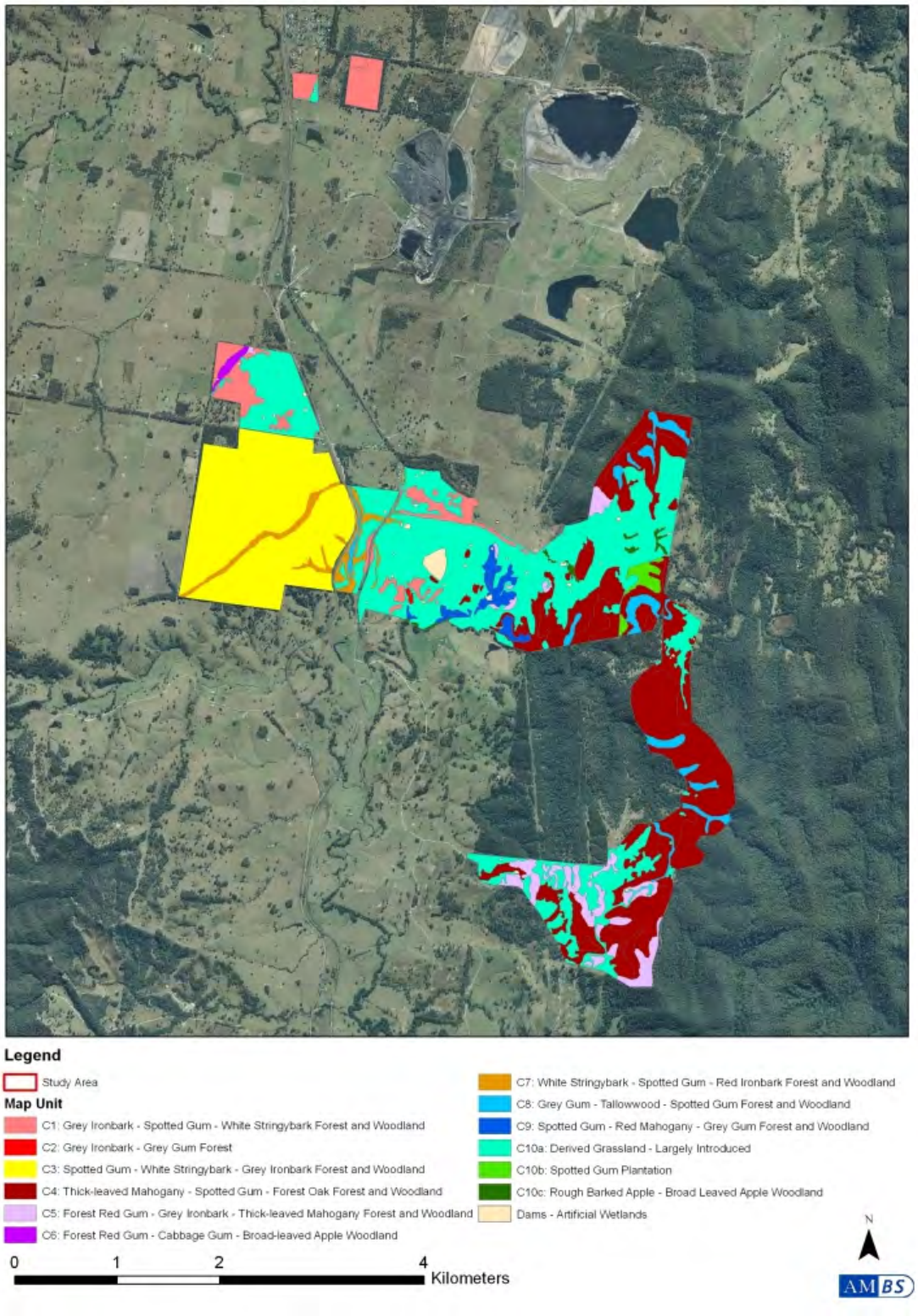


Figure 5 - Final mapped distribution of all communities within the Stratford study area

3.3.2 Community and Map Unit Descriptions

Within the following descriptions the lowest, highest and mean scores for richness per plot are given along with the total number of taxa found within the community. The species are listed in order of importance, with species with the highest combined cover/abundance scores listed first. Not all species found are listed in these descriptions, only the most important taxa.

Community 1: Grey Ironbark – Spotted Gum – White Stringybark Forest and Woodland

Formation: Dry Sclerophyll Forests.
BioMetric Vegetation Type: Spotted Gum - Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630).
Full floristic sample sites (22): 1, 2, 3, 4, 5, 19, 20, 22, 23, 24, 49, 51, 70, 71, 72, 74, 84, 87, 94, 96, 127, 128.
Distribution within area: within the north and western parts.
(Note: Condition 1 good; 2 moderate; 3 poor. **Figure 6**).
No. of taxa: 169. **No. of taxa per plot:** 16-**31**-51.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus siderophloia, Corymbia maculata, Eucalyptus globoidea, Eucalyptus moluccana, Eucalyptus carnea, Eucalyptus propinqua, Eucalyptus tereticornis*.
Shrubs: *Acacia ulicifolia, Pultenaea villosa, Melaleuca nodosa, Leucopogon juniperinus, Daviesia ulicifolia, Bursaria spinosa, Phyllanthus hirtellus*.
Climbers and trailers: *Desmodium gunnii, Hardenbergia violacea, Polymeria scandens, Parsonsia eucalyptophylla, Kennedia rubicunda, Glycine clandestina, Billardiera scandens, Glycine microphylla, Parsonsia eucalyptophylla, Eustrephus latifolius, Clematis glycinoides, Pandorea pandorana, Glycine tabacina, Geitonoplesium cymosum, Desmodium varians, Clematis aristata, Cissus antarctica.*
Ground cover: *Cymbopogon refractus, Microlaena stipoides, Pratia purpurascens, Dichondra repens, Imperata cylindrica, Eragrostis leptostachya, Echinopogon caespitosus, Poa sieberiana, Themeda triandra, Entolasia stricta, Aristida vagans, Eragrostis brownii, Lomandra multiflora, Sporobolus creber, Cheilanthes sieberi, Oxalis perennans, Hypericum gramineum, Schoenus apogon, Juncus usitatus, Lagenifera stipitata, Bothriochloa macra, Aristida personata, Viola hederacea, Vernonia cinerea, Panicum simile, Lomandra filiformis, Goodenia hederacea, Cyperus gracilis, Carex longebrachiata, Bothriochloa decipiens, Opercularia diphylla, Lepidosperma laterale, Fimbristylis dichotoma, Digitaria ramularis, Brunoniella australis*.
Introduced taxa: *Hypochaeris radicata, Axonopus fissifolius, Senecio madagascariensis, Andropogon virginicus, Paspalum dilatatum, Plantago lanceolata, Ligustrum sinense, Setaria sphacelata, Cirsium vulgare, Conyza bonariensis, Verbena bonariensis, Pinus* spp., *Medicago polymorpha, Taraxacum officinale, Rubus fruticosus, Modiola caroliniana, Hypochaeris glabra, Solanum mauritianum, Setaria pumila, Lolium perenne, Trifolium cernuum, Solanum nigrum, Sida rhombifolia, Poa annua, Medicago sativa, Ehrharta erecta, Cynodon dactylon, Cerastium glomeratum, Trifolium repens, Gomphocarpus fruticosus, Cyperus sesquiflorus, Ciclospermum leptophyllum, Briza minor.*
Percent of species introduced: 20%.
Condition: – 13.7 ha in good condition, 38.6 ha in moderate condition, 9.4 ha in poor condition (Section 3.7; Figure 6).
Photos: Plate 1 and 2.

Note: Condition 1 good; 2 moderate; 3 poor.

Figure 6 - Mapped distribution and condition of Community 1.

Plate 1 - Photographs of Community 1; above Site 2, below Site 5.

Plate 2 - Photographs of Community 1; above Site 24, below Site 49.

Community 2: Grey Ironbark – Grey Gum Forest

Formation: Dry Sclerophyll Forests.
BioMetric Vegetation Type: Spotted Gum - Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630).
Full floristic sample sites (2): 50, 97.
Distribution within study area: restricted to a single hillcrest.
(Note: Condition 2 moderate. **Figure 7**).
No. of taxa: 28. **No. of taxa per plot:** 16-19-21.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus siderophloia, Eucalyptus propinqua.*
Shrubs: *Notelaea longifolia.*
Climbers and trailers: Nil
Ground cover: *Microlaena stipoides, Solanum brownii, Eragrostis leptostachya, Stellaria flaccida, Sporobolus elongatus, Einadia hastata, Cyperus gracilis, Abutilon halophilum, Schoenus apogon, Rumex brownii, Oxalis perennans, Lotus cruentus, Daucus glochidiatus, Carex longebrachiata, Acaena ovina, Abutilon oxycarpum.*
Introduced taxa: *Ehrharta erecta, Senecio madagascariensis, Conyza bonariensis, Sida rhombifolia, Plantago lanceolata, Soliva sessilis, Solanum nigrum, Petrorhagia nanteuilii, Anthoxanthum odoratum.*
Percent of species introduced: 11%.
Condition: all 0.7 ha in moderate condition (Section 3.7; Figure 7).
Photos: Plate 3.

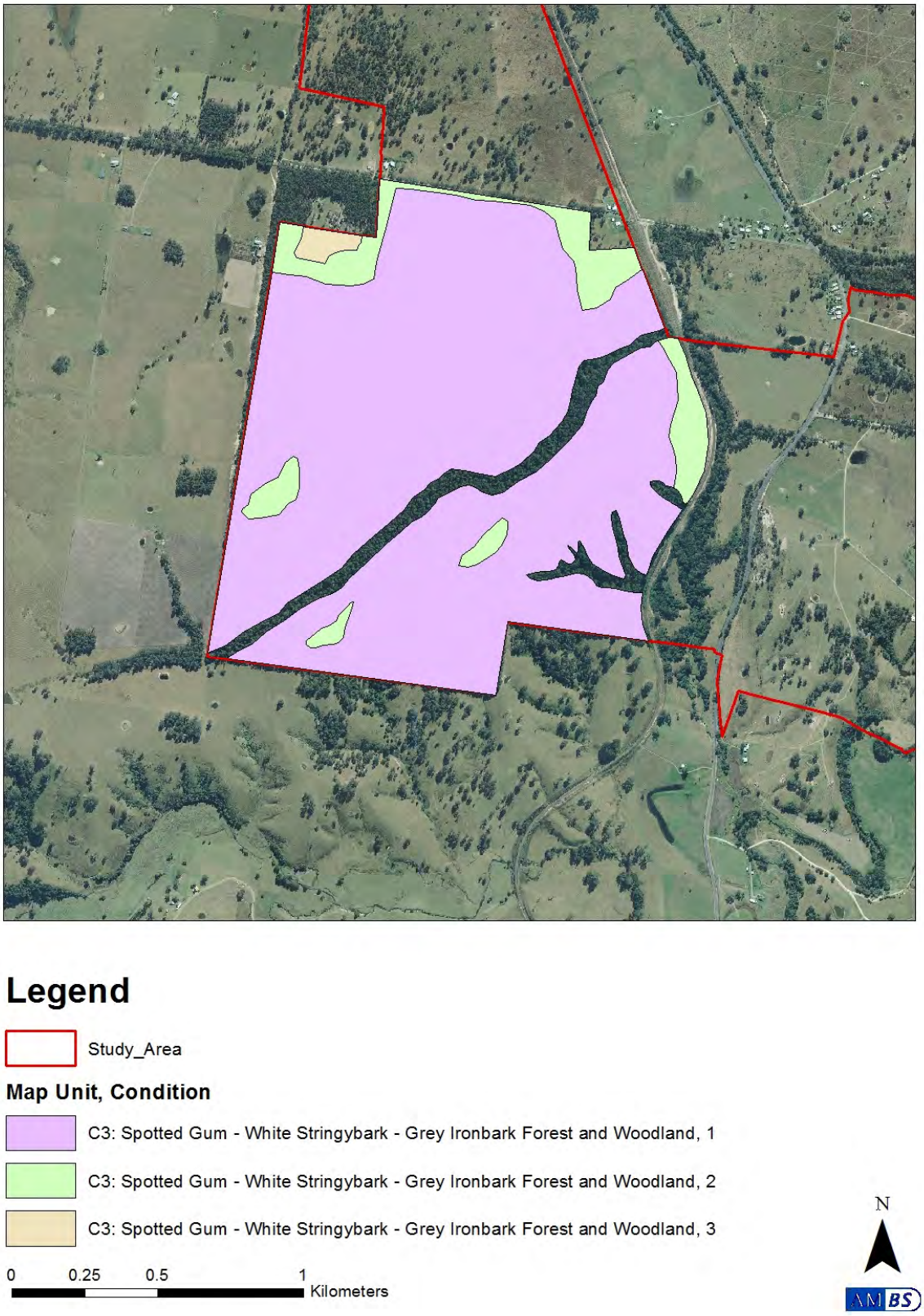
Note: Condition 2 moderate.

Figure 7 - Mapped distribution and condition of Community 2.

Plate 3 - Photograph of Community 2; above Site 50.

Community 3: Spotted Gum – White Stringybark – Grey Ironbark Forest and Woodland

Formation: Dry Sclerophyll Forests.
BioMetric Vegetation Type: Spotted Gum - Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630).
Full floristic sample sites (10): 6, 7, 8, 10, 11, 13, 14, 16, 17, 18.
Distribution within study area: restricted to the far western part of the study area within a current Voluntary Conservation Agreement area (Figure 8).
No. of taxa: 84. **No. of taxa per plot:** 19-**27**-35.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Corymbia maculata, Eucalyptus globoidea, Eucalyptus siderophloia, Eucalyptus carnea, Eucalyptus largeana, Eucalyptus moluccana, Eucalyptus fibrosa, Allocasuarina torulosa, Eucalyptus resinifera.*
Shrubs: *Pultenaea villosa, Acacia ulicifolia, Breynia cernua, Melaleuca nodosa, Leucopogon juniperinus, Exocarpos cupressiformis, Polyscias sambucifolia, Jacksonia scoparia, Daviesia ulicifolia, Notelaea longifolia, Alphitonia excels, Acacia maidenii.*
Climbers and trailers: *Cassytha pubescens, Billardiera scandens, Hardenbergia violacea, Parsonsia straminea, Kennedia rubicund, Desmodium gunnii, Marsdenia suaveolens.*
Ground cover: *Entolasia stricta, Pratia purpurascens, Themeda triandra, Lomandra longifolia, Opercularia diphylla, Echinopogon caespitosus, Microlaena stipoides, Imperata cylindrica, Goodenia heterophylla, Lepidosperma laterale, Dianella caerulea, Aristida vagans, Lagenifera stipitata, Poa sieberiana, Cheilanthes sieberi, Panicum simile, Lomandra multiflora, Cymbopogon refractus, Acianthus fornicates, Vernonia cinerea, Poa sieberiana, Dianella tasmanica, Desmodium brachypodum, Aristida personata, Paspalidium gracile.*
Introduced taxa: none recorded.
Percent of species introduced: 0%.
Condition: 188.6 ha in good condition, 20.2 ha in moderate condition, 1.8 ha in poor condition (Section 3.7; Figure 8).
Photos: Plate 4.



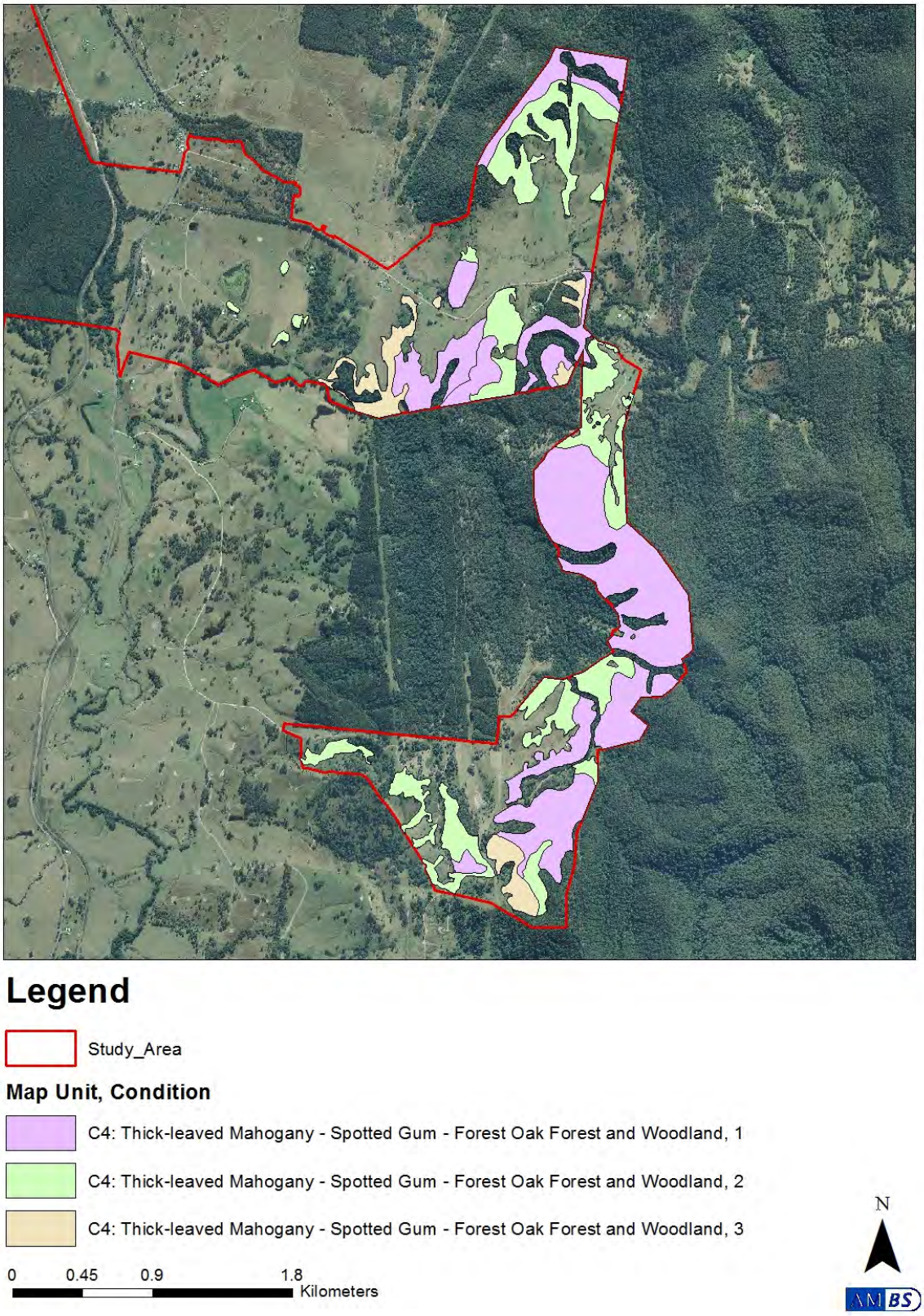
Note: Condition 1 good; 2 moderate; 3 poor.

Figure 8 - Mapped distribution and condition of Community 3.

Plate 4 - Photographs of Community 3; above Site 8, below Site 11.

Community 4: Thick-leaved Mahogany – Spotted Gum – Forest Oak Forest and Woodland

Formation: Wet Sclerophyll Forests (Grassy subformation)
BioMetric Vegetation Type: Tallowwood - Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (HU644)
Full floristic sample sites (32): 28, 29, 32, 33, 34, 36, 38, 39, 41, 42, 43, 52, 53, 54, 55, 57, 59, 62, 64, 65, 68, 69, 99, 105, 108, 109, 111, 113, 116, 117, 118, 119.
Distribution within study area: restricted primarily to hilly country within eastern parts**.**
(Note: Condition 1 good; 2 moderate; 3 poor. **Figure 9**).
No. of taxa: 214. **No. of taxa per plot:** 21-**35**-55.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus carnea, Corymbia maculata, Allocasuarina torulosa, Eucalyptus propinqua, Eucalyptus globoidea, Eucalyptus tereticornis, Syncarpia glomulifera, Eucalyptus siderophloia, Eucalyptus microcorys, Eucalyptus moluccana, Angophora subvelutina, Alphitonia excelsa, Eucalyptus eugenioides, Eucalyptus crebra, Eucalyptus canaliculata, Eucalyptus acmenoides, Ficus rubiginosa, Eucalyptus resinifera, Angophora floribunda*.
Shrubs: *Breynia cernua, Acacia maidenii, Acacia floribunda, Acacia binervia, Persoonia linearis, Acacia longissima, Maytenus silvestris, Pittosporum multiflorum, Ozothamnus diosmifolius, Exocarpos cupressiformis, Myrsine variabilis*.
Climbers and trailers: *Rubus parviflorus, Hibbertia scandens, Cissus antarctica, Eustrephus latifolius, Pandorea pandorana, Desmodium gunnii, Clematis glycinoides, Kennedia rubicunda, Smilax australis, Billardiera scandens, Desmodium varians, Geitonoplesium cymosum, Hardenbergia violacea, Clematicissus opaca, Cissus hypoglauca, Stephania japonica, Clematis aristata, Glycine microphylla, Cayratia clematidea, Desmodium rhytidophyllum, Commelina cyanea, Parsonsia straminea, Morinda jasminoides, Glycine clandestina, Cassytha pubescens, Rubus rosifolius, Pyrrosia rupestris, Parsonsia eucalyptophylla, Parsonsia brownii, Palmeria scandens, Glycine tabacina, Dioscorea transversa.*
Ground cover: *Imperata cylindrica, Microlaena stipoides, Dichondra repens, Lomandra longifolia, Oplismenus aemulus, Themeda triandra, Pteridium esculentum, Pratia purpurascens, Poa sieberiana, Echinopogon caespitosus, Cymbopogon refractus, Entolasia marginata, Entolasia stricta, Cheilanthes sieberi, Eragrostis leptostachya, Adiantum aethiopicum, Poa labillardieri, Daucus glochidiatus, Geranium solanderi, Pterostylis nutans, Plectranthus parviflorus, Digitaria breviglumis*.
Introduced taxa: *Lantana camara, Hypochaeris radicata, Senecio madagascariensis, Plantago lanceolata, Bidens pilosa, Andropogon virginicus, Verbena bonariensis, Hypochaeris glabra, Cirsium vulgare, Ageratina adenophora, Solanum nigrum, Sida rhombifolia, Ligustrum sinense, Conyza bonariensis, Solanum mauritianum, Rubus fruticosus, Axonopus fissifolius, Anagallis arvensis, Taraxacum officinale, Setaria sphacelata, Setaria pumila, Paronychia brasiliana, Sporobolus indicus, Rubus discolor, Prunus laurocerasus, Gomphocarpus fruticosus, Conyza sumatrensis.*
Percent of species introduced: 13%.
Condition: 154 ha in good condition, 91.7 ha in moderate condition, 22.1 ha in poor condition (Section 3.7; Figure 9).
Photos: Plate 5 and 6.



Note: Condition 1 good; 2 moderate; 3 poor.

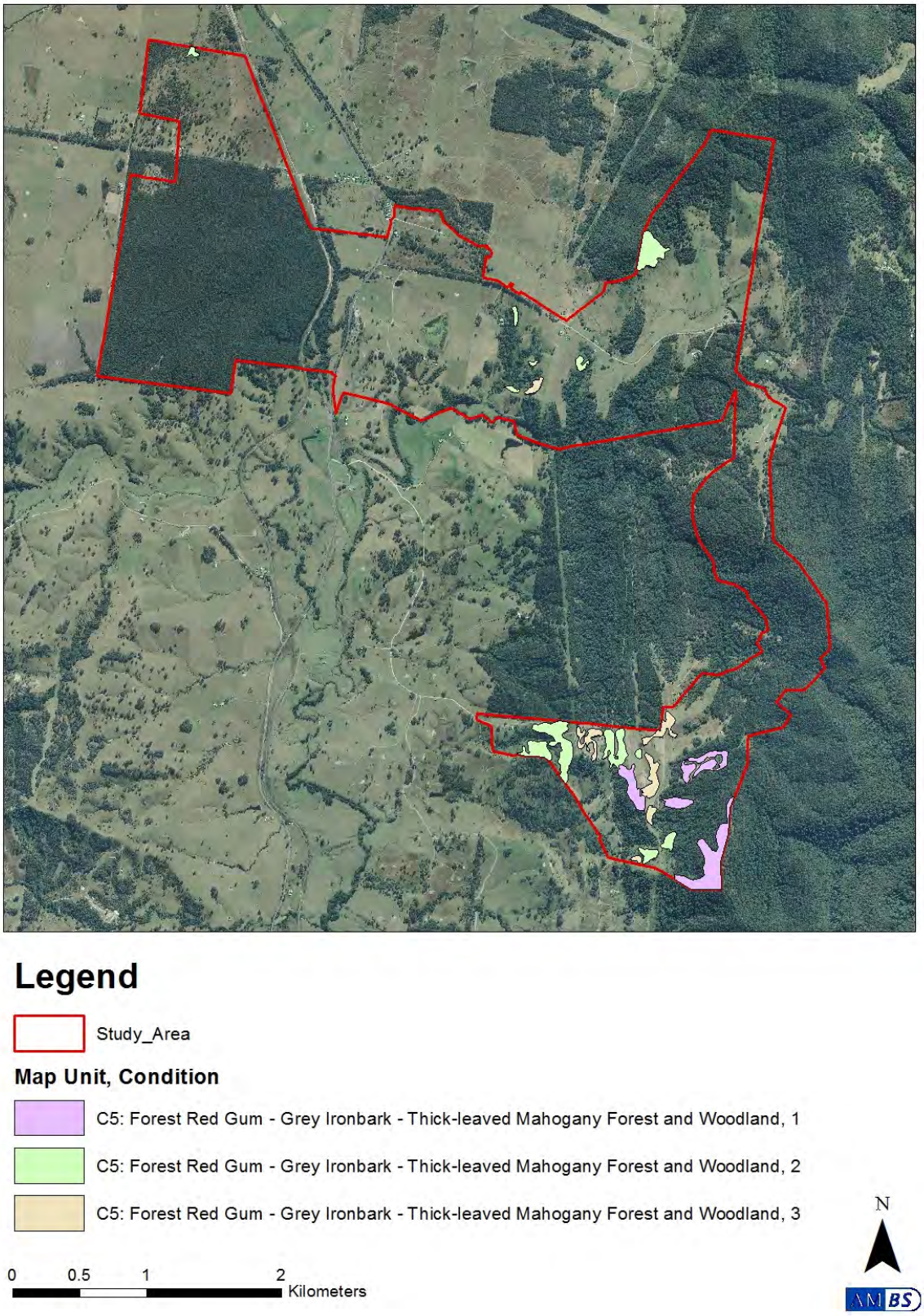
Figure 9 - Mapped distribution and condition of Community 4.

Plate 5 - Photographs of Community 4; above Site 38, below Site 54.

Plate 6 - Photographs of Community 4; above Site 55, below Site 64.

Community 5: Forest Red Gum – Grey Ironbark – Thick-leaved Mahogany Forest and Woodland

Formation: Grassy Woodlands.
BioMetric Vegetation Type: Grey Box - Forest Red Gum - Grey Ironbark open forest of the hinterland ranges of the North Coast (HU549).
Full floristic sample sites (18): 40, 60, 61, 63, 66, 67, 75, 76, 78, 79, 80, 81, 98, 103, 104, 107, 114, 132.
Distribution within study area: scattered throughout the study area.
(Note: Condition 1 good; 2 moder; 3 poor. **Figure 10**).
No. of taxa: 218. **No. of taxa per plot:** 19-**43**-71.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus tereticornis, Eucalyptus siderophloia, Eucalyptus globoidea, Eucalyptus carnea, Eucalyptus moluccana, Corymbia maculata, Allocasuarina torulosa, Angophora subvelutina, Eucalyptus resinifera, Eucalyptus propinqua, Eucalyptus canaliculata, Angophora floribunda, Eucalyptus crebra, Eucalyptus amplifolia.*
Shrubs: *Breynia cernua, Acacia implexa, Acacia maidenii, Acacia irrorata, Podolobium ilicifolium, Persoonia linearis, Exocarpos cupressiformis, Acacia longissima, Acacia leiocalyx.*
Climbers and trailers: *Rubus parviflorus, Hibbertia scandens, Desmodium gunnii, Glycine microphylla, Desmodium rhytidophyllum, Glycine clandestina, Geitonoplesium cymosum, Glycine tabacina, Eustrephus latifolius, Clematis glycinoides, Pandorea pandorana, Desmodium varians, Billardiera scandens, Stephania japonica, Kennedia rubicunda, Polymeria calycina, Hardenbergia violacea, Commelina cyanea, Clematis aristata, Smilax australis, Cayratia clematidea, Passiflora aurantia, Parsonsia straminea, Parsonsia eucalyptophylla, Hibbertia dentate, Clematicissus opaca.*
Ground cover: *Imperata cylindrica, Themeda triandra, Cymbopogon refractus, Dichondra repens, Pteridium esculentum, Echinopogon caespitosus, Pratia purpurascens, Microlaena stipoides, Poa sieberiana, Oplismenus aemulus, Sigesbeckia orientalis, Geranium solanderi, Aristida personata, Ranunculus lappaceus, Poa labillardieri, Panicum simile, Lomandra longifolia, Eragrostis brownii, Oxalis perennans, Eragrostis leptostachya, Lomandra filiformis, Sporobolus creber, Daucus glochidiatus, Cheilanthes sieberi, Aristida vagans.*
Introduced taxa: *Hypochaeris radicata, Senecio madagascariensis, Verbena bonariensis, Plantago lanceolata, Lantana camara, Axonopus fissifolius, Conyza bonariensis, Andropogon virginicus, Rubus fruticosus, Cirsium vulgare, Bidens pilosa, Setaria pumila, Taraxacum officinale, Ligustrum sinense, Hypochaeris glabra, Chloris gayana, Solanum nigrum, Sida rhombifolia, Gomphocarpus fruticosus, Anagallis arvensis, Ageratina adenophora, Solanum mauritianum, Pennisetum clandestinum, Cyperus sesquiflorus, Crassocephalum crepidioides, Stellaria media, Sporobolus africanus, Sonchus oleraceus, Paspalum dilatatum, Medicago polymorpha, Fallopia convolvulus, Cyperus aggregatus, Bidens subalternans, Trifolium repens, Setaria gracilis, Modiola caroliniana, Lolium perenne, Gamochaeta americanum, Cerastium glomeratum, Centaurium erythraea, Aster subulatus, Araujia sericiflora.*
Percent of species introduced: 19%.
Condition: 15.8 ha in good condition, 18.6 ha in moderate condition, 7.6 ha in poor condition (Section 3.7; Figure 10).
Photos: Plate 7.



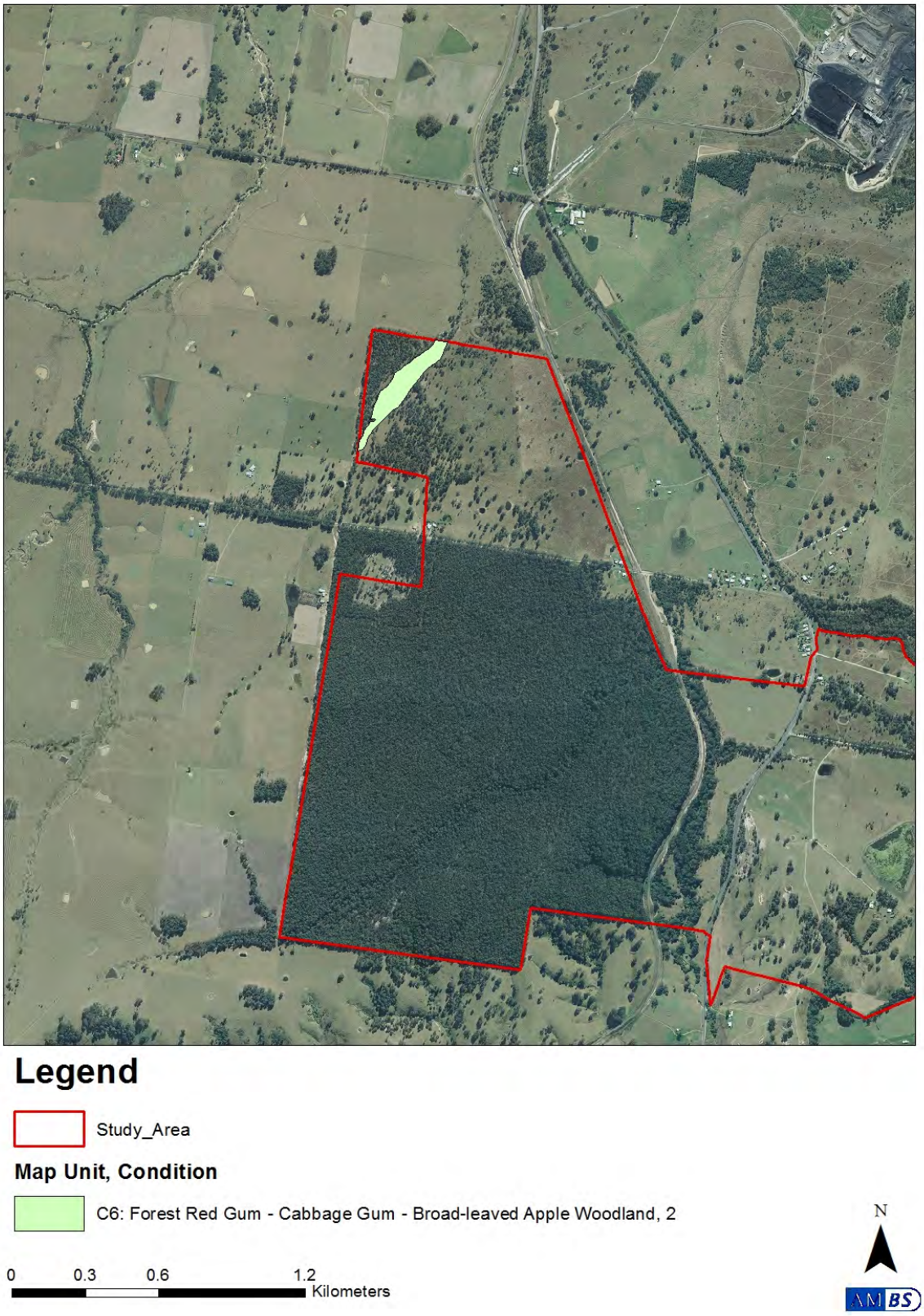
Note: Condition 1 good; 2 moderate; 3 poor.

Figure 10 - Mapped distribution and condition of Community 5.

Plate 7 - Photographs of Community 5; above Site 40, below Site 61.

Community 6: Forest Red Gum – Cabbage Gum – Broad-leaved Apple Woodland

Formation: Grassy Woodlands.
BioMetric Vegetation Type: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526).
Full floristic sample sites (4): 21, 73, 77, 83.
Distribution within study area: restricted to a low lying frequently waterlogged area in the north-western section.
(Note: Condition 2 moderate. **Figure 11**).
No. of taxa: 61. **No. of taxa per plot:** 18-**26**-33.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus tereticornis, Eucalyptus amplifolia, Angophora subvelutina.*
Shrubs: *Melaleuca nodosa.*
Climbers and trailers: *Persicaria strigosa, Persicaria decipiens, Polymeria calycina, Glycine microphylla, Pandorea pandorana.*
Ground cover: *Juncus usitatus, Hydrocotyle peduncularis, Pratia purpurascens, Carex longebrachiata, Themeda triandra, Carex appressa, Fimbristylis dichotoma, Sporobolus creber, Schoenus apogon, Rumex brownii, Ranunculus lappaceus, Juncus continuus, Epilobium billardierianum, Dichondra repens, Trachymene incisa, Imperata cylindrica, Hypericum gramineum, Gonocarpus humilis, Eragrostis brownii, Cyperus polystachyos, Cyperus difformis, Alternanthera denticulata, Vernonia cinerea, Schoenoplectus mucronatus, Oxalis radicosa, Microlaena stipoides, Lythrum hyssopifolia, Juncus vaginatus, Goodenia paniculata, Geranium solanderi, Euchiton involucratus, Eragrostis leptostachya, Echinopogon caespitosus, Centella asiatica*.
Introduced taxa: *Axonopus fissifolius, Paspalum dilatatum, Senecio madagascariensis, Andropogon virginicus, Hypochaeris radicata, Cyperus sesquiflorus, Plantago lanceolata, Aster subulatus, Verbena bonariensis, Ludwigia peploides, Juncus articulatus, Cynodon dactylon, Cirsium vulgare, Trifolium repens, Taraxacum officinale, Sporobolus fertilis, Sonchus oleraceus, Solanum mauritianum, Ranunculus repens, Moraea flaccida, Lotus uliginosus, Leontodon taraxacoides, Juncus cognatus, Digitaria sanguinalis.*
Percent of species introduced: 36%.
Condition: all 3.5 ha in moderate condition (Section 3.7; Figure 11).
Photo: Plate 8.



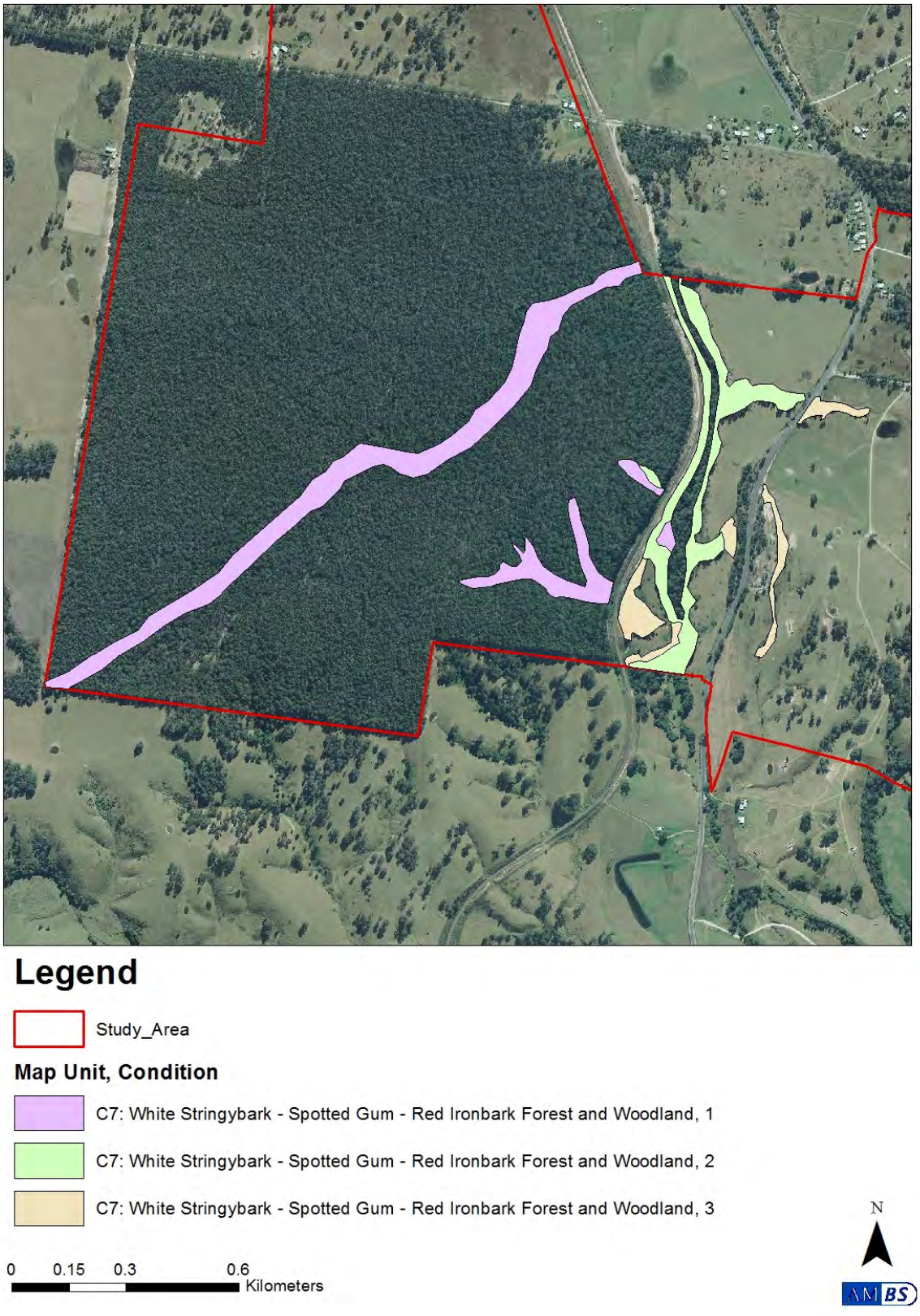
Note: Condition 2 moderate.

Figure 11 - Mapped distribution and condition of Community 6.

Plate 8 - Photograph of Community 6; Site 21.

Community 7: White Stringybark – Spotted Gum – Red Ironbark Forest and Woodland

Formation: Rainforests.
BioMetric Vegetation Type: Weeping Lily Pilly – Water Gum Riparian Rainforest of the Southern North Coast (HU651).
Full floristic sample sites (9): 9, 12, 15, 25, 27, 89, 91, 92, 93.
Distribution within study area: restricted to gullies within the western parts.
(Note: Condition 1 good; 2 moderate; 3 poor. **Figure 12**).
No. of taxa: 127. **No. of taxa per plot:** 19-**35**-52.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus globoidea, Corymbia maculata, Eucalyptus fibrosa, Eucalyptus moluccana, Eucalyptus siderophloia, Eucalyptus carnea, Eucalyptus largeana, Eucalyptus propinqua, Eucalyptus microcorys, Angophora subvelutina, Allocasuarina torulosa, Syncarpia glomulifera.*
Shrubs: *Backhousia myrtifolia, Pittosporum revolutum, Polyscias sambucifolia, Breynia cernua, Alphitonia excelsa, Maytenus silvestris, Leucopogon juniperinus, Acacia irrorata, Myrsine variabilis, Melaleuca nodosa, Zieria smithii, Pittosporum multiflorum, Notelaea ovata, Melaleuca styphelioides, Streblus brunonianus, Notelaea microcarpa, Diospyros australis, Dodonaea triquetra, Trochocarpa laurina, Ozothamnus diosmifolius, Eupomatia laurina, Callistemon sieberi, Callistemon salignus, Acacia decurrens.*
Climbers and trailers: *Pandorea pandorana, Pyrrosia rupestris, Pellaea falcata, Parsonsia straminea, Eustrephus latifolius, Morinda jasminoides, Clematis glycinoides, Cissus antarctica, Parsonsia eucalyptophylla, Parsonsia brownii, Geitonoplesium cymosum, Dioscorea transversa, Smilax australis, Hardenbergia violacea, Desmodium gunnii, Denhamia celastroides, Clematis aristata, Parsonsia rotata, Kennedia rubicunda, Desmodium varians, Davallia solida, Cissus hypoglauca, Cayratia clematidea, Cassytha pubescens, Billardiera scandens.*
Ground cover: *Doodia aspera, Dianella caerulea, Adiantum aethiopicum, Microlaena stipoides, Entolasia marginata, Platycerium bifurcatum, Lomandra longifolia, Entolasia stricta, Adiantum formosum, Blechnum cartilagineum, Poa sieberiana, Pellaea nana, Oplismenus aemulus, Gahnia clarkei, Dichondra repens, Carex longebrachiata, Ozothamnus diosmifolius, Imperata cylindrica, Callistemon sieberi*.
Introduced taxa: *Hypochaeris radicata, Ligustrum sinense, Lantana camara, Cestrum parqui, Axonopus fissifolius, Tagetes minuta, Solanum mauritianum, Rubus fruticosus, Senecio madagascariensis, Conyza bonariensis, Plantago lanceolata, Paspalum dilatatum, Andropogon virginicus, Verbena bonariensis, Medicago polymorpha, Gomphocarpus fruticosus, Citrus* sp., *Cirsium vulgare.*
Percent of species introduced: 14%.
Condition: 13.9 ha in good condition, 7 ha in moderate condition, 3.2 ha in poor condition (Section 3.7; Figure 12).
Photos: Plate 9.



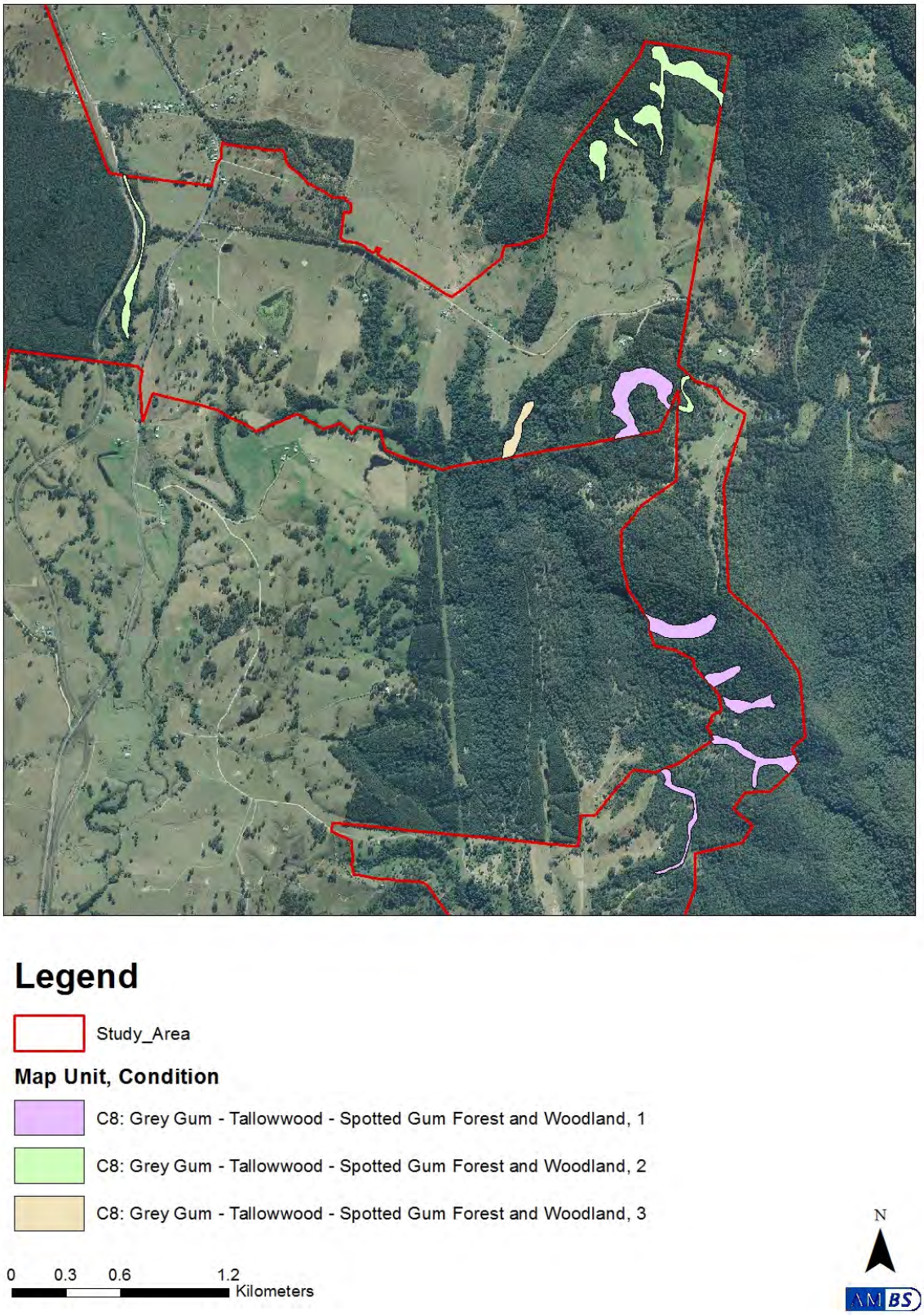
Note: Condition 1 good; 2 moderate; 3 poor.

Figure 12 - Mapped distribution and condition of Community 7.

Plate 9 - Photographs of Community 7; above Site 9, below Site 25.

Community 8: Grey Gum – Tallowwood – Spotted Gum Forest and Woodland

Formation: Wet Sclerophyll Forests
BioMetric Vegetation Type: Grey Gum – Tallowood – Spotted Gum Forest and Woodland
Full floristic sample sites (11): 26, 30, 31, 35, 37, 56, 58, 90, 110, 112, 120.
Distribution within study area: restricted to protected gullies.
(Note: Condition 1 good; 2 moderate; 3 poor. **Figure 13**).
No. of taxa: 127. **No. of taxa per plot:** 18-**28**-70.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus propinqua, Eucalyptus microcorys, Corymbia maculata, Syncarpia glomulifera, Streblus brunonianus, Lophostemon confertus, Ficus coronata, Eucalyptus saligna, Eucalyptus globoidea, Casuarina cunninghamiana, Eucalyptus carnea, Allocasuarina torulosa, Synoum glandulosum.*
Shrubs: *Backhousia myrtifolia, Pittosporum revolutum, Alphitonia excels, Pittosporum multiflorum, Maytenus silvestris, Notelaea longifolia, Breynia cernua, Waterhousea floribunda, Myrsine variabilis, Glochidion ferdinandi, Rhodamnia rubescens, Melaleuca styphelioides, Clerodendrum floribundum, Alectryon subcinereus, Pittosporum undulatum, Diospyros australis, Persicaria hydropiper, Parsonsia straminea, Hibbertia scandens, Desmodium gunnii, Clematis glycinoides, Cayratia clematidea.*
Climbers and trailers: *Pandorea pandorana, Eustrephus latifolius, Cissus antarctica, Smilax australis, Dioscorea transversa, Morinda jasminoides, Aphanopetalum resinosum, Stephania japonica, Geitonoplesium cymosum, Cissus hypoglauca, Pyrrosia rupestris, Parsonsia brownii, Denhamia celastroides, Parsonsia eucalyptophylla, Palmeria scandens, Marsdenia flavescens, Glycine microphylla, Clematicissus opaca, Billardiera scandens.*
Ground cover: *Doodia aspera, Lomandra longifolia, Gymnostachys anceps, Adiantum aethiopicum, Ageratina riparia, Calochlaena dubia, Pellaea paradoxa, Lomandra hystrix, Entolasia stricta, Adiantum hispidulum, Adiantum aethiopicum, Blechnum cartilagineum, Asplenium australasicum, Pterostylis nutans, Pteridium esculentum, Lepidosperma laterale, Cheilanthes sieberi.*
Introduced taxa: *Lantana camara, Ageratina adenophora, Verbena bonariensis, Tradescantia fluminensis, Solanum nigrum, Solanum mauritianum, Senecio madagascariensis, Ligustrum sinense, Cirsium vulgare, Ageratina houstonianum.*
Percent of species introduced: 8%.
Condition: 16.2 ha in good condition, 11.3 ha in moderate condition, 1.7 ha in poor condition (Section 3.7; Figure 13).
Photos: Plate 10.



Note: Condition 1 good; 2 moderate; 3 poor.

Figure 13 - Mapped distribution and condition of Community 8.

Plate 10 - Photographs of Community 8; above Site 37, below Site 56.

Community 9: Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland

Formation: Wet Sclerophyll Forest.
BioMetric Vegetation Type: *No direct equivalent.*
Full floristic sample sites (11): 44, 45, 46, 47, 48, 123, 124, 125, 129, 130, 131.
Distribution within the study area: restricted to disturbed gullies.
(Notae: Condition 2 moderate; 3 poor. **Figure 14**).
No. of taxa: 146. **No. of taxa per plot:** 20-**35**-52.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Corymbia maculata, Eucalyptus resinifera, Eucalyptus canaliculata, Eucalyptus tereticornis, Eucalyptus siderophloia, Eucalyptus propinqua, Eucalyptus fibrosa, Syncarpia glomulifera, Eucalyptus moluccana, Eucalyptus microcorys*.
Shrubs: *Backhousia myrtifolia, Alphitonia excelsa, Maytenus silvestris, Maclura cochinchinensis, Notelaea ovata, Breynia cernua, Acacia floribunda, Callistemon sieberi, Acacia longissima, Acacia binervia, Alectryon subcinereus, Acacia irrorata, Pittosporum revolutum, Pittosporum multiflorum, Leucopogon juniperinus, Synoum glandulosum, Ozothamnus diosmifolius, Melaleuca styphelioides*.
Climbers and trailers: *Pandorea pandorana, Cissus antarctica, Eustrephus latifolius, Geitonoplesium cymosum, Rubus parvifolius, Desmodium varians, Clematis glycinoides, Smilax australis, Pyrrosia rupestris, Clematis aristata, Cissus hypoglauca, Stephania japonica, Cissus hypoglauca, Stephania japonica, Parsonsia straminea, Kennedia rubicunda, Hibbertia scandens, Morinda jasminoides, Dioscorea transversa, Desmodium rhytidophyllum, Cayratia clematidea, Aphanopetalum resinosum, Parsonsia eucalyptophylla, Hardenbergia violacea, Glycine microphylla, Desmodium gunnii, Billardiera scandens.*
Ground cover: *Doodia aspera, Dichondra repens, Sigesbeckia orientalis, Geranium solanderi, Adiantum formosum, Platycerium bifurcatum, Pellaea paradoxa, Microlaena stipoides, Carex longebrachiata, Poa sieberiana, Poa labillardieri, Lomandra longifolia, Imperata cylindrica, Blechnum cartilagineum, Sporobolus creber, Geranium solanderi, Echinopogon caespitosus, Sigesbeckia orientalis, Pratia purpurascens, Platycerium bifurcatum, Oplismenus undulatifolius, Oplismenus aemulus, Dianella caerulea, Adiantum formosum.*
Introduced taxa: *Lantana camara, Ligustrum sinense, Solanum mauritianum, Senecio madagascariensis, Bidens pilosa, Plantago lanceolata, Verbena bonariensis, Cirsium vulgare, Chloris gayana, Ligustrum lucidum, Hypochaeris radicata, Conyza bonariensis, Axonopus fissifolius, Anagallis arvensis, Rubus fruticosus, Paspalum dilatatum, Taraxacum officinale, Sonchus oleraceus, Medicago polymorpha, Andropogon virginicus.*
Percent of species introduced: 14%.
Condition: 7.3 ha in moderate condition, 9.7 ha in poor condition (Section 3.7; Figure 14).
Photos: Plate 11.

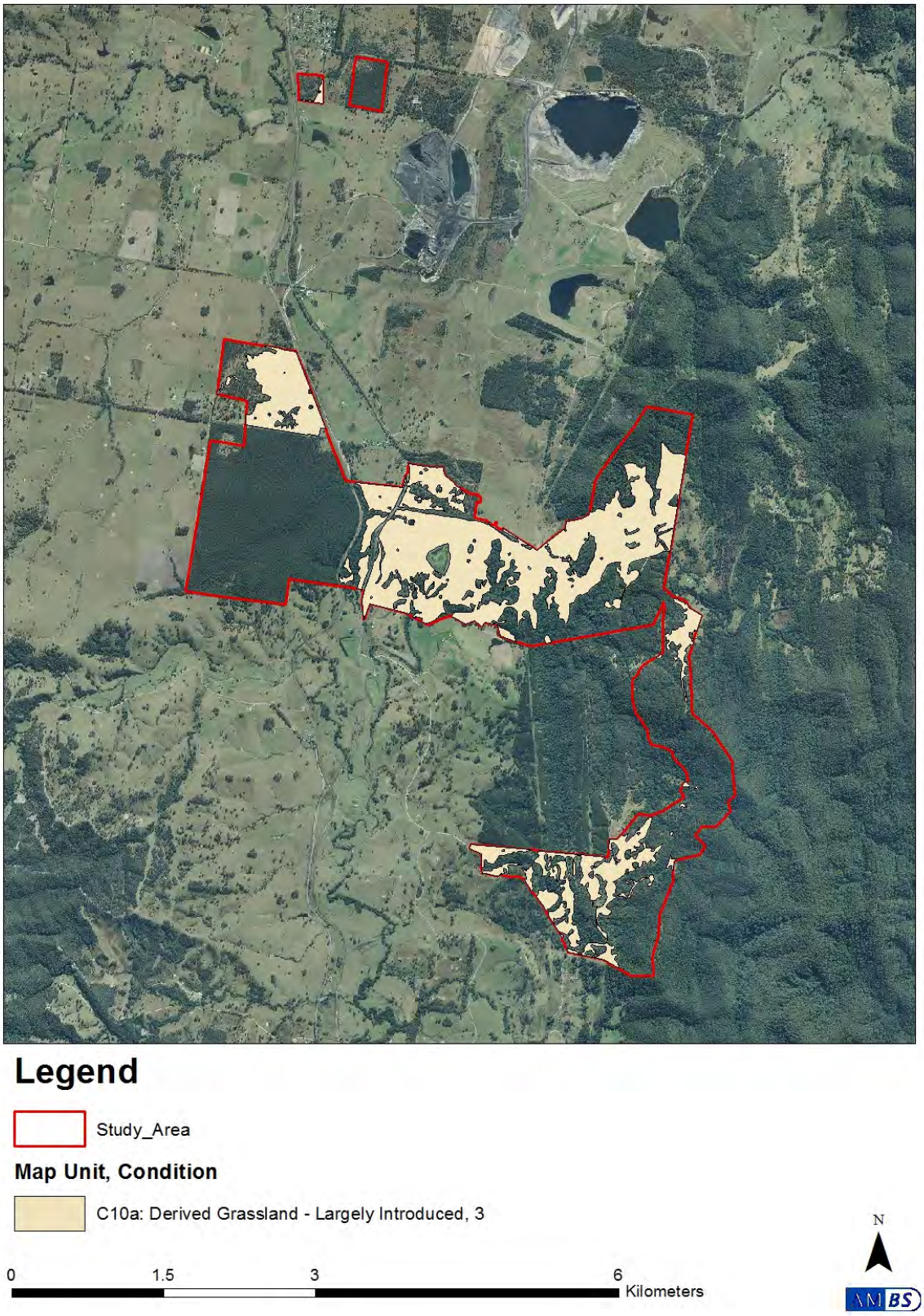
Note: Condition2 moderate; 3 poor.

Figure 14 - Mapped distribution and condition of Community 9.

Plate 11 - Photographs of Community 9; above Site 44, below Site 48.

Community 10a: Derived Grassland – Largely Introduced

Formation: Cleared Land.
BioMetric Vegetation Type: N/A
Full floristic sample sites (8): 85, 86, 88, 95, 100, 106, 115, 126.
Distribution within study area: throughout the study area (**Figure 15**).
No. of taxa: 82. **No. of taxa per plot:** 14-**20**-31.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Eucalyptus fibrosa, Corymbia maculata*.
Shrubs: *Pultenaea villosa, Acacia ulicifolia, Pimelea linifolia, Daviesia ulicifolia, Acacia floribunda*.
Climbers and trailers: *Desmodium gunnii, Clematis aristata.*
Ground cover: *Carex longebrachiata, Sporobolus creber, Imperata cylindrica, Eragrostis leptostachya, Cyperus gracilis, Bothriochloa macra, Viola caleyana, Schoenus apogon, Pratia purpurascens, Poa labillardieri, Microlaena stipoides, Poa sieberiana, Themeda triandra, Sporobolus elongatus, Eragrostis brownii, Ranunculus lappaceus, Juncus usitatus, Fimbristylis dichotoma, Wahlenbergia gracilis, Hydrocotyle tripartite, Hydrocotyle peduncularis, Goodenia bellidifolia, Gonocarpus elatus, Geranium solanderi, Geranium homeanum, Dichondra repens, Cyperus polystachyos, Cymbopogon refractus, Aristida personata, Vittadinia cuneata, Viola hederacea, Veronica calycina, Ranunculus sessiliflorus, Ranunculus plebeius, Panicum simile, Oxalis perennans, Lomandra multiflora, Lomandra filiformis, Hypericum gramineum, Goodenia paniculata, Euchiton sphaericus, Dichelachne micrantha, Cyperus gunnii*.
Introduced taxa: *Axonopus fissifolius, Andropogon virginicus, Senecio madagascariensis, Plantago lanceolata, Hypochaeris radicata, Paspalum dilatatum, Pennisetum clandestinum, Verbena bonariensis, Medicago polymorpha, Gomphocarpus fruticosus, Conyza bonariensis, Hypochaeris glabra, Cirsium vulgare, Aster subulatus, Trifolium repens, Taraxacum officinale, Tagetes minuta, Sonchus oleraceus, Setaria sphacelata, Briza minor, Bidens pilosa, Anagallis arvensis, Sida rhombifolia, Rumex crispus, Modiola caroliniana, Lolium perenne, Juncus cognatus, Juncus articulatus, Conyza sumatrensis, Cerastium glomeratum, Sporobolus africanus.*
Percent of species introduced: 14%.
Condition: all 358.2 ha in poor condition (Section 3.7; Figure 15).
Photos: Plate 12.



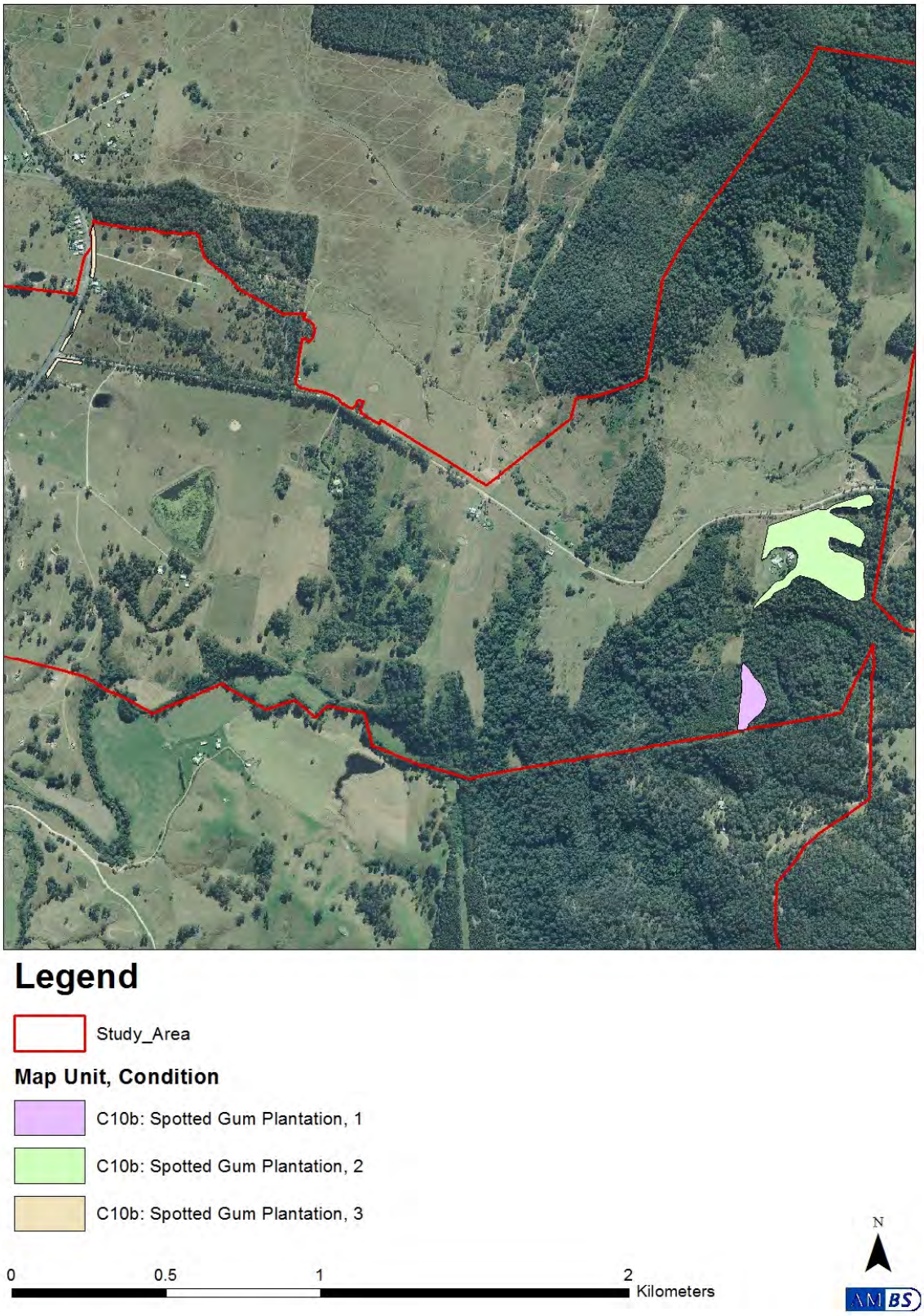
Note: All condition 3.

Figure 15 - Mapped distribution and condition of Community 10a.

Plate 12 - Photographs of Community 10a; Site 88 and 95

Community 10b: Spotted Gum Plantation

Formation: Cleared Land
BioMetric Vegetation Type: N/A.
Full floristic sample sites (3): 102, 121, 122.
Distribution within study area: restricted to a single property near the eastern boundary (**Figure 16**).
No. of taxa: 66 **No. of taxa per plot:** 32-**35**-37.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Corymbia maculata, Eucalyptus carnea*.
Shrubs: *Leucopogon juniperinus, Acacia floribunda, Trema tomentosa* subsp. *aspera, Persoonia linearis, Waterhousea floribunda, Pittosporum revolutum, Ozothamnus diosmifolius, Maytenus silvestris, Hibbertia obtusifolia, Bursaria spinosa, Breynia cernua, Acacia irrorata, Acacia implexa, Acacia binervia*.
Climbers and trailers: *Clematis glycinoides, Stephania japonica, Pandorea pandorana, Desmodium varians, Desmodium gunnii, Hibbertia scandens, Glycine microphylla, Cissus antarctica.*
Ground cover: *Imperata cylindrica, Cymbopogon refractus, Themeda triandra, Microlaena stipoides, Eragrostis brownii, Pratia purpurascens, Echinopogon caespitosus, Dichondra repens, Oxalis perennans, Hypericum gramineum, Cheilanthes sieberi, Viola hederacea, Pteridium esculentum, Lomandra multiflora, Viola caleyana, Viola betonicifolia, Oplismenus aemulus, Lomandra longifolia, Lomandra filiformis, Galium migrans, Euchiton sphaericus, Entolasia marginata, Opercularia diphylla, Hydrocotyle peduncularis, Dianella longifolia, Carex longebrachiata, Caladenia catenata, Arthropodium milleflorum, Aristida vagans*.
Introduced taxa: *Andropogon virginicus, Hypochaeris radicata, Verbena bonariensis, Plantago lanceolata, Lantana camara, Axonopus fissifolius, Hypochaeris glabra, Conyza bonariensis, Anagallis arvensis, Solanum mauritianum, Senecio madagascariensis, Cirsium vulgare, Bidens pilosa.*
Percent of species introduced: 20%.
Condition: 1.2 ha in good condition, 6.9 ha in moderate condition, 0.5 ha in poor condition (Section 3.7; Figure 16)
Photos: Plate 13.



Note: Condition 1 good; 2 moderate; 3 poor.

Figure 16 - Mapped distribution and condition of Community 10b.

Plate 13 - Photographs of Map Unit B.

Community 10c: Rough-barked Apple – Broad-leaved Apple Woodland

Formation: Dry Sclerophyll Forest.
BioMetric Vegetation Type: Rough-barked Apple Grassy Open Forest on Valley Flats of the North Coast and Sydney Basin (HU605).
Full floristic sample sites (1): 101.
Distribution within study area: restricted to highly cleared areas such as grasslands, particularly along drainage lines with isolated remnant trees (**Figure 17**).
No. of taxa: 18 **No. of taxa per plot: 18**.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Angophora floribunda, Angophora subvelutina*.
Shrubs: none apparent.
Climbers & trailers: none apparent.
Ground cover: *Cynodon dactylon, Carex longebrachiata, Poa labillardieri, Juncus usitatus, Ranunculus sessiliflorus, Hydrocotyle peduncularis*.
Introduced taxa: *Axonopus fissifolius, Trifolium repens, Senecio madagascariensis, Rumex crispus, Plantago lanceolata, Medicago polymorpha, Hypochaeris radicata, Verbena bonariensis, Solanum nigrum, Rubus fruticosus, Paspalum dilatatum, Anagallis arvensis.*
Percent of species introdu ced: 14%.
Condition: all 4.2 ha in poor condition.
Photo: Plate 14.

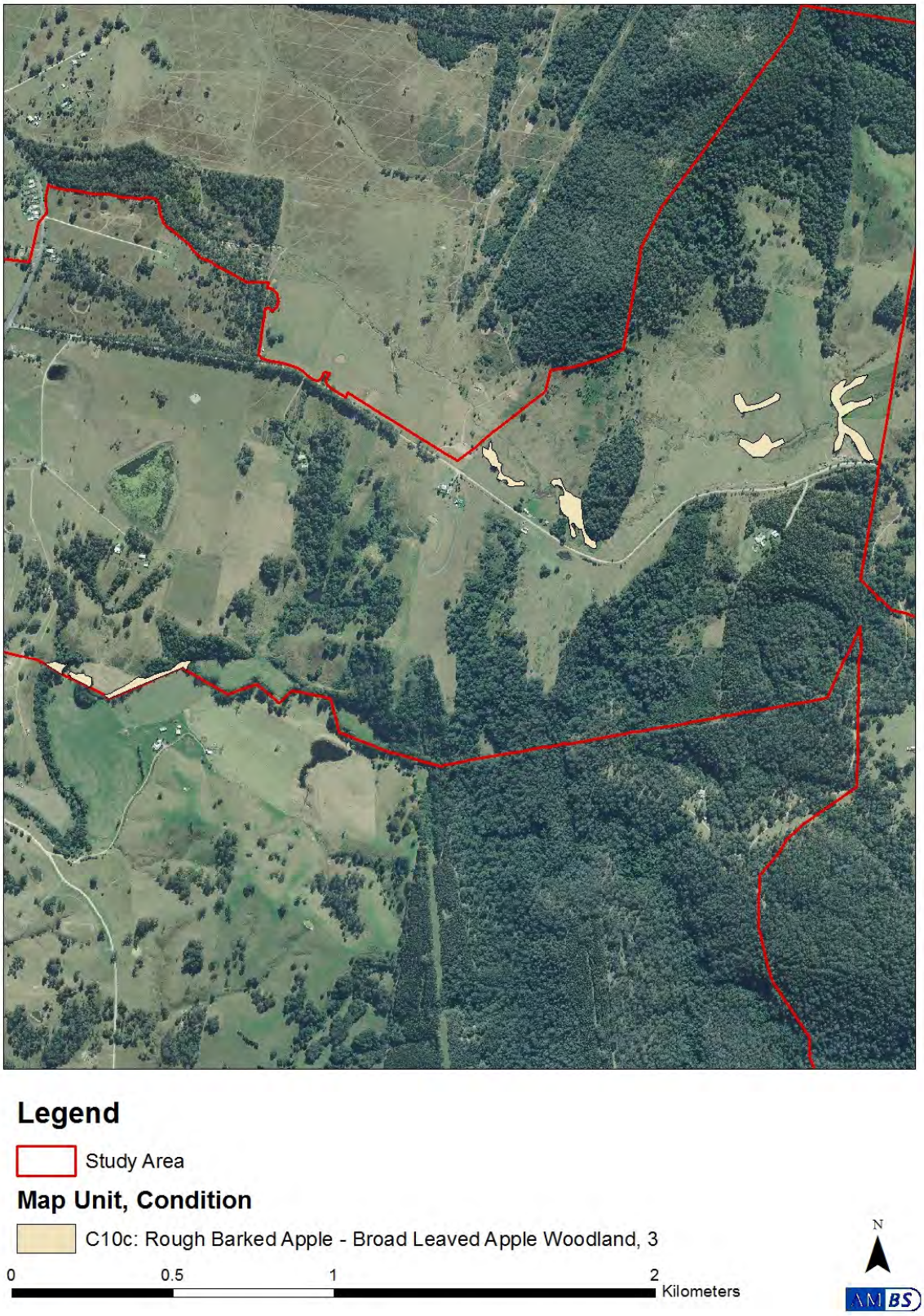


Figure 17 - Mapped distribution and condition of Community 10c. All Condition 3 poor.

Plate 14 - Photograph of Community 10c. Site 101.

3.4 Comparison with EcoBiological/FloraSearch mapping within the Stratford Mining Area

As is often the case, different methods used for mapping within a region can lead to difficulty in cross comparisons. This study is consistent with the recommendations of Native Vegetation Interim Type Standard (Sivertson 2009). Based on the information at hand there are a number of communities that overlap with the work undertaken by FloraSearch. However, there are units within both mapping programs that do not have any direct equivalents. Some of these non-equivalent units could largely be due to the differences in site characteristics as some assemblages may not occur across both survey areas.

3.5 Introduced Species and Weeds

A total of 77 introduced taxa were recorded in the study area. These included four species listed as Noxious in the Gloucester Shire and Great Lakes Council under the *Noxious Weeds Act 1993* (Appendix C). Three of these species are listed as Class 4 weeds (*Ageratina adenophora* [Crofton Weed], *Rubus fruticosus* [Blackberry] and *Lantana camara* [Lantana]), and one is listed as a Class 3 weed *Cestrum parqui* (Green cestrum). The location of recorded Noxious Weeds and their class is shown in Figure 18. The *Noxious Weeds Act 1993* states the following requirements to control noxious weeds:

- the growth and spread of Class 4 Noxious Weeds must be controlled according to the measures specified in a management plan published by the local control authority; and
- Class 3 Noxious Weeds must be fully and continuously suppressed and destroyed.

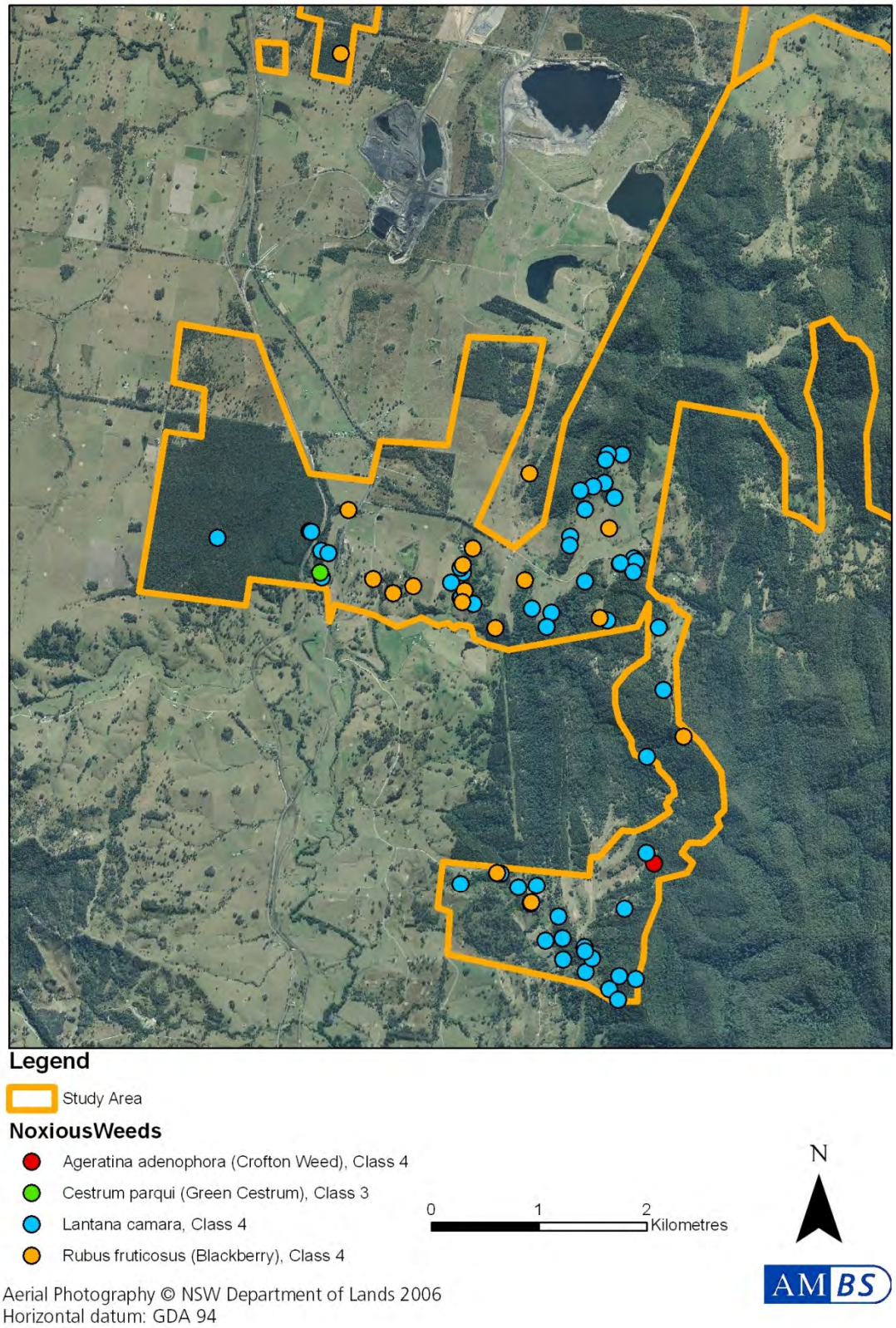


Figure 18 - Location of recorded Noxious Weeds.

3.6 SEPP 44 Koala Habitat Assessment

Overall, eleven survey sites contained either *Eucalyptus tereticornis* (Forest Red Gum) or *Eucalyptus microcorys* (Tallowood). These sites occurred within Communities 1, 4 and 5. A total of 164.5 ha (approximately 16%) of the mapped study area contains Potential Koala Habitat (Table 2) in accordance with SEPP 44. This figure was based on the proportion of koala feed trees at each site, the area of potential koala habitat within each community dominated by *Eucalyptus tereticornis* or *Eucalyptus microcorys* and the area of each of these communities within the study area (Table 2).

It should be noted that this assessment is based only on the criteria indicated in SEPP 44 and may not be a definitive representation of the Koala habitat present.

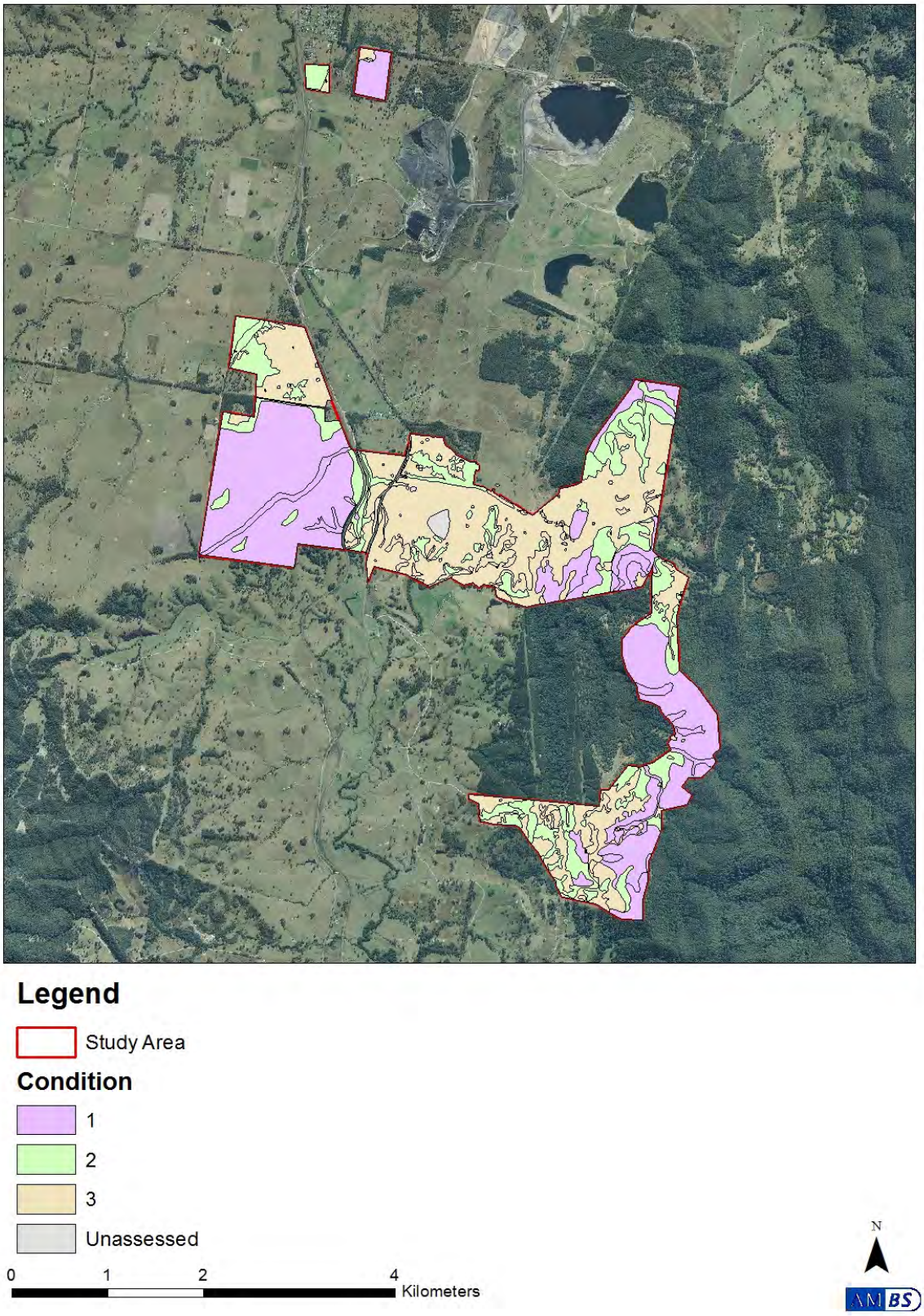
Table 2 - An assessment of Koala food trees present within the study area.

Community	Site No.	Site Area (ha)	Number of trees per site		Potential Koala Habitat (ha)
			Eucalyptus tereticornis	*Eucalyptus microcorys*	
Community 1 (one site)	82	0.21	11 of 15	0 of 15	15.4
Community 4 (four sites)	99	0.03	0 of 15	5 of 15	107.1
	105	0.03	0 of 15	3 of 15	
	109	0.02	1 of 15	0 of 15	
	118	0.01	0 of 15	4 of 15	
Community 5 (six sites)	97	0.02	11 of 15	1 of 15	42
	103	0.02	9 of 15	0 of 15	
	104	0.16	13 of 15	0 of 15	
	107	0.11	15 of 15	0 of 15	
	114	0.02	4 of 15	0 of 15	
	132	0.03	8 of 15	0 of 15	
Total					**164.5**

3.7 Condition of the Vegetation

Condition was mapped under three criteria (as described in Section 2.2.2) (Note: Condition 1 and 2 are considered to be in good condition while areas mapped as 3 are in poor condition.

Figure 19; Table 3). Overall 40% of the mapped study area was in poor condition (Condition 3). The remaining 60% of the mapped area was in good condition according to the assessment methodology (OEH 2009a). However, those areas in good condition consisted entirely of regrowth from past clearing activities. The majority of areas in poor condition were attributed to Map Unit A Derived Grasslands – Largely Introduced. More than 80% of the area containing communities 1-9 have more than 80% of their mapped area in good condition (condition scores 1 or 2). No parts of the study area could be classed as old growth. Some small areas did contain large and old trees but these were small in number and not of a mappable size.



Note: Condition 1 and 2 are considered to be in good condition while areas mapped as 3 are in poor condition.

Figure 19 - Mapped condition.

Table 3 - Condition of Vegetation Communities within the Study Area

Vegetation Community	Condition of each community (ha)				
	1*	2#	3+	Unassessed	Total
Dams – Artificial Wetlands	NA	NA	NA	8.2	8.2
Community 1: Grey Ironbark – Spotted Gum – White Stringybark Forest and Woodland	13.7	38.6	9.4		61.7
Community 2: Grey Ironbark – Grey Gum Forest		0.7			0.7
Community 3: Spotted Gum – White Stringybark – Grey Ironbark Forest and Woodland	188.6	20.2	1.8		210.6
Community 4: Thick-leaved Mahogany – Spotted Gum – Forest Oak Forest and Woodland	154.0	91.7	22.1		267.8
Community 5: Forest Red Gum – Grey Ironbark – Thick-leaved Mahogany Forest and Woodland	15.8	18.6	7.6		42.0
Community 6: Forest Red Gum – Cabbage Gum – Broad-leaved Apple Woodland		3.5			3.5
Community 7: White Stringybark – Spotted Gum – Red Ironbark Forest and Woodland	13.9	7.0	3.2		24.1
Community 8: Grey Gum – Tallowwood – Spotted Gum Forest and Woodland	16.2	11.3	1.7		29.2
Community 9: Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland		7.3	9.7		17.0
Community 10: Rough-barked Apple – Broad-leaved Apple Woodland			4.2		4.2
Map Unit A: Derived Grassland – Largely Introduced			358.2		358.2
Map Unit B: Spotted Gum Plantation	1.2	6.9	0.5		8.6
Total Area	**403.4**	**205.9**	**418**	**8.2**	**1035.8**
Total Percentage of Area	**39%**	**20%**	**40%**	**1%**	

Key:

* = the highest condition with low weed cover and abundance and little or no recognisable disturbance.

= significant disturbance and continuing disturbance but with largely original canopy species cover and predominantly native understorey components.

+ = significant overstorey removal or not original overstorey and predominantly modified understory and continued disturbance.

3.8 Threatened Flora Communities and Species

No threatened flora species were recorded during surveys of the study area. No threatened communities were found, however four threatened ecological communities listed under the TSC Act require discussion, as on a casual inspection of their descriptions their presence could easily be inaccurately identified.

3.8.1 Carex Sedgelands of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions

This endangered community is typified by the dominance of *Carex* species within its overstorey. A sedgeland dominated by *Carex appressa* was sampled within Site 77 and it is within the North Coast Bioregion. In addition, some of the species found in association are those listed within the determination. Under these criteria this may include the vegetation at Site 77 within this determination. The determination largely relies on the publication by Hunter & Bell (2009) which was restricted to the eastern escarpment of the New England Plateau and west to the Pilliga Region within the Brigalow Belt South Bioregion. Parts of the New England Plateau fall within the North Coast Bioregion (over 400 m altitude). This paper provided the evidence for the determination and as such the determination relies heavily on it for the description of the communities covered, namely Communities 1, 2, 3 4 and 6. Hunter & Bell (2009) state that while Carex assemblages on the lower altitude areas of the North Coast may also require investigation, their study did not assess the threatened status of these. Based on this discussion it was assessed that this occurrence within the study area does not fall within the intent of the listing at present.

3.8.2 Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions

The characteristics of this threatened community include *Eucalyptus tereticornis* as the common canopy tree in association with *E. punctata, Angophora floribunda, E. crebra, E. moluccana* and *Corymbia maculata* and an understory shrub layer of *Breynia oblonga, Leucopogon juniperinus, Daviesia ulicifolia* and *Jacksonia scoparia*. The ground layer contains *Microlaena stipoides, Pratia purpurascens, Lomandra multiflora, Cymbopogon refractus, Cheilanthes sieberi* and *Dichondra repens*. The distribution of this community is between Muswellbrook, Beresfield, Mulbring and Cessnock in the lower Hunter and Sydney Basin and North Coast Bioregions. Within these regions the community is restricted to gentle slopes and drainage flats on the Hunter Valley floor on Permian sediments and exists in less than 500 ha.

The assemblages in the determination do not occur within the study area. In addition, the study area is not within the LGAs mentioned nor does it contain Permian sediments of the Hunter Valley Floor. Some minor parts of Community 5 have similarities with the main floristics of the determination however as a larger classified entity the overall description of Community 5 as a unit is unlike that of the determination.

3.8.3 Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions

This endangered community is characterised as being a subtropical rainforest with related dry rainforest associations. The community is described as being, in its undisturbed state, structurally complex with a high diversity of trees with irregular crown shapes and sizes. The community's species composition is diverse at the family and genus levels and buttress roots, palms, vines, vascular epiphytes may be found. The community occurs from the Hawkesbury River north. The determination principally follows suballiances 1. *Agyrodendrom trifoliatum*, 5. *Castanopsermum australe – Dysoxylum muelleri* within the *Argyrodendron trifoliatum* alliance and 14. *Doryphora sassafras- Daphnandra micranthus – Dendrochnide excelsa – Ficus* spp. *– Toona* and 15. *Ficus* spp. *– Dysoxylum fraserianum – Toona – Dendrochnidea* within the *Dendrochnide excelsa – Ficus* spp. Alliance and 21. *Araucaria cunninghamii* – 22. *Flinderisa* within the *Drypetes australasica – Araucaria cunninghamii* alliance of Floyd (1990).

The sub-alliances listed above are the predominant associations describing this community and in transitional areas a number of other alliances and suballiances are included. Overall, the determination describes structurally and floristically rich subtropical rainforest. Within the study area some protected gullies and particularly within the riparian zone of major creeks and rivers (such as within Communities 7, 8 and 9) Floyd's (1990) Alliance 23. *Ficus – Streblus – Dendrocnide – Cassine* which is structurally and floristically simple could be determined to occur. This alliance is listed within the above threatened community definition. However, it is clearly stated within the determination that only for "part of the Lowland Rainforest where they occur in transitional zones with any suballiance" listed above. This situation does not occur within the study area.

3.8.4 River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

This community is found on river flats of coastal floodplains. The community is dominated by *Eucalyptus tereticornis, Eucalyptus amplifolia, Angophora floribunda, Angophora subvelutina* and a number of other subdominants particularly in more southern areas of the state. Small trees such as *Melaleuca decora, M. styphelioides, Backhousia myrtifolia, Melia azadarach, Casuarina cunninghamiana* and *C. glauca* may occur with smaller shrubs such as *Solanum prinophyllum, Rubus parvifolius, Breynia oblonga, Ozothamnus diosmifolius, Hymenanthera dentata, Acacia floribunda* and *Phyllanthus gunnii*. The ground layer includes *Microlaena stipoides, Dichondra repens, Glycine clandestina, Oplismenus aemulus, Desmodium gunnii, Pratia purpurascens, Entolasia marginata, Oxalis perennans* and *Veronica plebeia*. The determination states that this community is distinguished by its overstorey species and by the low abundance or subdominance of *Casuarina* and *Melaleuca* species, a low abundance of *Eucalyptus robusta* and the prominent ground layer of soft leaved forbs and grasses. The community has been recorded within Port Stephens, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Palerang, Eurobodalla and the Bega Valley.

Some sites within Community 8 and 9 were similar structurally and floristically to the determination above within the study area. However, this endangered community was thought not to occur as one of the requirements are that:

> *The combination of features that distinguish River-Flat Eucalypt Forest on Coastal Floodplains from other endangered communities on the coastal floodplains include: its dominance by either a mixed eucalypt canopy or by a single species of eucalypt belonging to either the genus Angophora or the sections Exsertaria or Transversaria of the genus Eucalyptus (Hill 2002); the relatively low abundance or sub-dominance of Casuarina and Melaleuca species; the relatively low abundance of Eucalyptus robusta; and the prominent groundcover of soft-leaved forbs and grasses.*

While the second and third criteria are met, in no sampled locations were all three met. In addition, most of the areas containing such stands were within incised gullies but not in what could be determined as floodplains. The areas containing these understorey components within the study area were largely dominated by *Eucalyptus siderophloia, E. carnea, E, globoidea, E, saligna¸ E. resinifera* and *Corymbia maculata.* Whereas locations containing the overstoreys dominated by *E. tereticornis, E. amplifolia, Angophora subvelutina* and *A. floribunda* did not contain such understorey components. It is highly likely that this endangered community does occur in the general vicinity of study area as the study area does not contain typical floodplain areas where larger watercourse are found to be meandering.

4 Conclusions

In conclusion, the study area contained 420 flora species of which 77 species (18%) were introduced taxa including three Class 4 and one Class 3 noxious weed species. Vegetation contained ten plant communities and two map units, including nine different vegetation types. Assessment of condition determined that 40% of the study area was in poor condition, and 60% was in moderate to good condition. Approximately 16% or 164.5 ha of the study area contained Potential Koala Habitat in accordance with SEPP 44. No threatened species, populations or communities were recorded during the survey. A total of 14 threatened species have the potential to occur in the study area and require targeted searches to determine their presence or absence.

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Appendix A: Site Record Forms.

20 x 20m Full Floristic Survey Sites

Date: _____ Recorder: _____Site No: _____

Film No: _____ Photo No: _____ Quadrat Size:_____

General Location: _____

Map Name: _____ Scale: _____
AMG Ref: _____E _____N
Lat:_____'S Long: _____'E

Landform Pattern: _____
Physiography:(circle)
Crest Upper Slope Mid-slope Lower Slope Flat Open Depression

Altitude: _____metres
Slope: _____degrees
Aspect: _____degrees (magnetic)
Horizontal Elevation: N_____NE_____E_____SE_____S_____SW_____W_____NW_____

Map Geology: _____ Lithology: _____

Soil: (circle)
Drainage: Waterlogged Damp Moist Well drained
Texture: _____
Colour: _____
Depth: Deep (>1m) Shallow (0.3-1m) Skeletal (<0.3m)

Fire History (how determined)_____

Other Disturbance: (circle) clearing logging grazing erosion feral animals
other (state):_____

Vegetation Structure: (Walker & Hopkins, 1990)

Stratum	Height (m)	% Cover	Dominant Species

Structural Formation Class: _____
Comments:_____
_____
_____

Floristic Composition: Site No:

No.	Species	C/A	Canopy Spp	Data	No.	Species	C/A	Canopy Spp	Data
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				

C/A: Cover Abundance Scale -Modified Braun Blanquet

Data: to be marked when entered into computer database

1 = cover less than 5% of site and uncommon
2 = cover less than 5% of site and common
3 = cover of 6-20% of site
4 = cover of 21-50% of site
5 = cover of 51-75% of site
6 = cover of 76-100% of site

Rapid Assessment Survey Sites

RAPID ASSESSMENT SHEET FOR STRATFORD SURROUNDS FLORA SURVEY

Site Information

Recorder:		Date:	
Site Number:		GPS coordinates: (In GDA 94 Datum)	
		GPS coordinates: (In GDA 94 Datum)	

Dominant Species

Stratum	**3 dominant Species Name (in order of dominance)**
Upper	
Upper	
Upper	
Mid	
Mid	
Mid	
Ground	
Ground	
Ground	

Condition

Circle	**Good**	**Moderate**	**Poor**

Appendix B: Flora Species List

Scientific Name	Common Name
Fern & Fern Allies	
Adiantaceae	
Adiantum aethiopicum L.	Common Maidenhair
Adiantum formosum R.Br.	Giant Maidenhair
Adiantum hispidulum Sw.	Rough Maidenhair Fern
Cheilanthes sieberi Kunze subsp. *sieberi*	Poison Rock Fern
Pellaea falcata (R.Br.) Fée	Sickle Fern
Pellaea nana (Hook.) Bostock	Dwarf Sickle Fern
Pellaea paradoxa (R.Br.) Hook.	Sickle Fern
Aspleniaceae	
Asplenium australasicum (J.Sm.) Hook.	Bird's Nest Fern
Blechnaceae	
Blechnum cartilagineum Sweet	Gristle Fern
Blechnum wattsii Tindale	Hard Water Fern
Doodia aspera R.Br.	Prickly Rasp Fern
Davalliaceae	
Davallia solida var. *pyxidata* (Cav.) Noot.	Hare's Foot Fern
Dennstaedtiaceae	
Calochlaena dubia (R.Br.) M.D.Turner & R.A.White	Rainbow Fern
Pteridium esculentum (G.Forst.) Cockayne	Common Bracken
Lindsaeaceae	
Lindsaea linearis Sweet	Screw Fern
Ophioglossaceae	
Botrychium australe R.Br.	Parsley Fern
Polypodiaceae	
Platycerium bifurcatum (Cav.) C.Chr. subsp. *bifurcatum*	Elkhorn Fern
Pyrrosia rupestris (R.Br.) Ching	Rock Felt Fern
Pinaceae	
**Pinus* sp.	

Scientific Name	Common Name
Anthericaceae	
Arthropodium milleflorum (DC.) J.F.Macbr.	Pale Vanilla-Lily
Laxmannia gracilis R.Br.	Slender Wire Lily
Tricoryne elatior R.Br.	Yellow Autumn-Lily
Araceae	
Gymnostachys anceps R.Br.	Settlers' Twine
Commelinaceae	
Commelina cyanea R.Br.	Native Wandering Jew
Murdannia graminea (R.Br.) G.A.Brukn.	Chocolate Lily
**Tradescantia fluminensis* Vell.	Wandering Jew
Cyperaceae	
Carex appressa R.Br.	Tall Sedge
Carex breviculmis R.Br.	Sedge
Carex inversa R.Br.	Knob Sedge
Carex longebrachiata Boeck.	Bergalia Tussock
**Cyperus aggregatus* (Willd.) Endl.	Sedge
Cyperus difformis L.	Dirty Dora
Cyperus gracilis R.Br.	Slender Flat-sedge
Cyperus gunnii Hook.f. subsp. *gunnii*	Flecked Flat-sedge
Cyperus polystachyos Rottb.	Sedge
**Cyperus sesquiflorus* (Torrey) Mattf. & Kuk.	Sedge
Cyperus trinervis R.Br.	Sedge
Fimbristylis dichotoma (L.) Vahl	Common Fringe Rush
Gahnia clarkei Benl	Tall-saw Sedge
Gahnia radula (R.Br.) Benth.	Thatch Saw Sedge
Lepidosperma laterale R.Br.	Variable Saw Sedge
Schoenoplectus mucronatus (L.) Palla ex A.Kern.	Club-rush
Schoenus apogon Roem. & Schult.	Common Bog-rush
Dioscoreaceae	
Dioscorea transversa R.Br.	Native Yam
Iridaceae	
**Moraea flaccida* Sweet	One-leaved Cape Tulip
Juncaceae	
**Juncus articulatus* L.	Jointed Rush
**Juncus cognatus* Kunth	Rush
Juncus continuus L.A.S.Johnson	Rush

Scientific Name	Common Name
Juncus remotiflorus L.A.S.Johnson	Rush
Juncus usitatus L.A.S.Johnson	Common Rush
Juncus vaginatus R.Br.	Rush
Luzula flaccida (Buchenau) Edgar	Grass Rush
Lomandraceae	
Lomandra confertifolia (F.M.Bailey) Fahn.	Mat-rush
Lomandra filiformis (Thunb.) Britten	Wattle Mat-rush
Lomandra hystrix (R.Br.) L.R.Fraser & Vickery	Mat-rush
Lomandra longifolia Labill.	Spiny-headed Mat-rush
Lomandra multiflora (R.Br.) Britten subsp. *multiflora*	Many-flowered Mat-rush
Luzuriagaceae	
Eustrephus latifolius R.Br. ex Ker Gawl.	Wombat Berry
Geitonoplesium cymosum (R.Br.) A.Cunn. ex Hook.	Scrambling Lily
Orchidaceae	
Acianthus fornicatus R.Br.	Pixie Caps
Bulbophyllum shepherdii (F.Muell.) F.Muell.	Wheat-leaved Orchid
Caladenia catenata (Sm.) Druce	White Fingers
Caladenia gracilis R.Br.	Musky Caladenia
Cymbidium suave R.Br.	Snake Orchid
Eriochilus cucullatus (Labill.) Rchb.f.	Parson's Band
Papillilabium beckleri (F.Muell. ex Benth.) Dockrill	Tangle Orchid
Plectorrhiza tridentata (Lindl.) Dockrill	Tangle Orchid
Pterostylis grandiflora R.Br.	Cobra Greenhood
Pterostylis nutans R.Br.	Nodding Greenhood
Sarcochilus falcatus R.Br.	Orange Blossom Orchid
Sarcochilus hillii (F.Muell.) F.Muell.	Orchid
Phormiaceae	
Dianella caerulea var. *producta* R.J.F.Hend.	Rough Flax Lily
Dianella caerulea Sims var. *caerulea*	Blue Flax Lily
Dianella longifolia R.Br.	Blue Flax Lily
Dianella revoluta R.Br. var. *revoluta*	Spreading Flax Lily
Dianella tasmanica Hook.f.	Tasman Flax-Lily
Poaceae	
**Andropogon virginicus* L.	Whiskey Grass
**Anthoxanthum odoratum* L.	Sweet Vernal Grass
Aristida personata Henrard	Purple Wire-grass
Aristida vagans Cav.	Threeawn Speargrass

Scientific Name	Common Name
Austrodanthonia fulva (Vickery) H.P.Linder	Wallaby Grass
Austrodanthonia monticola (Vickery) H.P.Linder	Wallaby Grass
Austrostipa ramosissima (Trin.) S.W.L.Jacobs & J.Everett	Stout Bamboo Grass
**Axonopus fissifolius* (Raddi) Kuhlm	Narrow-leafed Carpet Grass
Bothriochloa decipiens (Hack.) C.E.Hubb.	Pitted Bluegrass
Bothriochloa macra (Steud.) S.T.Blake	Red Grass
**Briza minor* L.	Shivery Grass
Capillipedium spicigerum S.T.Blake	Scented-top Grass
Chloris divaricata R.Br. var. *divaricata*	Slender Chloris
**Chloris gayana* Kunth	Rhodes Grass
Cymbopogon refractus (R.Br.) A.Camus	Barbed Wire Grass
**Cynodon dactylon* (L.) Pers.	Couch, Bermuda Grass
Dichelachne micrantha (Cav.) Domin	Shorthair Plumegrass
Digitaria breviglumis (Domin) Henrard	Finger Panic Grass
Digitaria didactyla Willd.	Queensland Blue Couch
Digitaria parviflora (R.Br.) Hughes	Small-flowered Finger Grass
Digitaria ramularis (Trin.) Henrard	Finger Panic Grass
**Digitaria sanguinalis* (L.) Scop.	Summer Grass
Echinopogon caespitosus C.E.Hubb. var. *caespitosus*	Tufted Hedgehog Grass
Echinopogon mckiei C.E.Hubb.	Hedgehog Grass
Echinopogon ovatus (G.Forst.) P.Beauv.	Forest Hedgehog Grass
**Ehrharta erecta* Lam.	Panic Veldtgrass
Entolasia marginata (R.Br.) Hughes	Bordered Panic
Entolasia stricta (R.Br.) Hughes	Wiry Panic
Eragrostis brownii (Kunth) Nees	Brown's Lovegrass
Eragrostis leptostachya Steud.	Paddock Lovegrass
Imperata cylindrica var. *major* (Nees) C.E.Hubb	Blady Grass
**Lolium perenne* L.	Perennial Ryegrass
Microlaena stipoides (Labill.) Druce var. *stipoides*	Weeping Meadow Grass
Oplismenus aemulus (R.Br.) Roem. & Schult.	Wavy Beard Grass
Oplismenus imbecillis (R.Br.) Roem. & Schult.	Creeping Beard Grass
Oplismenus undulatifolius var. *mollis* Domin	Beard Grass
Panicum effusum R.Br.	Hairy Panic
Panicum simile Domin	Two-colour Panic
Paspalidium distans (Trin.) Hughes	Panic
Paspalidium gracile (R.Br.) Hughes	Slender Panic
**Paspalum dilatatum* Poir.	Paspalum
**Pennisetum clandestinum* Hochst. ex Chiov.	Kikuyu Grass
**Poa annua* L.	Winter Grass
Poa labillardieri Steud.	Tussock Grass
Poa sieberiana Spreng.	Snow Grass
**Setaria gracilis* Kunth	Slender Pigeon Grass

Scientific Name	Common Name
**Setaria pumila* (Poir.) Roem. & Schult.	Pale Pigeon Grass
**Setaria sphacelata* (K.Schum.) Stapf & C.E.Hubb.	South African Pigeon Grass
**Sporobolus africanus* L.	Parramatta Grass
Sporobolus creber De Nardi	Slender Rat's Tail Grass
Sporobolus elongatus R.Br.	Slender Rat's Tail Grass
**Sporobolus fertilis* (Steud.) Clayton	Giant Parramatta Grass
**Sporobolus indicus* (L.) R.Br.	Parramatta Grass
Themeda triandra Forssk.	Kangaroo Grass
Smilaceae	
Smilax australis R.Br.	Lawyer Vine
Typhaceae	
Typha orientalis C.Presl	Broadleaf Cumbungi
Acanthaceae	
Brunoniella australis (Cav.) Bremek.	Blue Trumpet
Brunoniella pumilio (R.Br.) Bremek.	Dwarf Blue Trumpet
Pseuderanthemum variablile (R.Br.) Radlk.	Pastel Flower
Amaranthaceae	
Alternanthera denticulata R.Br.	Lesser Joyweed
Nyssanthes diffusa R.Br.	Barbwire Weed
Amygdalaceae	
**Prunus laurocerasus* L.	Cherry Laurel
Apiaceae	
Centella asiatica (L.) Urb.	Indian Pennywort
**Ciclospermum leptophyllum* (Pers.) Sprague	Slender Celery
Daucus glochidiatus (Labill.) Fisch., C.A.Mey. & Ave-Lall.	Native Carrot
Hydrocotyle geraniifolia F.Muell.	Forest Pennywort
Hydrocotyle laxiflora DC.	Stinking Pennywort
Hydrocotyle peduncularis R.Br. ex A.Rich.	Small-leaved Pennywort
Hydrocotyle tripartita R.Br. ex A.Rich.	Pennywort
Trachymene incisa Rudge subsp. *incisa*	Native Parsnip
Xanthosia pilosa Rudge	Wooly Xanthosia
Apocynaceae	
Alyxia ruscifolia R.Br.	Prickly Alyxia
Parsonsia brownii (Britten) Pichon	Mountain Silkpod
Parsonsia eucalyptophylla F.Muell.	Gargaloo

Scientific Name	Common Name
Parsonsia rotata Maiden & Betche	Veinless Silkpod
Parsonsia straminea (R.Br.) F.Muell.	Common Silkpod
Araliaceae	
Polyscias sambucifolia (Sieber ex DC.) Harms	Elderberry Panax
Asclepiadaceae	
**Araujia sericifera* Brot.	Moth Vine
**Gomphocarpus fruticosus* (L.) R.Br.	Narrow-leaved Cotton Bush
Marsdenia flavescens A.Cunn.	Hairy Milk Vine
Marsdenia suaveolens R.Br.	Scented Marsdenia
Asteraceae	
**Ageratina adenophora* (Spreng.) R.King & H.Robinson	Crofton Weed
**Ageratina riparia* (Regel) R.King & H.Robinson	Mistflower
**Ageratum houstonianum* Miller	Mist Flower
**Aster subulatus* Michaux	Wild Aster
**Bidens pilosa* L.	Cobbler's Pegs
**Bidens subalternans* DC.	Greater Beggar's Ticks
Brachyscome dissectifolia G.L.R.Davis	Swamp Daisy
Brachyscome microcarpa F.Muell.	Forest Daisy
Calotis cuneifolia R.Br.	Purple Burr-daisy
**Cirsium vulgare* (Savi) Ten.	Spear Thistle
**Conyza bonariensis* (L.) Cronq.	Flaxleaf Fleabane
**Conyza sumatrensis* (Retz.) E.Walker	Tall Fleabane
Coronidium elatum (A.Cunn. ex DC.) Paul G.Wilson	White Everlasting
Cotula australis (Sieber ex Spreng.) Hook.f.	Common Cotula
**Crassocephalum crepidioides* (Benth.) S.Moore	Thickhead
Euchiton gymnocephalus (DC.) Holub	Creeping Cudweed
Euchiton involucratus (G.Forst.) Holub	Star Cudweed
Euchiton sphaericus (Willd.) Holub	Cudweed
**Gamochaeta americanum* (Mill.) Wedd.	Cudweed
**Hypochaeris glabra* L.	Smooth Catsear
**Hypochaeris radicata* L.	Catsear
Lagenophora gracilis Steetz	Slender Lagenophora
Lagenophora stipitata (Labill.) Druce	Blue Bottle-daisy
**Leontodon taraxacoides* (Villars) Merat subsp. *taraxacoides*	Lesser Hawkbit
Ozothamnus diosmifolius (Vent.) DC.	White Dogwood
Senecio diaschides Drury	Fireweed
**Senecio madagascariensis* Poir.	Fireweed
Senecio pinnatifolius var. *lanceolatus*(Benth.) I.Thomps.	Variable Groundsel
Sigesbeckia australiensis D.L.Schulz	

Scientific Name	Common Name
Sigesbeckia orientalis L. subsp. *orientalis*	Indian Weed
**Soliva sessilis* Ruiz Lopez & Pavon	Jo-jo
**Sonchus oleraceus* L.	Common Sowthistle
**Tagetes minuta* L.	Stinking Roger
**Taraxacum officinale* Weber	Dandelion
Vernonia cinerea (L.) Less. var. *cinerea*	Vernonia
Vittadinia cuneata DC.	Fuzzweed
Bignoniaceae	
Pandorea pandorana (Andrews) Steenis	Wonga Wonga Vine
Brassicaceae	
**Capsella bursa-pastoris* (L.) Medik.	Shepherd's Purse
Campanulaceae	
Wahlenbergia gracilis (Forster f.) A.DC.	Australian Bluebell
Caryophyllaceae	
**Cerastium glomeratum* Thuill.	Mouse-ear Chickweed
**Paronychia brasiliana* DC.	Brazilian Whitlow
**Petrorhagia nanteuilii* (Burnat) P.W.Ball & Heywood	Proliferous Pink
Stellaria flaccida Hook.	Chickweed
**Stellaria media* (L.) Cirillo	Common Chickweed
Casuarinaceae	
Allocasuarina torulosa (Aiton) L.A.S.Johnson	Forest Oak
Casuarina cunninghamiana Miq.	River Oak
Celastraceae	
Denhamia celastroides (F.Muell.) Jessup	Denhamia
Maytenus silvestris Lander & L.A.S.Johnson	Narrow-leaved Orangebark
Chenopodiaceae	
Einadia hastata (R.Br.) A.J.Scott	Berry Saltbush
Einadia nutans (R.Br.) A.J.Scott subsp. *nutans*	Climbing Saltbush
Clusiaceae	
Hypericum gramineum Forst.f.	Small St. John's Wort
Hypericum japonicum Thunb.	St. John's Wort
Convolvulaceae	
Calystegia marginata R.Br.	Calystegia

Scientific Name	Common Name
Dichondra repens Forst. & Forst.f.	Kidney Weed
Polymeria calycina R.Br.	Polymeria
Cunoniaceae	
Aphanopetalum resinosum Endl.	Gum Vine
Dilleniaceae	
Hibbertia dentata R.Br. ex DC.	Trailing Guinea Flower
Hibbertia diffusa DC.	Wedge Guinea Flower
Hibbertia obtusifolia DC.	Hoary Guinea Flower
Hibbertia scandens (Willd.) K.D.Konig & J.Sims	Climbing Guinea Flower
Droseraceae	
Drosera auriculata Backh. ex Planch.	Sundew
Ebenaceae	
Diospyros australis (R.Br.) Hiern	Black Plum
Epacridaceae	
Leucopogon fraseri A.Cunn.	Fraser's Beard Heath
Leucopogon juniperinus R.Br.	Prickly Beard-heath
Lissanthe strigosa (Sm.) R.Br subsp. *strigosa*.	Peach Heath
Trochocarpa laurina R.Br.	Tree Heath
Euphorbiaceae	
Alchornea ilicifolia (J.Sm.) Muell.Arg.	Native Holly
Breynia cernua (Poir.) Muell.Arg.	Coffee Bush
Glochidion ferdinandi (Muell.Arg.) Bailey var. *ferdinandi*	Cheese Tree
Phyllanthus gunnii Hook.f.	Shrubby Spurge
Phyllanthus hirtellus Muell.Arg.	Spurge
Poranthera microphylla Brongn.	Small Poranthera
Eupomatiaceae	
Eupomatia laurina R.Br.	Bolwarra
Fabaceae	
Acacia binervia (J.C.Wendl.) J.F.Macbr.	Coast Myall
Acacia decurrens Willd.	Black Wattle
Acacia falcata Lindl.	Wattle
Acacia falciformis DC.	Broad-leaved Hickory
Acacia floribunda (Vent.) Willd.	White Sally Wattle
Acacia implexa Benth.	Hickory Wattle

Scientific Name	Common Name
Acacia irrorata Sieber ex Spreng. subsp. *irrorata*	Blueskin
Acacia leiocalyx (Domin) Pedley subsp. *leiocalyx*	Curracabah
Acacia longifolia (Andrews) Willd. subsp. *longifolia*	Sydney Golden Wattle
Acacia longissima H.L.Wendl.	Narrow-leaf Wattle
Acacia maidenii F.Muell.	Maiden's Wattle
Acacia ulicifolia (Salisb.) Court	Prickly Moses
Daviesia ulicifolia Sm. subsp. *ulicifolia*	Gorse Bitter Pea
Desmodium brachypodum A.Gray	Large Tick-trefoil
Desmodium gunnii Benth. ex J.D.Hook.	Slender tick trefoil
Desmodium rhytidophyllum F.Muell. ex Benth.	Hairy Tick-trefoil
Desmodium varians (Labill.) Endl.	Slender Tick Trefoil
Glycine clandestina Wendl.	Twining Glycine
Glycine microphylla (Benth.) Tindale	Small-leaf Glycine
Glycine tabacina (Labill.) Benth.	Variable Glycine
Hardenbergia violacea (Schneev.) Stearn	False Sarsaparilla
Hovea heterophylla A.Cunn. ex Hook.f.	Hovea
Indigofera australis Willd.	Australian Indigo
Jacksonia scoparia R.Br.	Dogwood
Kennedia rubicunda (Schneev.) Vent.	Dusky Coral Pea
Lespedeza juncea subsp. *sericea* (Thunb.) Steenis	Lespedeza
Lotus cruentus Court	Red-flowered Lotus
**Lotus uliginosus* Schk.	Birds-foot Trefoil
**Medicago polymorpha* L.	Burr Medic
**Medicago sativa* L.	Lucerne
Platylobium formosum subsp. *parviflorum* (Sm.) A.Lee	Handsome Flat Pea
Podolobium ilicifolium (Andrews) Crisp & P.H.Weston	Prickly Shaggy Pea
Pultenaea retusa Sm.	Blunt-leaf Bush Pea
Pultenaea villosa Willd.	Hairy Bush-pea
**Trifolium cernuum* Brot.	Drooping-flowered Clover
**Trifolium repens* L.	White Clover
Gentianaceae	
**Centaurium erythraea* Rafn	Common Centaury
Geraniaceae	
Geranium homeanum Turcz.	Geranium
Geranium potentilloides	Soft Cranesbill
Geranium solanderi Carolin var. *solanderi*	Native Geranium
Goodeniaceae	
Coopernookia barbata (R.Br.) Carolin	Purple goodenia

Scientific Name	Common Name
Goodenia bellidifolia Sm. subsp. *bellidifolia*	Goodenia
Goodenia heterophylla Sm.	Variable Goodenia
Goodenia paniculata Sm.	Branched Goodenia
Haloragaceae	
Gonocarpus elatus (A.Cunn. ex Fenzl) Orchard	Raspwort
Gonocarpus humilis Orchard	Raspwort
Gonocarpus teucrioides DC.	Raspwort
Lamiaceae	
Ajuga australis R.Br.	Austral Bugal
Mentha diemenica Spreng.	Slender Mint
Plectranthus parviflorus Willd.	Cockspur Flower
Prostanthera rhombea R.Br.	Sparkling Mint-bush
Lauraceae	
Cassytha pubescens R.Br.	Hairy Devil's Twine
Litsea australis B.Hyland	Brown Bolly Gum
Lobeliaceae	
Pratia purpurascens (R.Br.) F.Wimmer	Whiteroot
Loranthaceae	
Amyema congener (Sieber ex Schult. & Schult.f.) Tiegh. subsp. *congener*	Erect Mistletoe
Amyema pendulum (Sieber ex Spreng.) Tiegh. subsp. *pendulum*	Drooping Mistletoe
Muellerina celastroides (Sieber ex Schult. & Schult.f.) Tiegh.	Mistletoe
Lythraceae	
Lythrum hyssopifolia L.	Hyssop Loosestrife
Malvaceae	
Abutilon oxycarpum (F.Muell.) F.Muell. ex Benth.	Straggly Lantern-bush
Hibiscus heterophyllus Vent.	Native Rosella
Hibiscus trionum L.	Flower-of-an-Hour
**Modiola caroliniana* (L.) G.Don	Red-flowered Mallow
**Sida rhombifolia* L.	Paddy's Lucerne
Meliaceae	
Melia azedarach L.	White Cedar
Synoum glandulosum (Sm.) A.Juss.	Scentless Rosewood

Scientific Name	Common Name
Menispermaceae	
Stephania japonica var. *discolor* (Blume) Forman	Snake Vine
Monimiaceae	
Daphnandra micrantha (Tul.) Benth.	Socketwood
Doryphora sassafras Endl.	Sassafras
Palmeria scandens F.Muell.	Anchor Vine
Wilkiea huegeliana (Tul.) A.DC.	Veiny Wilkiea
Moraceae	
Ficus coronata Spin & Colla	Creek Sandpaper Fig
Ficus rubiginosa Desf. ex Vent.	Port Jackson Fig
Maclura cochinchinensis (Lour.) Corner	Cockspur Thorn
Streblus brunonianus (Endl.) F.Muell.	Whalebone Tree
Myoporaceae	
Eremophila debilis (Andrews) Chinnock	Winter Apple
Myrsinaceae	
Myrsine variabilis R.Br.	Muttonwood
Myrtaceae	
Acmena smithii (Poir.) Merr. & L.M.Perry	Lilly Pilly
Angophora floribunda (Sm.) Sweet	Rough-barked Apple
Angophora subvelutina F.Muell.	Broad-leaved Apple
Backhousia myrtifolia Hook. f. & Harvey	Grey Myrtle
Callistemon salignus (Sm.) Sweet	Willow Bottlebrush
Callistemon sieberi DC.	River Bottlebrush
Corymbia maculata (Hook.) K.D.Hill & L.A.S.Johnson	Spotted Gum
Eucalyptus acmenoides Schauer	White Mahogany
Eucalyptus amplifolia Naudin subsp. *amplifolia*	Cabbage Gum
Eucalyptus canaliculata Maiden	Grey Gum
Eucalyptus carnea R.Baker	Thick-leaved Mahogany
Eucalyptus crebra F.Muell.	Narrow-leaved Ironbark
Eucalyptus eugenioides Sieber ex Spreng.	Thin-leaved Stringybark
Eucalyptus fibrosa F.Muell.	Red Ironbark
Eucalyptus globoidea Blakely	White Stringybark
Eucalyptus largeana Blakely & Beuzev.	Craven Grey Box
Eucalyptus microcorys F.Muell.	Tallowwood
Eucalyptus moluccana Roxb.	Grey Box
Eucalyptus propinqua H.Deane & Maiden	Small-fruited Grey Gum

Scientific Name	Common Name
Eucalyptus resinifera Smith subsp. *resinifera*	Red Mahogany
Eucalyptus saligna Sm.	Sydney Blue Gum
Eucalyptus siderophloia Benth.	Grey Ironbark
Eucalyptus tereticornis Sm.	Forest Red Gum
Leptospermum polyanthemum Joy Thomps.	Tea-tree
Leptospermum polygalifolium Salisb. subsp. *polygalifolium*	Tantoon
Lophostemon confertus (R.Br.) Peter G.Wilson & J.T.Waterh.	Brush Box
Melaleuca linariifolia Sm.	Flax-leaved Paperbark
Melaleuca nodosa (Sol ex Gaertn.) Sm.	Prickly-leaved Paperbark
Melaleuca squarrosa Sm.	Scented Paper-bark
Melaleuca styphelioides Sm.	Prickly-leaved Tea Tree
Rhodamnia rubescens (Benth.) Miq.	Scrub Turpentine
Syncarpia glomulifera (Smith) Niedenzu	Turpentine
Syzygium australe (Wendl. ex Link) B.Hyland	Brush Cherry
Waterhousea floribunda (F.Muell.) B.Hyland	Weeping Lilly Pilly
Oleaceae	
**Ligustrum lucidum* Aiton	Large Leaved Privet
**Ligustrum sinense* Lour.	Small Leaved Privet
Notelaea longifolia Vent.	Large Mock-Olive
Notelaea ovata R.Br.	Mock Olive
Onagraceae	
Epilobium billardierianum Ser.	Variable Willow Herb
**Ludwigia peploides* subsp. *montevidensis* (Spreng.) P.H.Raven	Water Primrose
Oxalidaceae	
Oxalis chnoodes Lourteig	Wood Sorrel
Oxalis exilis A.Cunn.	Wood Sorrel
Oxalis perennans Haw.	Wood Sorrel
Oxalis radicosa A.Rich.	Wood Sorrel
Passifloraceae	
Passiflora aurantia G.Forst. var. *aurantia*	Blunt-leaved Passionfruit
Phytolaccaceae	
**Phytolacca octandra* L.	Inkweed
Pittosporaceae	
Billardiera scandens Sm. var. *scandens*	Apple Dumplings
Bursaria spinosa Cav.	Blackthorn

Scientific Name	Common Name
Pittosporum multiflorum (A.Cunn. ex Loudon) L.Cayzer, Crisp & I.Telford	Orange Thorn
Pittosporum revolutum Aiton	Wild Yellow Pittosporum
Pittosporum undulatum Vent.	Sweet Pittosporum
Plantaginaceae	
Plantago debilis R.Br.	Small Plantain
**Plantago lanceolata* L.	Lamb's Tongues
Polygalaceae	
Polygala japonica Houtt.	Dwarf Milkwort
Polygonaceae	
**Fallopia convolvulus* (L.) A.Love	Black Bindweed
Persicaria decipiens (R.Br.) K.L.Wilson	Slender Knotweed
Persicaria hydropiper (L.) Spach	Water Pepper
Persicaria strigosa (R.Br.) Gross	Slender Knotweed
Rumex brownii Campd.	Swamp Dock
**Rumex crispus* L.	Curled Dock
Primulaceae	
**Anagallis arvensis* L.	Scarlet Pimpernel
Proteaceae	
Persoonia linearis Andrews	Narrow-leaved Geebung
Ranunculaceae	
Clematis aristata R.Br. ex Ker Gawl.	Old Man's Beard
Clematis glycinoides DC.	Headache Vine
Ranunculus lappaceus Sm.	Common Buttercup
Ranunculus plebeius R.Br. ex DC.	Forest Buttercup
**Ranunculus repens* L.	Creeping Buttercup
Ranunculus sessiliflorus R.Br. ex DC. var. *sessiliflorus*	Small-flowered Buttercup
Rhamnaceae	
Alphitonia excelsa (Fenzl) Reisseck ex Benth.	Red Ash
Pomaderris intermedia Sieber	Pomaderris
Rosaceae	
Acaena ovina A.Cunn.	Bidgee Widgee
**Rubus fruticosus* L.	Blackberry
Rubus parvifolius L.	Small-leaved Bramble

Scientific Name	Common Name
Rubus rosifolius Sm.	Rose-leaf Bramble
Rubiaceae	
Galium binifolium Wakef.	Bedstraw
Galium migrans Ehrend. & McGillivray	Bedstraw
Galium propinquum A.Cunn.	Maori Bedstraw
Morinda jasminoides A.Cunn.	Sweet Morinda
Opercularia aspera Gaertn.	Coarse Stinkweed
Opercularia diphylla Gaertn.	Stinkweed
Opercularia hispida Spreng.	Hairy Stinkweed
Pomax umbellata (Gaertn.) Sol. ex A.Rich.	Pomax
Rutaceae	
Boronia parviflora Sm.	Swamp Boronia
Citrus australasica F.Muell.	Finger Lime
**Citrus limonia* Osbeck	Rough Lemon
Melicope elleryana (F.Muell.) T.G.Hartley	Pink-flowered Doughwood
Zieria smithii J.A. Armstr. subsp. *smithii*	Sandfly Zieria
Santalaceae	
Exocarpos cupressiformis Labill.	Cherry Ballart
Sapindaceae	
Alectryon subcinereus (A.Gray) Radlk.	Wild Quince
Dodonaea triquetra J.C.Wendl.	Hop-bush
Scrophulariaceae	
Gratiola peruviana L.	Australian Brooklime
Veronica calycina R.Br.	Hairy Speedwell
Veronica plebeia R.Br.	Trailing Speedwell
Solanaceae	
**Cestrum parqui* L'Her.	Green Poisonberry
Solanum brownii Dunal	Violet Nightshade
**Solanum mauritianum* Scop.	Wild Tobacco Bush
**Solanum nigrum* L.	Black-berry Nightshade
Solanum prinophyllum Dunal	Forest Nightshade
Sterculiaceae	
Brachychiton populneus (Schott & Endl.) R.Br. subsp. *populneus*	Kurrajong
Thymelaeaceae	

Scientific Name	Common Name
Pimelea linifolia Sm. subsp. *linifolia*	Slender Rice Flower
Pimelea microcephala R.Br. subsp. *microcephala*	Shrubby Rice-flower
Ulmaceae	
Trema tomentosa var. *aspera* (Brongn.) Hewson	Native Peach
Urticaceae	
Urtica incisa Poir.	Stinging Nettle
Verbenaceae	
Clerodendrum floribundum R.Br.	Smooth Clerodendrum
**Lantana camara* L.	Lantana
**Verbena bonariensis* L.	Purpletop
Violaceae	
Viola betonicifolia Sm.	Native Violet
Viola caleyana G.Don	Swamp Violet
Viola hederacea Labill.	Ivy-leaved Violet
Viola odorata L.	Sweet Violet
Vitaceae	
Cayratia clematidea (F.Muell.) Domin	Native Grape
Cissus antarctica Vent.	Water Vine
Cissus hypoglauca A.Gray	Giant Water Vine
Clematicissus opaca (F.Muell.) Jackes & Rossetto	Pepper Vine

* Indicates introduced species.

Appendix C: Noxious Weeds Records

Scientific Name	Weed Class	Easting	Northing
Ageratina adenophora	Class 4	403108	6441710
Ageratina adenophora	Class 4	403077	6441441
Ageratina adenophora	Class 4	402848	6441372
Ageratina adenophora	Class 4	403533	6437903
Ageratina adenophora	Class 4	400512	6440788
Ageratina adenophora	Class 4	402895	6441195
Lantana camara	Class 4	400335	6440993
Lantana camara	Class 4	399479	6440933
Lantana camara	Class 4	400352	6440986
Lantana camara	Class 4	400451	6440565
Lantana camara	Class 4	403350	6440739
Lantana camara	Class 4	403029	6440186
Lantana camara	Class 4	403101	6440161
Lantana camara	Class 4	403216	6440688
Lantana camara	Class 4	402894	6440528
Lantana camara	Class 4	403167	6441303
Lantana camara	Class 4	403167	6441303
Lantana camara	Class 4	403238	6441705
Lantana camara	Class 4	403108	6441710
Lantana camara	Class 4	401758	6440606
Lantana camara	Class 4	403085	6441657
Lantana camara	Class 4	403077	6441441
Lantana camara	Class 4	402968	6441408
Lantana camara	Class 4	402848	6441372
Lantana camara	Class 4	402756	6440940
Lantana camara	Class 4	402392	6437528
Lantana camara	Class 4	401651	6440513
Lantana camara	Class 4	402685	6437206
Lantana camara	Class 4	401736	6440649
Lantana camara	Class 4	401739	6440371
Lantana camara	Class 4	401760	6440679
Lantana camara	Class 4	401744	6440374
Lantana camara	Class 4	403366	6436826
Lantana camara	Class 4	403118	6436730
Lantana camara	Class 4	401739	6437711
Lantana camara	Class 4	403624	6439518
Lantana camara	Class 4	403261	6437477
Lantana camara	Class 4	403199	6436634
Lantana camara	Class 4	402899	6436890
Lantana camara	Class 4	402887	6437121
Lantana camara	Class 4	403212	6436855

Scientific Name	Weed Class	Easting	Northing
Lantana camara	Class 4	402529	6437180
Lantana camara	Class 4	402692	6437006
Lantana camara	Class 4	402396	6437540
Lantana camara	Class 4	402110	6437813
Lantana camara	Class 4	402272	6437682
Lantana camara	Class 4	401855	6440834
Lantana camara	Class 4	403462	6438005
Lantana camara	Class 4	400444	6440813
Lantana camara	Class 4	400512	6440788
Lantana camara	Class 4	402895	6441195
Lantana camara	Class 4	402752	6440858
Lantana camara	Class 4	403225	6440697
Lantana camara	Class 4	402075	6437819
Lantana camara	Class 4	402443	6437696
Lantana camara	Class 4	402647	6437408
Lantana camara	Class 4	402958	6437017
Lantana camara	Class 4	402892	6437083
Lantana camara	Class 4	403468	6438898
Lantana camara	Class 4	403581	6440100
Lantana camara	Class 4	403369	6440711
Lantana camara	Class 4	403345	6440613
Lantana camara	Class 4	402580	6440237
Lantana camara	Class 4	402540	6440101
Lantana camara	Class 4	402399	6440273
Lantana camara	Class 4	401778	6440437
Lantana camara	Class 4	401856	6440316
Lantana camara	Class 4	401753	6440333
Rubus fruticosus	Class 4	400695	6441191
Rubus fruticosus	Class 4	403029	6440186
Rubus fruticosus	Class 4	402058	6440094
Rubus fruticosus	Class 4	401112	6440416
Rubus fruticosus	Class 4	401760	6440679
Rubus fruticosus	Class 4	401298	6440482
Rubus fruticosus	Class 4	403809	6439084
Rubus fruticosus	Class 4	402396	6437540
Rubus fruticosus	Class 4	400625	6445442
Rubus fruticosus	Class 4	401855	6440834
Rubus fruticosus	Class 4	402376	6441526
Rubus fruticosus	Class 4	402337	6440536
Rubus fruticosus	Class 4	400430	6440610
Rubus fruticosus	Class 4	400927	6440549
Rubus fruticosus	Class 4	403121	6441019
Rubus fruticosus	Class 4	402075	6437819
Rubus fruticosus	Class 4	401778	6440437

Scientific Name	Weed Class	Easting	Northing
Rubus fruticosus	Class 4	401753	6440333
Cestrum parqui	Class 3	400430	6440610

Appendix D: Potentially Occurring Threatened Flora

Family	Scientific Name	Common Name	Legal Status[1]		Required Survey Timing	Targeted Searches Completed?
			TSC Act	EPBC Act		
Rubiaceae	*Asperula asthenes*	Trailing Woodruff	V	V	All Year	Yes
Orchidaceae	*Corybas dowlingii*	Red Helmet Orchid	E	-	All Year	Yes
Apocynaceae	*Cynanchum elegans*	White-flowered Wax Plant	E	E	All Year	Yes
Orchidaceae	*Diuris pedunculata*	Small Snake Orchid	E	E	September - November	**No**
Myrtaceae	*Eucalyptus glaucina*	Slaty Red Gum	V	V	All Year	Yes
Proteaceae	*Grevillea guthrieana*	Guthrie's Grevillea	E	E	All Year	Yes
Proteaceae	*Grevillea obtusiflora*		E	E	All Year	**No** - National Herbarium Records needed to determine potential habitat
Myrtaceae	*Melaleuca biconvexa*	Biconvex Paperbark	V	V	All Year	Yes
Myrtaceae	*Melaleuca groveana*	Grove's Paperbark	V	-	All Year	**No** - National Herbarium Records needed to determine potential habitat
Apocynaceae	*Parsonsia dorrigoensis*	Milky Silkpod	V	E	All Year	Yes
Rhamnaceae	*Pomaderris queenslandica*	Scant Pomaderris	E	-	All Year	**No** - National Herbarium Records needed to determine potential habitat
Orchidaceae	*Rhizanthella slateri*	Rhizanthella slateri (Rupp) M.A.Clem. & Cribb in the Great Lakes local government area	EP	E	November	**No**
Fabaceae (Caesalpinioideae)	*Senna acclinis*	Rainforest Cassia	E	-	All Year	Yes
Orchidaceae	*Thesium australe*	Austral Toadflax, Toadflax	V	V	All Year	Yes

[1] Threatened flora species status under the New South Wales *Threatened Species Conservation Act, 1995* and Commonwealth *Environment Proection and Biodiversity Conservation Act, 1999* (current as of 30 November 2011).
V = Vulnerable E = Endangered EP = Endangered Population

ATTACHMENT C

FLORASEARCH QUADRAT DATA

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
CLASS FILICOPSIDA											
Adiantaceae											
Adiantum aethiopicum	Common Maidenhair						2				4
Adiantum formosum	Black Stem Maidenhair				5	3					
Adiantum hispidulum	Rough Maidenhair Fern				1	3	2				
Cheilanthes sieberi	Poison Rock Fern	2					2				2
Pellaea falcata	Sickle Fern				1						
Pellaea paradoxa					1	3					
Aspleniaceae											
Asplenium australasicum	Bird's Nest Fern				1	1					
Blechnaceae											
Doodia aspera	Prickly Rasp Fern				6	5					
Doodia caudata	Small Rasp Fern									1	
Davalliaceae											
Arthropteris tenella					1	5					
Dryopteridaceae											
Lastreopsis microsora subsp. *microsora*	Creeping Shield Fern				5	3					
Lastreopsis munita	Naked Shield Fern				1	5					
Lindsaeaceae											
Lindsaea linearis	Screw Fern								3		
Polypodiaceae											
Dictymia brownii	Strap Fern				1						
Microsorum scandens	Fragrant Fern				1	1					
Platycerium bifurcatum	Elkhorn				1						
Pyrrosia confluens	Horse-shoe Felt Fern				1						
Pyrrosia rupestris	Rock Felt Fern									2	
Pteridaceae											
Pteris umbrosa	Jungle Brake					2					

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
CLASS MAGNOLIOPSIDA											
SUBCLASS MAGNOLIIDAE											
Acanthaceae											
Brunoniella australis	Blue Trumpet	4									
Brunoniella pumilio	Dwarf Blue Trumpet								1		
Amaranthaceae											
Alternanthera denticulata	Lesser Joy Weed									1	2
Nyssanthes diffusa	Barbwire Weed									1	
Aphanopetalaceae											
Aphanopetalum resinosum	Gum Vine				1	1					
Apiaceae											
Centella asiatica	Indian Pennywort	3	3	2							2
**Hydrocotyle bonariensis*			5								
Hydrocotyle peduncularis		3	3	5							
Apocynaceae											
**Araujia sericifera*	Moth Vine									3	
**Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush	1	1	1						1	1
Melodinus australis	Southern Melodinus					1					
Parsonsia straminea	Common Silkpod	4	3		1	1					
Parsonsia velutina					1						
Araliaceae											
Cephalaralia cephalobotrys	Climbing Panax					1					
Asteraceae											
**Ageratina adenophora*	Crofton Weed	1	2								
**Ageratina riparia*	Creeping Crofton Weed				1						
**Aster subulatus*	Wild Aster			1							
**Bidens pilosa*	Cobblers Pegs						6	5			
**Bidens subalternans*	Greater Beggar's Ticks						3	4		2	
Calotis cuneifolia	Purple Burr-daisy	1									

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
**Cirsium vulgare*	Spear Thistle	1					2	1		2	1
**Conyza bonariensis*	Flaxleaf Fleabane										1
**Conyza canadensis*	Canadian Fleabane						2	2		1	
**Conyza* sp.	A Fleabane		1								
**Conyza* sp. 2								1			
**Conyza sumatrensis*	Tall Fleabane										2
Cotula australis	Carrot Weed									1	
Eclipta platyglossa		3	3								
Euchiton involucratus	Star Cudweed	1									
**Gamochaeta americana*	Cudweed	2		1							
**Hypochaeris radicata*	Catsear	2	1	3							
**Senecio madagascariensis*	Fireweed	1	1	1			2			1	1
Senecio quadridentatus	Cotton Fireweed						1				
**Sonchus oleraceus*	Common Sowthistle							1			
**Tagetes minuta*	Stinking Roger							1			
**Taraxacum officinale*	Dandelion							1			1
**Xanthium occidentale*	Noogoora Burr						2	2		1	
Bignoniaceae											
Pandorea pandorana	Wonga Wonga Vine	1	1			1	1				
Brassicaceae											
**Lepidium bonariense*											1
**Sisymbrium* sp.											1
Capparaceae											
Capparis arborea	Native Pomegranate				1						
Caryophyllaceae											
**Stellaria media*	Common Chickweed						5	5		4	
Casuarinaceae											
Casuarina cunninghamiana	River Sheoak						7	8		6	

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Celastraceae											
Elaeodendron australe var. *australe*					1						
Denhamia celastroides	Orange Boxwood					1					
Chenopodiaceae											
**Chenopodium album*	Fat Hen						2				
**Chenopodium ambrosioides*	Mexican Tea							1			
Einadia hastata	Berry Saltbush						1	3		3	
Convolvulaceae											
Dichondra repens	Kidney Weed	5	2	2			3	4		3	5
**Ipomoea indica*	Morning Glory					1					
Polymeria calycina				3							
Dilleniaceae											
Hibbertia aspera	Rough Guinea Flower	1							3		
Ericaceae - Styphelioideae											
Monotoca scoparia									4		
Euphorbiaceae											
Alchornea ilicifolia	Native Holly				1						
Baloghia inophylla	Brush Bloodwood					1					
Claoxylon australe	Brittlewood				1						
Mallotus philippensis	Red Kamala					1					
Fabaceae: Faboideae											
Desmodium gunnii	Slender Tick trefoil						3				
Desmodium varians	Slender Tick-trefoil						2				
Dillwynia retorta									2		
Glycine clandestina	Twining Glycine	2					3			1	
Glycine microphylla	Small-leaf glycine			3							
Glycine tabacina				1			1				
Glycine tomentella	Woolly Glycine			1							
**Trifolium repens*	White Clover							4			1

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Fabaceae: Mimosoideae											
Acacia irrorata	Green Wattle										1
Acacia longifolia	Sydney Golden Wattle								1		
Acacia sp.			1								
Acacia ulicifolia	Prickly Moses								3		
Pararchidendron pruinosum var. *pruinosum*	Snow Wood					1					
Flacourtiaceae											
Scolopia braunii	Flintwood				1						
Geraniaceae											
Geranium homeanum			2				3			3	
Geranium solanderi	Native Geranium										
Geranium sp.								1			
Goodeniaceae											
Goodenia paniculata	Branched Goodenia		1	2							
Haloragaceae											
Gonocarpus teucrioides	Raspwort			2							
Lamiaceae											
Plectranthus parviflorus	Cockspur Flower						1				
Lauraceae											
Cassytha glabella	Devil's Twine								3		
Litsea reticulata	Bolly Gum					1					
Lobeliaceae											
Pratia purpurascens	Whiteroot	4	2	2			2	1		2	3
Lythraceae											
Lythrum hyssopifolia	Hyssop Loosestrife		2								
Malvaceae											
**Modiola caroliniana*	Red-flowered Mallow							1		1	3
**Sida rhombifolia*	Paddy's Lucerne	1					3	3		4	3

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Meliaceae											
Dysoxylum rufum	Hairy Rosewood				1	1					
Melia azedarach	White Cedar						1	1			
Monimiaceae											
Daphnandra micrantha					1						
Doryphora sassafras	Sassafras				1						
Moraceae											
Ficus coronata	Sandpaper Fig				1	1					
Maclura cochinchinensis	Cockspur Thorn						1				
Streblus brunonianus	Whalebone Tree				1	1		1			
Trophis scandens subsp *scandens*	Burny Vine					1					
Myrsinaceae											
Embelia australiana						1					
Myrtaceae											
Angophora costata	Smooth-barked Apple								5		
Angophora subvelutina	Broad-leaved Apple	5	5	5			1				5
Backhousia myrtifolia	Grey Myrtle				1	1					
Backhousia sciadophora	Shatterwood				7						
Callistemon salignus	White Bottlebrush									5	7
Eucalyptus amplifolia	Cabbage Gum	5	6	5							
Eucalyptus globoidea	White Stringybark								6		
Eucalyptus tereticornis	Forest Red Gum	5									
Leptospermum polygalifolium subsp. *polygalifolium*	Tantoon								5		
Leptospermum trinervium	Slender Tea-tree								5		
Melaleuca decora	A Honeymyrtle	6		5							
Melaleuca linariifolia	Flax-leaved Paperbark	2	7								
Melaleuca sieberi									5		

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Syzygium australe	Brush Cherry				1	1					
Syzygium smithii	Lilly Pilly									6	
Oleaceae											
**Ligustrum lucidum*	Large Leaved Privet						3			6	
**Ligustrum sinense*	Small Leaved Privet	1	5				2	2			2
Jasminum volubile	Stiff Jasmine										
Notelaea longifolia	Large Mock-olive		1								
Oxalidaceae											
Oxalis exilis											3
Oxalis sp.	An Oxalis	1	1								
Peperomiaceae											
Peperomia blanda var. *floribunda*					1	1					
Phyllanthaceae											
Breynia oblongifolia	Coffee Bush	1		1		1					
Phyllanthus hirtellus	Thyme Spurge								1		
Phytolaccaceae											
**Phytolacca octandra*	Inkweed							2			
Pittosporaceae											
Billardiera scandens var. *scandens*	Hairy Apple Berry								2		
Pittosporum multiflorum	Orange Thorn		1		1	1					
Plantaginaceae											
**Plantago lanceolata*	Lamb's Tongues	1	3	2			2	2		3	3
**Plantago major*	Large Plantain						1				1
Polygonaceae											
Persicaria hydropiper	Waterpiper						5	2			1
Rumex brownii	Swamp Dock						3	3			
**Rumex crispus*	Curled Dock						3			1	
**Rumex* sp.											3

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Proteaceae											
Banksia spinulosa var. *collina*	Hairpin Banksia								5		
Persoonia linearis	Narrow-leaved Geebung								1		
Putranjivaceae											
Drypetes deplanchei	Yellow Tulipwood				1	1					
Quintiniaceae											
Quintinia verdonii	Grey Possumwood				1	1					
Ranunculaceae											
Clematis glycinoides	Headache Vine						1				
Ranunculus inundatus	River Buttercup		3								
Ranunculus lappaceus	Common Buttercup		1								
Rhamnaceae											
Pomaderris queenslandica	A Pomaderris		1								
Rosaceae											
**Rubus fruticosus*		4	1	1							
Rubus parvifolius	Native Raspberry		3				4	1			
Rubiaceae											
Cyclophyllum longipetalum	Coast Canthium				1						
Morinda jasminoides	Sweet Morinda				1	1					
**Richardia stellaris*											1
Rutaceae											
Acronychia oblongifolia	White Aspen				1						
**Citrus x taitensis*	Bush Lemon					1					
Salicaceae											
**Populus nigra*	Lombardy Poplar							1			
Santalaceae											
Exocarpos strictus	Dwarf Cherry		2								

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Sapindaceae											
Guioa semiglauca	Guioa				1	1					
Sapotaceae											
Planchonella australis	Black Apple				1	1					
Scrophulariaceae											
Veronica plebeia	Trailing Speedwell										2
Solanaceae											
**Solanum mauritianum*	Wild Tobacco Bush						3	3		3	
**Solanum nigrum*	Black-berry Nightshade							1		2	1
**Solanum pseudocapsicum*	Madeira Winter									2	
Thymelaeaceae											
Pimelea linifolia subsp.*linifolia*	Slender Rice Flower								1		
Urticaceae											
Urtica urens	Small Nettle							1			
Verbenaceae											
**Lantana camara*	Lantana				1		3				
**Verbena bonariensis*	Purpletop						1	1			1
**Verbena quadrangularis*		1	2	1							
Violaceae											
Melicytus dentatus	Tree Violet						1	1		3	5
Vitaceae											
Cayratia clematidea	Native Grape				1		1	1		1	
Cissus antarctica	Water Vine				1	1					
Cissus hypoglauca	Five-leaf Water Vine				1						
Cissus sterculiifolia	Yaroong				1	1					
SUBCLASS LILIIDAE											
Araceae											
Gymnostachys anceps	Settlers' Twine				1						

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Commelinaceae											
Aneilema biflorum						1					
Commelina cyanea	Native Wandering Jew						3	4		5	3
Cyperaceae											
Carex longebrachiata	A Carex	5	5	2							
Carex sp.								3			
**Cyperus eragrostis*										3	3
Cyperus gracilis	Slender Flat Sedge										
Cyperus haspan										2	
Cyperus polystachyos							1	2			
Cyperus procerus			1								
Cyperus sphaeroideus			3								
Eleocharis cylindrostachys							2				
Eleocharis dietrichiana		3	5	2							
Fimbristylis dichotoma	Common Fringe-sedge	1	4	5							
Gahnia sp.									5		
Ptilothrix deusta	Ptilothrix								5		
Schoenoplectus mucronatus								1			
Dioscoreaceae											
Dioscorea transversa	Native Yam				1	1					
Hypoxidaceae											
Hypoxis sp.			1								
Juncaceae											
**Juncus articulatus*			1								
Juncus usitatus			1	1			2	2			2
Lomandraceae											
Lomandra filiformis subsp. *filiformis*	Wattle Mat-rush	2									
Lomandra longifolia	Spiny-headed Mat-rush						1	3		5	3
Lomandra spicata						1					

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Luzuriagaceae											
Eustrephus latifolius	Wombat Berry				1		1				
Orchidaceae											
Arthrochilus prolixus	An Elbow Orchid			1							
Plectorrhiza tridentata	Tangle Orchid				1	1					
Thelymitra sp.									1		
Philydraceae											
Philydrum lanuginosum	Woolly Waterlily		1								
Phormiaceae											
Dianella longifolia var. *longifolia*			1								
Dianella revoluta var. *revoluta*	Blue Flax-lily	1	1								
Poaceae											
**Andropogon virginicus*	Whisky Grass	2	3	3							
**Anthoxanthum odoratum*	Sweet Vernal Grass	1									
Aristida vagans	Three-awned Speargrass								3		
Austrodanthonia fulva	Wallaby Grass	2									
Austrostipa pubescens									4		
**Axonopus fissifolius*	Narrow-leafed Carpet Grass	5	3	5			1	1			6
Bothriochloa bladhii	Forest Blue Grass	1									
**Bromus catharticus*	Prairie Grass							5			2
Capillipedium spicigerum	Scented-top Grass						2				
**Chloris gayana*	Rhode's Grass							1			
Cymbopogon refractus	Barbed Wire Grass	2									
Cynodon dactylon	Couch	3	3	2			1	3		1	2
Dichelachne micrantha	Shorthair Plumegrass	1	1	1							
Echinopogon caespitosus	Bushy Hedgehog Grass	2	5	2							
Echinopogon ovatus	Forest Hedgehog Grass	1									1

Scientific Name	Common Name	Quadrats									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Entolasia marginata	Bordered panic	3	5	1							
Entolasia stricta	Wiry Panic								6		
Eragrostis brownii	Common Lovegrass	2							1		1
Eragrostis leptostachya	Paddock Lovegrass			2							
Eragrostis parviflora	Weeping Lovegrass			1							
Imperata cylindrica	Blady Grass	2									
**Lolium multiflorum*	Italian Ryegrass							1			
Microlaena stipoides var. *stipoides*	Weeping Grass		1				3	6		6	6
Oplismenus aemulus	Basket Grass	3	4								
Oplismenus imbecillis	Basket Grass						5	5		5	
Oplismenus sp.				2							
Paspalidium distans		1								2	3
**Paspalum dilatatum*	Paspalum	1	4	5			3	2		2	3
**Paspalum urvillei*	Vasey Grass						1	1			
**Pennisetum clandestinum*	Kikuyu Grass						6	5			
Poa sieberiana var. *sieberiana*	Fine-leaved Tussock Grass	1		2							
**Setaria pumila*	Pale Pigeon Grass	5					2	1		3	3
**Setaria sphacelata*	South African Pigeon Grass			1							
Sporobolus creber	Western Rat-tail Grass										1
Sporobolus elongatus	Slender Rat's Tail Grass			1							
**Sporobolus fertilis*	Giant Parramatta Grass						2				
Sporobolus sessilis		1									
**Stenotaphrum secundatum*	Buffalo Grass	1									
Themeda australis	Kangaroo Grass	3		8							
Smilacaceae											
Smilax australis	Lawyer Vine					1					

Scientific Name	Common Name	Quadrats									
		1	2	3	4	5	6	7	8	9	10
Xanthorrhoeaceae											
Xanthorrhoea glauca subsp. *glauca*									4		
	Total Species/quadrat										
No. Native Species	67	41	38	29							
No. Introduced Species	22	17	14	12							
Total No. of Species	89	58	52	41							

*Introduced Species

ATTACHMENT D

CO-ORDINATES FOR RAPID ASSESSMENT SAMPLES

Number	Co-ordinates	
	Northings	Eastings
1	402662	6448109
2	402553	6447699
3	402462	6447233
4	402802	6448160
5	402847	6447870
6	403106	6447217
7	403826	6446436
8	403964	6446464
9	403651	6446765
10	403543	6446934
11	404296	6446180
12	403902	6446234
13	402286	6441009
14	402278	6441294
15	402454	6441627
16	402454	6441627
17	402088	6441919
18	402246	6440895
19	402352	6441042
20	402508	6442084
21	403387	6443527
22	403241	6443223
23	403095	6442848
24	402946	6442538
25	402887	6442421
26	402795	6442237

ATTACHMENT E

FLORA RECORDS WITHIN THE STRATFORD COAL MINE AREA AND SURROUNDS

Total Flora Species - All Surveys of Stratford Mine Site

Scientific Name	Common Name	FloraSearch (2011)[1]	Ecobiological (2011)[2]	EIS (1994)[3]	Dowling (2001)[4]	AMBS (2011)[5]
CLASS FILICOPSIDA						
Adiantaceae						
Adiantum aethiopicum	Common Maidenhair	•	•	•		•
Adiantum atroviride		•				
Adiantum diaphanum	Filmy Maidenhair			•		
Adiantum formosum	Black Stem Maidenhair	•	•			•
Adiantum hispidulum	Rough Maidenhair Fern	•	•			•
Cheilanthes distans	Woolly Cloak-fern			•		
Cheilanthes sieberi	Poison Rock Fern	•	•		•	•
Pellaea falcata	Sickle Fern	•	•			•
Pellaea nana						•
Pellaea paradoxa		•	•			•
Aspleniaceae						
Asplenium australasicum	Bird's Nest Fern	•	•			•
Blechnaceae						
Blechnum cartilagineum	Gristle Fern		•		•	•
Blechnum wattsii	Hard Water Fern					•
Doodia aspera	Prickly Rasp Fern	•	•	•		•
Doodia caudata	Small Rasp Fern	•				
Cyatheaceae						
Cyathea australis	Black Tree Fern	•				
Davalliaceae						
Arthropteris tenella		•				
Davallia solida var. *pyxidata*	Hare's Foot Fern					•
Nephrolepis cordifolia	Fishbone Fern			•		
Dennstaedtiaceae						
Hypolepis grandulifera	Downy Ground Fern		•			
Pteridium esculentum	Common Bracken	•	•	•		•
Dicksoniaceae						
Calochlaena dubia	Rainbow Fern		•			•
Dicksonia antarctica	Soft Tree-fern			•		
Dryopteridaceae						
Lastreopsis acuminata	Glossy Shield Fern			•		
Lastreopsis microsora subsp. *microsora*	Creeping Shield Fern	•				
Lastreopsis munita	Naked Shield Fern	•				
Lindsaeaceae						
Lindsaea linearis	Screw Fern	•	•			•
Lindsaea microphylla			•			
Ophloglossaceae						
Botrychium australe	Parsley Fern					•
Osmundaceae						
Todea barbara	King Fern			•		
Polypodiaceae						
Dictymia brownii	Strap Fern	•				
Microsorum scandens	Fragrant Fern	•	•			
Platycerium bifurcatum	Elkhorn	•	•			•
Pyrrosia confluens	Horse-shoe Felt Fern	•	•			
Pyrrosia rupestris	Rock Felt Fern	•	•			•
Pteridaceae						
Pteris umbrosa	Jungle Brake	•				
Thelypteridaceae						
Christella dentata	Binung	•	•	•		
CLASS CONIFEROPSIDA						
Pinaceae						
Pinus sp.						•
CLASS MAGNOLIOPSIDA						
SUBCLASS MAGNOLIIDAE						
Acanthaceae						
Brunoniella australis	Blue Trumpet	•	•			•
Brunoniella pumilio	Dwarf Blue Trumpet	•				•
Pseuderanthemum variabile	Pastel Flower	•	•			•
Amaranthaceae						
Alternanthera denticulata	Lesser Joy Weed	•	•			•
Nyssanthes diffusa	Barbwire Weed	•				•
Amygdalaceae						
**Prunus armeniaca*	Apricot	•				
**Prunus laurocerasus*	Cherry Laurel					•
**Prunus mahaleb*	Mahaleb Cherry	•				
**Prunus persica*	Peach	•				

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Aphanopetalaceae						
Aphanopetalum resinosum	Gum Vine	•	•			•
Apiaceae						
Centella asiatica	Indian Pennywort	•	•			•
**Cyclospermum leptophyllum*	Slender Celery		•			•
Daucus glochidiatus	Native Carrot		•			•
**Hydrocotyle bonariensis*		•				
Hydrocotyle geraniifolia	Forest Pennywort					•
Hydrocotyle laxiflora	Stinking Pennywort		•			•
Hydrocotyle peduncularis		•	•		•	•
Hydrocotyle tripartita	Pennywort					•
Trachymene incisa subsp. *Incisa*	Native Parsnip					•
Xanthosia pilosa	Hairy Xanthosia					•
Apocynaceae						
Alyxia ruscifolia	Prickly Alyxia					•
**Araujia sericifera*	Moth Vine	•				•
**Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush	•	•			•
Gompholobium pinnatum	Pinnate Wedge Pea		•			
Marsdenia flavescens	Hairy Milk Vine					•
Marsdenia rostrata	Common Milk Vine		•			
Marsdenia suaveolens	Scented Marsdenia		•			•
Melodinus australis	Southern Melodinus	•				
Parsonsia brownii	Mountain Silkpod					•
Parsonsia eucalyptophylla	Gargaloo					•
Parsonsia rotata	Veinless Silkpod					•
Parsonsia straminea	Common Silkpod	•	•	•		•
Parsonsia velutina		•	•			
Araliaceae						
Cephalaralia cephalobotrys	Climbing Panax	•				
Polyscias sambucifolia	Elderberry Panax	•	•		•	•
Asteraceae						
**Ageratina adenophora*	Crofton Weed	•	•		•	•
**Ageratina riparia*	Creeping Crofton Weed	•	•			•
**Ageratum houstonianum*						•
**Aster subulatus*	Wild Aster	•	•			•
**Bidens pilosa*	Cobblers Pegs	•	•			•
**Bidens subalternans*	Greater Beggar's Ticks	•				•
Brachyscome angustifolia var. *heterophylla*			•			
Brachyscome dissectifolia	Daisy					•
Brachyscome microcarpa	Small Fruited Daisy Bush					•
Brachyscome multifida var. *multifida*	Cut-leaf Daisy		•			
Calotis cuneifolia	Purple Burr-daisy	•				•
Calotis dentex			•			
Cassinia quinquefaria			•			
**Cirsium vulgare*	Spear Thistle	•	•			•
**Conyza bonariensis*	Flaxleaf Fleabane	•	•			•
**Conyza canadensis*	Canadian Fleabane	•				
**Conyza sumatrensis*	Tall Fleabane	•				•
Coronidium elatum			•			•
Cotula australis	Carrot Weed	•				•
Craspedia sp.				•		
**Crassocephalum crepidioides*	Thickhead					•
Eclipta platyglossa	Yellow Eclipta	•	•			
Euchiton gymnocephalus			•			•
Euchiton involucratus	Star Cudweed	•	•			•
Euchiton sphaericus		•	•		•	•
**Facelis retusa*			•			
**Gamochaeta americana*	Cudweed	•				•
**Gamochaeta calviceps*	Cudweed		•			
**Gamochaeta spicata*			•			
**Hypochaeris glabra*	Smooth Catsear	•	•			•
**Hypochaeris radicata*	Catsear	•	•		•	•
Lagenophora gracilis	Slender Lagenophora					•
Lagenophora stipitata	Blue-bottle Daisy		•		•	•
**Leontodon taraxacoides* subsp. *taraxacoides*	Lesser Hawkbit					•
**Onopordum acanthium*	Scotch Thistle			•	•	
Ozothamnus diosmifolius	Rice Flower		•	•	•	•
Senecio diaschides	Fireweed					•
Senecio lautus				•		

Scientific Name	Common Name	FloraSearch (2011)[1]	Ecobiological (2011)[2]	EIS (1994)[3]	Dowling (2001)[4]	AMBS (2011)[5]
**Senecio madagascariensis*	Fireweed	•	•		•	•
Senecio pinnatifolius var. *lanceolatus*	Variable Groundsel					•
Senecio quadridentatus	Cotton Fireweed	•				
Senecio tenuiflorus		•				
Sigesbeckia australensis						•
Sigesbeckia orientalis subsp. *orientalis*	Indian Weed	•	•			•
**Silybum marianum*	Variegated Thistle	•				
**Solvia sesselis*	Jo-jo					•
**Sonchus oleraceus*	Common Sowthistle	•	•			•
**Tagetes minuta*	Stinking Roger	•	•			•
**Taraxacum officinale*	Dandelion	•	•	•	•	•
Vernonia cinerea var. *cinerea*			•		•	•
Vittadenia cuneata	Fuzzweed		•			•
**Xanthium occidentale*	Noogoora Burr	•				
Bignoniaceae						
Pandorea pandorana	Wonga Wonga Vine	•	•	•		•
Brassicaceae						
**Capsella bursa-pastoris*	Shepard's Purse		•			•
**Lepidium bonariense*		•				
**Sisymbrium* sp.		•				
Campanulaceae						
Wahlenbergia gracilis	Australian Bluebell		•			•
Wahlenbergia planiflora			•			
Wahlenbergia stricta subsp. *stricta*	Tall Bluebell		•			
Capparaceae						
Capparis arborea	Native Pomegranate	•	•			
Caprifoliaceae						
**Lonicera japonica*	Japanese Honeysuckle	•				
Caryophyllaceae						
**Cerastium glomeratum*	Mouse Ear Chickweed		•			•
**Paronychia brasiliana*	Chilean Whitlow Wort					•
**Petrorhagia nanteuilii*	Proliferous Pink					•
Stellaria flaccida			•			•
**Stellaria media*	Common Chickweed	•				•
Casuarinaceae						
Allocasuarina littoralis	Black She-oak		•		•	
Allocasuarina torulosa	Forest Oak	•	•	•		•
Casuarina cunninghamiana	River Sheoak	•	•	•		•
Celastraceae						
Denhamia celastroides	Orange Boxwood	•				•
Elaeodendron australe var. *australe*		•	•			
Maytenus silvestris	Orange Bark	•	•		•	•
Chenopodiaceae						
**Chenopodium album*	Fat Hen	•				
**Chenopodium ambrosioides*	Mexican Tea	•				
Einadia hastata	Berry Saltbush	•				•
Einadia nutans subsp. *nutans*	Climbing Saltbush					•
Einadia trigonos subsp. *leiocarpa*	Fishweed		•			
Clusiaceae						
Hypericum gramineum	Small St John's Wort	•	•		•	•
Hypericum japonicum	St John's Wort					•
Convolvulaceae						•
Calystegia marginata	Calystegia					•
Dichondra repens	Kidney Weed	•	•		•	
**Ipomoea indica*	Morning Glory	•				
Polymeria calycina		•	•			•
Cunoniaceae						
Caldcluvia paniculosa	Soft Corkwood		•			
Schizomeria ovata	Crabapple		•			
Dilleniaceae						
Hibbertia aspera	Rough Guinea Flower	•	•	•	•	
Hibbertia dentata	Trailing Guinea Flower		•			•
Hibbertia diffusa			•			•
Hibbertia linearis			•			
Hibbertia obtusifolia	Hoary Guinea Flower		•			•
Hibbertia pedunculata			•			
Hibbertia scandens	Climbing Guinea Flower	•	•			•
Droseraceae						
Drosera auriculata	Sundew		•			•
Drosera peltata					•	
Ebenaceae						

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Diospyros australis	Black Plum		•			•
Elaeocarpaceae						
Elaeocarpus obovatus	Blueberry Ash	•	•			
Elaeocarpus reticulatus	Blueberry Ash		•			
Tetratheca thymifolia			•			
Ericaceae - Styphelioideae						
Astroloma pinifolium	Pine Heath			•		
Leucopogon fraseri	Fraser's Beard Heath					•
Leucopogon juniperinus	Prickly Beard-heath	•	•	•	•	•
Lissanthe strigosa subsp. *strigosa*	Peach Heath					•
Monotoca scoparia		•	•			
Trochocarpa laurina	Tree Heath					•
Euphorbiaceae						
Alchornea ilicifolia	Native Holly	•				•
Baloghia inophylla	Brush Bloodwood	•	•	•		
Claoxylon australe	Brittlewood	•	•			
Croton verreauxii	Green Native Cascarilla	•				
Mallotus philippensis	Red Kamala	•		•		
Eupomatiaceae						
Eupomatia laurina	Bolwarra		•			•
Fabaceae - Caesalpinioideae						
Senna odorata					•	
Fabaceae: Faboideae						
Aotus ericoides				•		
Daviesia ulicifolia	Gorse Bitter Pea	•	•		•	•
Desmodium brachypodum	Large Tick-trefoil		•			•
Desmodium gunnii	Slender Tick-trefoil	•	•			•
Desmodium rhytidophyllum		•	•		•	•
Desmodium varians	Slender Tick-trefoil	•	•			•
Dillwynia retorta		•	•		•	
Glycine clandestina	Twining Glycine	•	•	•	•	•
Glycine microphylla	Small-leaf glycine	•	•		•	•
Glycine tabacina		•	•	•		•
Glycine tomentella	Woolly Glycine	•				
Hardenbergia violacea	Purple Coral Pea	•	•	•	•	•
Hovea heterophylla	Hovea					•
Indigofera australis	Australian Indigo					•
Jacksonia scoparia	Dogwood		•		•	•
Kennedia rubicunda	Dusky Coral Pea		•	•		•
Lespedeza juncea subsp. *sericea*	Lespedeza					•
Lotus cruentus	Red-flowered Lotus					•
**Lotus uliginosus*	Birds-foot Trefoil					•
**Medicago polymorpha*	Burr Medic					•
**Medicago sativa*	Lucerne					•
**Neonotonia wightii*	Perennial Soybean			•		
Platylobium formosum subsp. *parviflorum*			•			•
Podolobium ilicifolium	Prickly Shaggy Pea	•	•			•
Podolobium scandens	Netted Shaggy Pea				•	
Pultenaea euchila	Orange Pultenaea		•			
Pultenaea retusa	Notched Bush-pea		•			•
Pultenaea tuberculata				•		
Pultenaea villosa	Hairy Bush-pea		•		•	•
**Trifolium cernuum*	Drooping-flowered Clover					•
**Trifolium dubium*	Yellow Suckling Clover		•			
**Trifolium fragiferum*	Strawberry Clover		•			
**Trifolium repens*	White Clover	•	•		•	•
Viminaria juncea	Golden Spray		•			
Fabaceae: Mimosoideae						
Acacia binervia	Coast Myall					•
Acacia brownii	Heath Wattle		•			
Acacia decurrens	Black Wattle					•
Acacia falcata			•		•	•
Accia falciformis	Broad-leaved Hickory					•
Acacia floribunda	White Sally		•			•
Acacia implexa	Hickory Wattle		•			•
Acacia irrorata subsp. *irrorata*	Green Wattle	•	•	•	•	•
Acacia leiocalyx subsp. *leiocalyx*	Curracabah					•
Acacia linifolia	White Wattle		•			
Acacia longifolia subsp. *longifolia*	Sydney Golden Wattle	•	•		•	•
Acacia longissima	Long-leaf Wattle	•	•			•
Acacia maidenii	Maidens Wattle		•	•	•	•

Scientific Name	Common Name	FloraSearch (2011)[1]	Ecobiological (2011)[2]	EIS (1994)[3]	Dowling (2001)[4]	AMBS (2011)[5]
Acacia melanoxylon	Blackwood		•			
Acacia myrtifolia	Red Stemmed Wattle	•	•			
Acacia ulicifolia	Prickly Moses	•	•		•	•
Pararchidendron pruinosum var. *pruinosum*	Snow Wood	•				
Flacourtiaceae						
Scolopia braunii	Flintwood	•	•			
Gentianaceae						
**Centaurium erythraea*	Common Centaury	•	•			•
Geraniaceae						
Geranium homeanum		•	•			•
Geranium potentilloides			•			•
Geranium solanderi var. *solanderi*	Native Geranium		•			•
Goodeniaceae						
Coopernookia barbata	Coopernookia					•
Dampiera stricta			•			
Goodenia bellidifolia subsp. *bellidifolia*	Goodenia					•
Goodenia heterophylla subsp. *heterophylla*			•		•	•
Goodenia paniculata	Branched Goodenia	•	•			•
Haloragaceae						
Gonocarpus elatus	Raspwort					•
Gonocarpus humilis	Raspwort					•
Gonocar[pus oreophilus			•			
Gonocarpus tetragynus	Raspwort	•	•			
Gonocarpus teucrioides	Raspwort	•	•			•
Lamiaceae						
Ajuga australis	Austral Bugle	•				•
Clerodendrum floribundum						•
Clerodendrum tomentosum	Hairy Clerodendrum		•			
Mentha diemenica	Pennyroyal Mint					•
Mentha satureioides	Creeping Mint		•			
Plectranthus argentatus	Silver Plectranthus		•			
Plectranthus graveolens			•			
Plectranthus parviflorus	Cockspur Flower	•	•			•
Prostanthera incana	Velvet Mint Bush		•			
Prostanthera rhombea	Sparkling Mint-bush					•
Prostanthera violacea	Violet Mint Bush			•		
**Salvia verbenaca*	Verevain			•		
**Stachys arvensis*	Stagger Weed		•			
Lauraceae						
Beilschmiedia elliptica	Grey Walnut			•		
Cassytha glabella	Devil's Twine	•	•		•	
Cassytha pubescens	Hairy Devils Twine					•
**Cinnamomum camphora*	Camphor Laurel	•				
Cryptocarya glaucescens	Jackwood		•			
Cryptocarya microneura	Murrogun		•	•		
Litsea reticulata	Bolly Gum	•	•			•
Neolitsea australiensis	Green Bolly Gum		•			
Neolitsea dealbata	White Bolly Gum		•			
Lobeliaceae						
Pratia purpurascens	Whiteroot	•	•		•	•
Loganiaceae						
Logania albiflora			•			
Loranthaceae						
Amyema congener subsp. *congener*	Erect Mistletoe					•
Amyema miquelii				•		
Amyema pendulum subsp. *pendulum*	Drooping Mistletoe	•				•
Muellerina celastroides	Mistletoe					•
Lythraceae						
Lythrum hyssopifolia	Hyssop Loosestrife	•				•
Malaceae						
**Malus pumila*	Apple	•				
Malvaceae						
Abutilon oxycarpum	Straggly Lantern-bush			•		•
Hibiscus heterophyllus	Native Rosella		•	•		•
Hibiscus trionum	Flower-of-an-hour					•
**Modiola caroliniana*	Red-flowered Mallow	•				•
**Sida rhombifolia*	Paddy's Lucerne	•	•		•	•
Meliaceae						
Dysoxylum fraserianum	Rosewood	•	•	•		

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Melia azedarach	White Cedar	•	•			•
Synoum glandulosum	Scentless Rosewood		•			•
Toona ciliata	Red Cedar		•			
Menispermaceae						
Sarcopetalum harveyanum	Pearl Vine		•	•		
Stephania japonica var. *discolor*	Snake Vine	•	•			•
Monimiaceae						
Daphnandra apatela	Common Socketwood	•				•
Doryphora sassafras	Sassafras		•	•		•
Hedycarya angustifolia	Native Mulberry		•			
Palmeria scandens	Ànchor Vine					•
Wilkiea huegeliana	Veiny Wilkiea		•			•
Moraceae						
Ficus coronata	Sandpaper Fig	•	•	•		•
Ficus macrophylla	Moreton Bay Fig		•			
Ficus rubiginosa	Port Jackson Fig		•	•		•
Maclura cochinchinensis	Cockspur Thorn	•	•			•
Streblus brunonianus	Whalebone Tree	•	•	•		•
Trophis scandens subsp. *scandens*	Burny Vine	•	•			
Myoporaceae						
Eremophila debilis	Winter Apple		•			•
Myrsinaceae						
**Anagallis arvensis*	Scarlet Pimpernel	•	•	•		•
Embelia australiana		•				
Myrsine howittiana	Brush Muttonwood		•			
Myrsine variabilis	Muttonwood		•	•		•
Myrtaceae						
Acmena smithii	Lilly Pilly		•			•
Angophora costata	Smooth-barked Apple	•	•			
Angophora floribunda	Rough-barked Apple			•	•	•
Angophora subvelutina	Broad-leaved Apple	•	•		•	•
Backhousia myrtifolia	Grey Myrtle	•	•			•
Backhousia sciadophora	Shatterwood	•	•			
Callistemon linearis	Narrow-leaved Bottlebrush		•		•	
Callistemon rigidus	Stiff Bottlebrush		•			
Callistemon salignus	White Bottlebrush	•	•			•
Callistemon sieberi	River Bottlebrush					•
Choricarpia leptopetala	Brown Myrtle			•		
Corymbia maculata	Spotted Gum		•	•		•
Eucalyptus acmenoides	White Mahogany	•	•	•	•	•
Eucalyptus agglomerata	Blue-leaved Stringybark		•			
Eucalyptus amplifolia subsp. *amplifolia*	Cabbage Gum	•	•	•	•	•
Eucalyptus canaliculata	Large-fruited Grey Gum		•			•
Eucalyptus carnea	Thick-leaved Mahogany		•			•
Eucalyptus crebra	Narrow-leaved Ironbark		•	•	•	•
Eucalyptus eugenioides	Thin-leaved Stringybark			•	•	•
Eucalyptus fibrosa	Red Ironbark		•			•
Eucalyptus globoidea	White Stringybark	•	•	•	•	•
Eucalyptus largeana	Craven Grey Box	•	•			•
Eucalyptus microcorys	Tallow Wood		•	•		•
Eucalyptus molucanna	Grey Box		•	•	•	•
Eucalyptus propinqua	Small-fruited Grey Gum		•	•		•
Eucalyptus punctata	Grey Gum		•	•		
Eucalyptus resinifera subsp. *resinifera*	Red Mahogany	•	•		•	•
Eucalyptus rudderi	Rudder's Box	•				
Eucalyptus saligna	Sydney Bluegum	•	•			•
Eucalyptus siderophloia	Grey Ironbark	•	•	•		•
Eucalyptus tereticornis	Forest Red Gum	•	•	•		•
Kunzea sp. 'Middle Brother Mountain'	Tick Bush	•				
Leptospermum polyanthum	Tea-tree					•
Leptospermum polygalifolium subsp. *cismontanum*	Tantoon	•	•		•	•
Leptospermum trinervium	Slender Tea-tree	•	•	•		
Lophostemon confertus	Brush Box		•	•		•
Melaleuca decora	A Honeymyrtle	•	•	•	•	
Melaleuca linariifolia	Flax-leaved Paperbark	•	•			•
Melaleuca nodosa	Prickly-leaved Paperbark		•	•	•	•
Melaleuca sieberi		•	•	•	•	
Melaleuca squarrosa						•
Melaleuca styphelioides	Prickly-leaved Tea Tree	•	•			•
Melaleuca thymifolia	Thyme Honey-myrtle		•		•	

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Rhodamnia rubescens	Scrub Turpentine		•	•		•
Syncarpia glomulifera	Turpentine	•	•	•		•
Syzygium australe	Brush Cherry	•	•	•		•
Syzygium smithii	Lilly Pilly	•				
Tristaniopsis laurina	Water Gum			•		
Waterhousea floribunda	Weeping Lilly Pilly					•
Oleaceae						
**Ligustrum lucidum*	Large Leaved Privet	•				•
**Ligustrum sinense*	Small Leaved Privet	•	•		•	•
Jasminum volubile	Stiff Jasmine		•			
Notelaea longifolia	Large Mock-olive	•	•			•
Notelaea venosa	Veined Mock Olive	•	•			•
Onagraceae						
Epilobium billardierianum						•
Ludwigia peploides subsp. *montevidensis*	Water Primrose		•			•
Oxalidaceae						
Oxalis chnoodes						•
Oxalis exilis		•	•			•
Oxalis perennans	Creeping Oxalis		•			•
Oxalis radicosa						•
Passifloraceae						
Passiflora aurantia var. *aurantia*	Blunt Leaved Passionflower					•
Passiflora cinnabarina	Red Passionflower		•			
Peperomiaceae						
Peperomia blanda var. *floribunda*		•				
Phyllanthaceae						
Breynia oblongifolia	Coffee Bush	•	•	•		•
Glochidion ferdinandi var. *ferdinandi*	Cheese Tree	•	•			•
Phyllanthus gunnii			•			•
Phyllanthus hirtellus		•	•		•	•
Poranthera microphylla			•			•
Phytolaccaceae						
**Phytolacca octandra*	Inkweed	•				•
Pittosporaceae						
Billardiera scandens var. *scandens*	Hairy Apple Berry	•	•		•	•
Bursaria spinosa	Boxthorn	•	•	•	•	•
Hymenosporum flavum	Native Frangipani		•			
Pittosporum multiflorum	Orange Thorn	•	•			•
Pittosporum revolutum	Hairy Pittosporum		•		•	•
Pittosporum undulatum	Sweet Pittosporum		•			•
Plantaginaceae						
Plantago debilis	Small Plantain					•
**Plantago lanceolata*	Lamb's Tongues	•	•	•	•	•
**Plantago major*	Large Plantain	•				
Polygalaceae						
Polygala japonica	Dwarf Milkwort					•
Polygonaceae						
**Fallopia convolvulus*	Black Bindweed					•
Muehlenbeckia gracillima	Slender Lignum		•			
Persicaria decipiens	Slender Knot-weed	•	•			•
Persicaria hydropiper	Waterpiper	•	•			•
Persicaria lapathifolia			•			
Persicaria praetermissa			•			
Persicaria strigosa	Spotted Knotweed					•
**Polygonum aviculare*	Wireweed	•				
Rumex brownii	Swamp Dock	•	•			•
**Rumex conglomeratus*	Clustered Dock	•	•			
**Rumex crispus*	Curled Dock	•	•	•		•
Proteaceae						
Banksia spinulosa var. *collina*	Hairpin Banksia	•	•		•	
Grevillea robusta	Silky Oak	•				
Lomatia silaifolia	Crinkle Bush		•			
Persoonia linearis	Narrow-leaved Geebung	•	•		•	•
Stenocarpus salignus	Beef Wood		•			
Xylomelum pyriforme	Woody Pear		•			
Putranjivaceae						
Drypetes deplanchei	Yellow Tulipwood	•				
Quintiniaceae						
Quintinia verdonii	Grey Possumwood	•				
Ranunculaceae						
Clematis aristata	Old Man's Beard		•			•

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Clematis glycinoides	Headache Vine	•	•	•	•	•
Ranunculus inundatus	River Buttercup	•	•			
Ranunculus lappaceus	Common Buttercup	•	•			•
Ranunculus plebeius	Water Buttercup		•			•
**Ranunculus repens*	Creeping Buttercup					•
Ranunculus sessiliflorus var. *sessiliflorus*	Small Flowered Buttercup					•
Rhamnaceae						
Alphitonia excelsa	Red Ash	•	•	•		•
Pomaderris ferruginea	Rusty Pomaderris	•				
Pomaderris intermedia	Pomaderris					•
Pomaderris lanigera	Woolly Pomaderris		•			
Rosaceae						
Acaena ovina	Bidgee Widgee					•
**Rubus fruticosus*		•	•	•		•
Rubus moluccanus var. *trilobus*	Molucca Bramble		•			
Rubus parvifolius	Native Raspberry	•	•			•
Rubus rosifolius	Forest Bramble		•			•
Rubiaceae						
Cyclophyllum longipetalum	Coast Canthium	•				
Galium binifolium	Bedstraw		•			•
Galium leptogonium		•				
Galium migrans						•
Galium propinquum	Maori Bedstraw		•			•
Morinda jasminoides	Sweet Morinda	•	•			•
Opercularia aspera	Coarse Stinkweed					•
Opercularia diphylla			•			•
Opercularia hispida	Hairy Stinkweed					•
Pomax umbellata	Pomax		•			•
**Richardia humistrata*			•			
**Richardia stellaris*		•				
Rutaceae						
Acronychia oblongifolia	White Aspen	•	•	•		
Boronia polygalifolia	Dwarf Boronia		•			•
Citrus australasica	Finger Lime					•
**Citrus limonia*	Rough Lemon					•
**Citrus x taitensis*	Bush Lemon	•	•			
Correa reflexa	Common Correa	•	•			
Geijera salicifolia var. *latifolia*			•			
Melicope micrococca	Hairy-leaved Doughwood		•	•		•
Sarcomelicope simplicifolia	Big Yellow Wood		•			
Zieria smithii subsp.*smithii*	Sandfly Zieria		•	•		•
Salicaceae						
**Populus nigra*	Lombardy Poplar	•				
**Salix babylonica*	Weeping Willow	•				
**Salix fragilis*	Crack Willow	•				
**Salix viminalis*	Basket Willow	•				
Santalaceae						
Exocarpos cupressiformis	Native Cherry	•	•	•	•	•
Exocarpos strictus	Dwarf Cherry	•	•			
Sapindaceae						
Alectryon subcinereus	Native Quince		•			•
Diploglottis cunninghamii	Native Tamarind		•	•		
Dodonaea triquetra	Large-leaf Hop-bush	•	•			•
Dodonaea viscosa subsp. *angustifolia*	Sticky Hop-bush		•	•		
Elattostachys nervosa	Beetroot Tree		•			
Guioa semiglauca	Guioa	•	•	•		
Rhysotoechia bifoliolata subsp. *bifoliolata*	Two-leaf Tuckeroo		•			
Sapotaceae						
Planchonella australis	Black Apple	•				
Scrophulariaceae						
Gratiola peruviana	Australian Brooklime					•
Veronica calycina	Hairy Speedwell					•
Veronica plebeia	Trailing Speedwell	•	•			•
Solanaceae						
**Cestrum parqui*	Green Poisonberry					•
**Datura stramonium*	Common Thornapple			•		
Duboisia myoporoides	Corkwood	•	•			
Solanum brownii	Violet Nightshade		•			•
**Solanum mauritianum*	Wild Tobacco Bush	•	•		•	•
**Solanum nigrum*	Black-berry Nightshade	•	•	•	•	•
Solanum prinophyllum	Forest Nightshade		•			•

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**Solanum pseudocapsicum*	Madeira Winter	•				
Solanum stelligerum	Devil's Needles		•			
Stackhousiaceae						
Stackhousia viminea	Slender Stackhousia		•			
Sterculiaceae						
Brachychiton acerifolius	Flame Tree		•			
Brachychiton populneus subsp. *populneus*	Kurrajong	•	•			•
Commersonia fraseri	Brush Kurrajong		•			
Heritiera actinophylla	Black Booyong		•			
Thymelaeaceae						
Pimelea linifolia subsp. *linifolia*	Slender Rice Flower	•	•	•	•	•
Ulmaceae						
Aphananthe philippinensis	Rough-leaved Elm		•			
Trema tomentosa var. *aspera*	Peach-leaf Poison Bush	•	•			•
Urticaceae						
Dendrocnide excelsa	Giant Stinging Tree		•	•		
Perietaria debilis	Native Pellitory			•		
Urtica incisa	Stinging Nettle					•
Urtica urens	Small Nettle	•	•	•		
Verbenaceae						
**Lantana camara*	Lantana	•	•	•	•	•
**Verbena bonariensis*	Purpletop	•	•		•	•
**Verbena caracasana*		•				
**Verbena hispida*	Rough Verbena			•		
**Verbena quadrangularis*		•				
**Verbena rigida*	Purpletop	•	•		•	
**Verbena supina*	Trailing Verbena	•				
Violaceae						
Hybanthus monopetalus	Slender-violet Bush		•			
Melicytus dentatus	Tree Violet	•				
Viola betonicifolia	Native Violet		•		•	•
Viola caleyana	Ivy-leaf Violet					•
Viola hederacea	Ivy-leaved Violet		•		•	•
**Viola odorata*	Sweet Violet	•				•
Vitaceae						
Cayratia clematidea	Native Grape	•	•			•
Cissus antarctica	Water Vine	•	•			•
Cissus hypoglauca	Five-leaf Water Vine	•	•			•
Cissus sterculiifolia	Yaroong	•				
Clematicissus opaca	Pepper Vine					•
Tetrastigma nitens			•			
SUBCLASS LILIIDAE						
Anthericaceae						
Arthropodium milleflorum	Pale Vanilla-lily		•			•
Caesia parviflora var. *parviflora*	Pale Grass-lily		•			
Laxmannia gracilis	Slender Wire Lily		•			•
Tricoryne elatior	Yellow Autumn-Lily	•	•			•
Araceae						
Gymnostachys anceps	Settler's Twine	•	•			•
Colchicaceae						
Wurmbea dioica	Early Nancy			•		
Commelinaceae						
Aneilema biflorum		•				
Commelina cyanea	Native Wandering Jew	•	•			•
Murdannia graminea			•			•
**Tradescantia fluminensis*	Wandering Jew		•			•
Cyperaceae						
Baumea articulata	Jointed Twig-rush		•			
Carex appressa	Tall Sedge		•			•
Carex breviculmis			•			•
Carex gaudichaudiana	Tufted Sedge		•			
Carex inversa			•			•
Carex longebrachiata	A Sedge	•	•	•		•
**Cyperus aggregatus*						•
**Cyperus brevifolius*			•			
**Cyperus congestus*			•			
Cyperus difformis			•			•
Cyperus enervis			•			
**Cyperus eragrostis*		•	•	•		
Cyperus gracilis	Slender Flat Sedge		•			•

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Cyperus gunnii subsp. *gunnii*						•
Cyperus gymnocaulos				•		
Cyperus haspan		•				
Cyperus polystachyos		•	•			•
Cyperus procerus		•				
Cyperus rotundus	Nutgrass		•			
Cyperus sanguinolentus		•				
**Cyperus sesquiflorus*		•	•			•
Cyperus sphaeroideus		•	•			
Cyperus trinervis						•
Eleocharis cylindrostachys		•				
Eleocharis dietrichiana		•	•	•		
Eleocharis sphacelata			•			
Fimbristylis dichotoma	Common Fringe-sedge	•	•			•
Gahnia aspera	Swamp Sword Rush		•			
Gahnia clarkei	Tall Saw-sedge		•			•
Gahnia radula		•	•	•		•
Gahnia sieberiana	Red Fruited Saw Sedge		•		•	
Isolepis sp.		•		•		
Lepidosperma concavum			•			
Lepisosperma laterale		•	•			•
Ptilothrix deusta	Ptilothrix	•	•			
Schoenoplectus mucronatus		•	•			•
Schoenoplectus validus			•			
Schoenus apogon	Common Bog-rush		•			•
Dioscoreaceae						
Dioscorea transversa	Native Yam	•	•			•
Hydrocharitaceae						
Ottelia ovalifolia subsp. *ovalifolia*	Swamp Lily		•	•		
Hypoxidaceae						
Hypoxis glabella	Tiny Star			•		
Hypoxis hygrometrica	Golden Weather Grass		•		•	
Iridaceae						
**Moraea flaccida*	One-leaved Cape Tulip					•
Patersonia glabrata	Purple Flag		•			
Patersonia sericea	Silky Purple Flower		•			
Juncaceae						
**Juncus articulatus*		•				•
**Juncus cognatus*		•	•			•
Juncus continuus			•			•
Juncus prismatocarpus			•			•
Juncus subsecundus				•		
Juncus usitatus	Common Rush	•	•		•	•
Luzula flaccida	Grass Rush					•
Juncaginaceae						
Triglochin procera	Water Ribbons			•		
Liliaceae						
**Lilium formosanum*	Formosan Lily		•			
Lomandraceae						
Lomandra confertifolia			•			•
Lomandra cylindrica			•			
Lomandra filiformis subsp. *coriacea*	Wattle Mat-rush		•			
Lomandra filiformis subsp. *filiformis*	Wattle Mat-rush	•	•			•
Lomandra glauca	Pale Mat-rush		•			
Lomandra hystrix						•
Lomandra longifolia	Spiny-headed Mat-rush	•	•	•	•	•
Lomandra multiflora subsp. *multiflora*	Many-flowered Mat-rush		•	•		•
Lomandra spicata		•				
Luzuriagaceae						
Eustrephus latifolius	Wombat Berry	•	•	•		•
Geitonoplesium cymosum	Scrambling Lily	•	•	•		•
Orchidaceae						
Acianthus fornicatus	Pixie Caps		•			•
Arthrochilus prolixus	An Elbow Orchid	•			•	
Bulbophyllum shepherdii	Wheat-leaved Orchid					•
Caladenia catenata	White Fingers					•
Caladenia gracilis	Musky Caladenia					•
Chiloglottis diphylla	Bird Orchid		•		•	
Cymbidium suave	Snake Flower		•		•	•
Dendrobium gracilicaule	Bush Orchid		•			
Dendrobium linguiforme	Tongue Orchid	•				

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Dendrobium schoeninum	Pencil Orchid		•			
Dipodium variegatum			•			
Eriochilus cucullatus	Parson's Band					•
Papillilabium beckleri	Tangle Orchid					•
Plectorrhiza tridentata	Tangle Orchid	•				•
Pterostylis curta	Blunt Greenhood		•			
Pterostylis grandiflora	Cobra Greenhood		•			•
Pterostylis nutans	Nodding Greenhood		•		•	•
Sarcochilus falcatus	Orange Blossom Orchid					•
Sarcochilus hillii			•			•
Spiranthes australis	Ladies' Tresses		•			
Thelymitra sp.		•				
Philydraceae						
Philydrum lanuginosum	Woolly Waterlily	•	•			
Phormiaceae						
Dianella caerulea var. *caerulea*			•			•
Dianella caerulea var. *cinerascens*		•				
Dianella caerulea var. *producta*	Blue Flax-lily		•			•
Dianella longifolia var. *longifolia*		•	•	•		•
Dianella revoluta var. *revoluta*	Blue Flax-lily	•	•			•
Dianella tasmanica	Tasman Flax Lily		•			•
Stypandra glauca	Nodding Blue Lily		•			
Poaceae						
Agrostis sp.		•				
**Andropogon virginicus*	Whisky Grass	•	•		•	•
**Anthoxanthum odoratum*	Sweet Vernal Grass	•				•
Aristida personata	Purple Wiregrass					•
Aristida ramosa var. *ramosa*	Purple Wiregrass		•			
Aristida vagans	Three-awned Speargrass	•	•			•
Austrodanthonia fulva	Wallaby Grass	•	•			•
Austrodanthonia monticola	Wallaby Grass					•
Austrodanthonia racemosa var. *racemosa*		•	•			
Austrodanthonia tenuior		•	•			
Austrostipa pubescens		•				
Austrostipa ramosissima	Stout Bamboo Grass					•
Austrostipa setacea	Corkscrew Grass		•			
**Axonopus fissifolius*	Narrow-leafed Carpet Grass	•	•		•	•
Bothriochloa bladhii	Forest Blue Grass	•				
Bothriochloa decipiens	Pitted Blue Grass					•
Bothriochloa macra	Red Grass		•			•
**Briza minor*	Shivery Grass	•				•
**Bromus catharticus*	Prairie Grass	•				
Capillipedium parviflorum	Scented-top Grass		•			
Capillipedium spicigerum	Scented-top Grass	•				•
Chloris divaricata var. *divaricata*						•
**Chloris gayana*	Rhode's Grass	•	•			•
Chloris truncata	Windmill Grass	•		•		
**Chloris virgata*	Feathertop Rhode's Grass		•			
Cymbopogon refractus	Barbed Wire Grass	•	•			•
Cynodon dactylon	Couch	•	•	•	•	•
Dichelachne crinita	Longhair Plumegrass		•			
Dichelachne micrantha	Shorthair Plumegrass	•	•		•	•
Digitaria breviglumis	Finger Panic Grass					•
**Digitaria ciliaris*	Summer Grass	•	•			
Digitaria didactyla	Queensland Blue Couch					•
Digitaria parviflora	Small Flowered Finger Grass	•	•			•
Digitaria ramularis			•			•
**Digitaria sanguinalis*	Summer Grass	•		•		•
**Echinochloa crus-galli*	Barnyard Grass	•				
Echinopogon caespitosus var. *caespitosus*	Tufted Hedgehog Grass	•	•	•	•	•
Echinopogon mckiei						•
Echinopogon ovatus	Forest Hedgehog Grass	•	•			•
**Ehrharta erecta*	Panic Veldtgrass	•				•
Entolasia marginata	Bordered panic	•	•		•	•
Entolasia stricta	Wiry Panic	•	•	•	•	•
Eragrostis brownii	Common Lovegrass	•	•			•
**Eragrostis cilianensis*	Stinkgrass		•			
**Eragrostis curvula*	African Lovegrass	•	•			
Eragrostis leptostachya	Paddock Lovegrass	•	•		•	•
Eragrostis parviflora	Weeping Lovegrass	•				

Scientific Name	Common Name	FloraSearch (2011)[1]	Ecobiological (2011)[2]	EIS (1994)[3]	Dowling (2001)[4]	AMBS (2011)[5]
Hemarthria uncinata var. *uncinata*	Matgrass		•			
Imperata cylindrica var. *major*	Blady Grass	•	•		•	•
Isachne globosa	Swamp Millet		•			
Joycea pallida	Silvertop Wallaby Grass		•			
**Lolium multiflorum*	Italian Ryegrass	•				
**Lolium perenne*	Perennial Ryegrass					•
**Lolium temulentum*	Darnel	•				
Microlaena stipoides var. *stipoides*	Weeping Grass	•	•		•	•
Ottochloa gracillima		•				
Oplismenus aemulus	Basket Grass	•	•			•
Oplismenus imbecillis	Basket Grass	•	•			•
Panicum effusum	Hairy Panic		•	•		•
Panicum simile	Two-coloured Panic	•	•		•	•
Paspalidium distans		•	•		•	•
Paspalidium gracile	Slender Panic					•
**Paspalum dilatatum*	Paspalum	•	•	•	•	•
Paspalum distchum	Water Couch	•	•	•		
**Paspalum urvillei*	Vasey Grass	•			•	
**Pennisetum clandestinum*	Kikuyu Grass	•	•		•	•
Phragmites australis	Common Reed			•		
Poa affinis			•			
**Poa annua*	Winter Grass					•
Poa labillardierei var. *labillardierei*	Tussock Grass		•			•
Poa sieberiana var. *sieberiana*		•				•
**Setaria parviflora*			•			•
**Setaria pumila*	Pale Pigeon Grass	•	•	•		•
**Setaria sphacelata*	South African Pigeon Grass	•	•			•
**Sporobolus africanus*	Parramatta Grass		•			•
Sporobolus creber	Western Rat-tail Grass	•	•		•	•
Sporobolus elongatus	Slender Rat's Tail Grass	•				•
**Sporobolus fertilis*	Giant Parramatta Grass	•			•	•
**Sporobolus indicus*	Parramatta Grass					•
**Sporobolus pyramidalis*		•				
Sporobolus sessilis		•				
**Stenotaphrum secundatum*	Buffalo Grass	•				
Themeda australis	Kangaroo Grass	•	•	•	•	•
Ripogonaceae						
Ripogonum album	White Supplejack	•	•			
Ripogonum fawcettianum	Small Supplejack		•			
Smilacaceae						
Smilax australis	Lawyer Vine	•	•			•
Smilax glyciphylla	Sweet Sarsaparilla		•			
Typhaceae						
Typha orientalis	Broadleaf Cumbungi		•			•
Uvulariceae						
Tripladenia cunninghamii			•			
Xanthorrhoeaceae						
Xanthorrhoea glauca subsp. *glauca*		•	•			
Xanthorrhoea media	Grass Tree			•		
Total No. Native Species 563						
Total No. Introduced Species 132						
Total No. Species 695						

* Introduced Species

1 FloraSearch (2011) – current survey.

2 Ecobiological (2011) *Flora and Fauna Survey Report: Stratford Coal mine, Gloucester, New South Wales.* Report to Gloucester Coal Pty. Ltd

3 AGC Woodward-Clyde (1994) *Stratford Coal Project: Environmental Impact Statement.* Prepared for Stratford Coal Pty. Ltd.

4 Dowling, W. (2001) *Bowens Road North Project. Flora Survey and Assessment.* Report to Stratford Coal Pty. Ltd.

5 Australian Museum Business Services (2011) *Stratford Baseline Flora Report.*

ATTACHMENT F

THREATENED FLORA SPECIES DATABASE SEARCH RESULTS

Scientific Name	Common Name	Conservation Status[1]		Distribution	Habitat	Likelihood of Occurrence	Significance Assessment
		TSC Act	EPBC Act				
Allocasuarina defungens	Dwarf Heath Casuarina	E	E	The Dwarf Heath Casuarina was indicated as potentially occurring in the search area by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities [SEWPAC] Protected Matters Search Tool (SEWPAC, 2011).	Restricted to coastal sandplains and adjacent exposed hills and headlands (New South Wales [NSW] Office of Environment and Heritage [OEH], 2011e), which are absent from the study area. Consequently, the Dwarf Heath Casuarina is not considered further here.	Nil	No
Asperula asthenes	Trailing Woodruff	V	V	From Bulahdelah to Kempsey (OEH, 2011a).	Grows in moist near coastal locations, particularly on river banks (OEH, 2011e).	Low	Yes
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	The Leafless Tongue Orchid was indicated as potentially occurring in the search area by the SEWPaC (2011) Protected Matters Search Tool.	The Leafless Tongue Orchid is confined to low open woodlands with a heathy understorey on infertile, dry sandy loam soils on the NSW Central Coast (Bell, 2001). Such habitats are absent from the study area. Consequently, the Leafless Tongue Orchid is not considered further here.	Nil	No
Cynanchum elegans	White-flowered Wax Plant	E	E	From the coast to the escarpment. Wollongong to Queensland border (OEH, 2011a).	Rainforest and woodland (OEH, 2011e).	Medium	Yes
Eucalyptus glaucina	Slaty Red Gum	V	V	From Broke to Taree and the Casino district (OEH, 2011a).	On deep, fertile soils in river valleys (OEH, 2011a).	Medium	Yes
Euphrasia arguta	An Eye-bright	CE	CE	From Bathurst to the Nundle area including the North Coast, Central and Northern Tablelands, and Central West and North West Slopes of NSW (Barker, 1992).	A poorly known species that has recently been rediscovered in the Nundle area (OEH, 2011e). Habitats are said to include grassy areas beside rivers (Barker 1992). May once have occurred along the Avon River and/or Dog Trap Creek.	Low (but may formerly have occurred)	Yes
Grevillea obtusiflora	-	E	E	The Atlas of NSW Wildlife (OEH, 2011e), returned records of the Endangered Grey Grevillea (*Grevillea obtusiflora*) in the search area. However, these records are of *Grevillea granulifera*, formerly regarded as a subspecies of *G. obtusiflora* (Makinson, 2000). *G. obtusiflora* is not considered further here.		Nil	No
Melaleuca groveana	Grove's Paperbark	V	-	Port Stephens to Queensland (OEH, 2011e).	Heath in higher areas (OEH, 2011e).	Low	Yes

Scientific Name	Common Name	Conservation Status[1]		Distribution	Habitat	Likelihood of Occurrence	Significance Assessment
		TSC Act	EPBC Act				
Owenia cepiodora	Onion Cedar	V	V	A record of the Endangered rainforest tree species Onion Cedar (*Owenia cepiodora*), was returned for the search area by the NSW FloraOnline website (Royal Botanical Gardens and Domain Trust, 2011). However, all available information on Onion Cedar indicates its natural distribution is confined to areas north of the Richmond River in NSW. Consequently, it is not considered further here.		Nil	No
Pomaderris queenslandica	Scant Pomaderris	E	-	North east NSW and Queensland, including the New England Tablelands, North West Slopes and North Coast (OEH, 2011e).	Moist eucalypt forest, sheltered shrubby woodlands, and occasionally along creeks (OEH, 2011e).	Low	Yes
Senna acclinis	Rainforest Senna	E	-	Coast and tablelands from the Illawarra to Queensland (OEH, 2011e).	Edges of subtropical and dry rainforest (OEH, 2011e).	Medium	Yes
Syzygium paniculatum	Magenta Lilly Pilly	E	V	The Magenta Lilly Pilly was returned by searches of the Atlas of NSW Wildlife.	The Magenta Lilly Pilly occurs only in subtropical and littoral rainforest on sandy soils at low altitudes (NPWS, 2000). Such habitats are absent from the study area and this species is not considered further.	Nil	No

[1] Threatened flora species conservation status under the NSW *Threatened Species Conservation Act, 1995* and Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999.*

V = Vulnerable E = Endangered CE = Critically Endangered

ATTACHMENT G

FLORA SPECIES LIST FOR THE PROJECT AREA DERIVED FROM SAMPLES CONDUCTED FOR THIS ASSESSMENT BY ECOBIOLOGICAL AND FLORASEARCH

Flora Species List for Each Vegetation Community

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
CLASS FILICOPSIDA																					
Adiantaceae																					
Adiantum aethiopicum	Common Maidenhair		•			•		•		•		•								•	
Adiantum atroviride			•																		
Adiantum formosum	Black Stem Maidenhair	•		•	•							•									
Adiantum hispidulum	Rough Maidenhair Fern	•	•	•	•		•					•									
Cheilanthes sieberi	Poison Rock Fern		•	•		•		•		•	•	•		•				•		•	•
Pellaea falcate	Sickle Fern	•	•	•																	
**Pellaea paradoxa*	Sickle Fern	•	•	•	•							•		•							
Aspleniaceae																					
Asplenium australasicum	Bird's Nest Fern	•		•	•																
Blechnaceae																					
Blechnum cartilagineum	Gristle Fern	•		•	•	•															
Doodia aspera	Prickly Rasp Fern	•	•	•	•					•		•									
Doodia caudate	Small Rasp Fern		•																		
Davalliaceae																					
Arthropteris tenella		•																			
Dennstaedtiaceae																					
Pteridium esculentum	Common Bracken		•	•		•	•	•	•	•	•	•	•	•		•	•	•		•	
Dicksoniaceae																					
Calochlaena dubia	Rainbow Fern	•		•	•																
Dryopteridaceae																					
Lastreopsis microsora subsp. *microsora*	Creeping Shield Fern	•																			
Lastreopsis munita	Naked Shield Fern	•																			
Lindsaeaceae																					
Lindsaea linearis	Screw Fern							•						•		•					
Lindsaea microphylla	Lacy Wedge Fern											•									
Polypodiaceae																					
Dictymia brownie	Strap Fern	•																			
Microsorum scandens	Fragrant Fern	•																			
**Platycerium bifurcatum*	Elkhorn Fern	•		•	•	•						•									
Pyrrosia confluens	Horse-shoe Felt Fern	•	•																		
Pyrrosia rupestris	Rock Felt Fern		•	•								•									
Pteridaceae																					
Pteris umbrosa	Jungle Brake	•																			
Thelypteridaceae																					
Christella sp.			•																		

Scientific Name	Common Name	Community																	Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
CLASS MAGNOLIOPSIDA																					
SUBCLASS MAGNOLIIDAE																					
Acanthaceae																					
Brunoniella australis	Blue Trumpet		•			•		•	•		•			•	•					•	
Brunoniella pumilio	Dwarf Blue Trumpet															•					
Pseuderanthemum variabile	Pastel Flower		•	•	•	•					•	•		•							
Amaranthaceae																					
Alternanthera denticulate	Lesser Joy Weed		•					•											•		
Nyssanthes diffusa	Barbwire Weed		•																		
Amygdalaceae																					
**Prunus armeniaca*	Apricot		•																		
**Prunus mahaleb*	Mahaleb Cherry		•																		
**Prunus persica*	Peach		•	•																	
Aphanopetalaceae																					
Aphanopetalum resinosum	Gum Vine	•	•	•	•							•									
Apiaceae																					
Centella asiatica	Indian Pennywort							•	•	•	•			•				•		•	
**Cyclospermum leptophyllum*	Slender Celery										•										
Daucus glochidiatus	Native Carrot										•	•									
**Hydrocotyle bonariensis*								•													
Hydrocotyle laxiflora	Stinking Pennywort							•		•											
Hydrocotyle peduncularis								•		•	•	•						•		•	•
Apocynaceae																					
**Araujia sericifera*	Moth Vine		•																		
**Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush		•					•	•		•									•	
Gompholobium pinnatum	Pinnate Wedge Pea															•					
Marsdenia rostrata	Common Milk Vine											•									
Marsdenia suaveolens	Scented Marsdenia	•				•						•		•							
Melodinus australis	Southern Melodinus	•																			
Parsonsia straminea	Common Silkpod	•		•				•	•	•		•		•							
Parsonsia velutina		•																			
Araliaceae																					
Cephalaralia cephalobotrys	Climbing Panax	•																			
Polyscias sambucifolia	Elderberry Panax	•		•		•	•					•									
Asteraceae																					
**Ageratina adenophora*	Crofton Weed							•			•	•		•						•	
**Ageratina riparia*	Creeping Crofton Weed	•		•																	
**Aster subulatus*	Wild Aster							•		•								•		•	
**Bidens pilosa*	Cobblers Pegs		•	•		•		•		•	•				•					•	•

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
**Bidens subalternans*	Greater Beggar's Ticks		•	•																	
Calotis cuneifolia	Purple Burr-daisy							•													
Cassinia quinquefaria																				•	
**Cirsium vulgare*	Spear Thistle		•					•		•	•			•						•	
**Conyza bonariensis*	Flaxleaf Fleabane							•		•				•	•			•		•	
**Conyza canadensis*	Canadian Fleabane		•																		
**Conyza sumatrensis*	Tall Fleabane		•					•										•		•	
Coronidium elatum												•									
Cotula australis	Carrot Weed		•																		
Eclipta platyglossa	Yellow Eclipta							•		•											
Euchiton gymnocephalus												•			•			•			
Euchiton involucratus	Star Cudweed							•			•							•		•	•
Euchiton sphaericus																		•		•	
**Facelis retusa*								•													
**Gamochaeta americana*	Cudweed							•												•	
**Gamochaeta calviceps*	Cudweed														•						
**Gamochaeta spicata*											•			•							
**Hypochaeris glabra*	Smooth Catsear																	•			•
**Hypochaeris radicata*	Catsear		•	•		•	•	•	•	•	•	•		•	•		•	•		•	•
Lagenophora stipitata	Blue-bottle Daisy					•				•		•		•							
Ozothamnus diosmifolius	Rice Flower					•		•		•		•		•		•					
**Senecio madagascariensis*	Fireweed		•	•				•	•	•	•			•	•			•		•	
Senecio quadridentatus	Cotton Fireweed		•																		
Senecio tenuiflorus			•																		
Sigesbeckia orientalis subsp. *orientalis*	Indian Weed										•			•	•			•			
**Silybum marianum*	Variegated Thistle		•																		
**Sonchus oleraceus*	Common Sowthistle		•									•									
**Tagetes minuta*	Stinking Roger		•														•			•	
**Taraxacum officinale*	Dandelion		•					•													
Vernonia cinerea var. *cinerea*								•		•	•	•		•							
Vittadenia cuneata	Fuzzweed							•						•							
**Xanthium occidentale*	Noogoora Burr		•																		
Bignoniaceae																					
Pandorea pandorana	Wonga Wonga Vine	•	•	•	•	•		•	•	•	•	•									
Brassicaceae																					
**Capsella bursa-pastoris*	Shepard's Purse													•	•						
**Lepidium bonariense*								•													
**Sisymbrium* sp.								•													
Campanulaceae																					

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Wahlenbergia gracilis	Australian Bluebell										•	•								•	
Capparaceae																					
Capparis arborea	Native Pomegranate	•		•																	
Caprifoliaceae																					
**Lonicera japonica*	Japanese Honeysuckle		•																		
Caryophyllaceae																					
Stellaria flaccida												•									
**Stellaria media*	Common Chickweed		•																		
Casuarinaceae																					
Allocasuarina littoralis	Black She-oak													•		•					
Allocasuarina torulosa	Forest Oak			•	•	•	•					•		•						•	
Casuarina cunninghamiana	River Sheoak		•																		
Celastraceae				•	•																
Elaeodendron australe var. *australe*		•																			
Denhamia celastroides	Orange Boxwood	•																			
Maytenus silvestris	Orange Bark	•	•	•	•	•						•		•							
Chenopodiaceae																					
**Chenopodium album*	Fat Hen		•																	•	
**Chenopodium ambrosioides*	Mexican Tea		•																		
Einadia hastata	Berry Saltbush		•																		
Einadia trigonos subsp. *leiocarpa*	Fishweed									•				•	•						
Clusiaceae																					
Hypericum gramineum	St John's Wort							•	•			•						•		•	
Convolvulaceae																					
Dichondra repens	Kidney Weed		•	•		•		•	•	•	•	•		•			•	•			•
**Ipomoea indica*	Morning Glory	•																			
Polymeria calycina						•		•		•		•		•				•		•	
Cunoniaceae																					
Caldcluvia paniculosa	Soft Corkwood			•																	
Dilleniaceae																					
Hibbertia aspera	Rough Guinea Flower					•		•	•			•				•					
Hibbertia dentata	Trailing Guinea Flower											•									
Hibbertia diffusa	Wedge Guinea Glower					•		•			•	•		•							
Hibbertia obtusifolia	Hoary Guinea Flower							•													
Hibbertia pedunculata														•							
Hibbertia scandens	Climbing Guinea Flower					•					•	•								•	
Droseraceae																					
Drosera auriculata	Sundew											•									
Ebenaceae																					

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Diospyros australis	Black Plum			•	•																
Elaeocarpaceae																					
Elaeocarpus obovatus	Hard Quandong		•	•																	
Elaeocarpus reticulatus	Blueberry Ash					•															
Ericaceae - Styphelioideae																					
Leucopogon juniperinus	Prickly Beard-heath					•		•		•		•		•				•			
Monotoca scoparia																•					
Euphorbiaceae																					
Alchornea ilicifolia	Native Holly	•																			
Baloghia inophylla	Brush Bloodwood	•																			
Claoxylon australe	Brittlewood	•		•																	
Croton verreauxii	Green Native Cascarilla		•																		
Mallotus philippensis	Red Kamala	•																			
Eupomatiaceae																					
Eupomatia laurina	Bolwarra	•		•	•																
Fabaceae: Faboideae																					
Daviesia ulicifolia	Gorse Bitter Pea							•						•		•		•			
Desmodium brachypodum	Large Tick-trefoil							•													
Desmodium gunnii	Slender Tick trefoil		•						•												
Desmodium rhytidophyllum				•		•	•	•		•	•	•		•							
Desmodium varians	Slender Tick-trefoil		•			•		•		•	•	•		•				•			
Dillwynia retorta																•					
Glycine clandestina	Twining Glycine		•	•	•	•	•	•		•		•		•	•			•		•	
Glycine microphylla	Small-leaf glycine			•		•		•	•		•	•		•							
Glycine tabacina			•					•	•	•	•			•	•			•		•	•
Glycine tomentella	Woolly Glycine							•													
Hardenbergia violacea	Purple Coral Pea			•		•	•	•		•	•	•		•							
Jacksonia scoparia	Dogwood							•		•	•	•									
Kennedia rubicunda	Dusky Coral Pea											•		•							
Platylobium formosum subsp. *parviflorum*														•		•					
Podolobium ilicifolium	Prickly Shaggy Pea			•		•	•					•	•					•		•	
Pultenaea euchila	Orange Pultenaea													•							
Pultenaea retusa	Notched Bush-pea					•								•							
Pultenaea villosa	Hairy Bush-pea							•						•		•		•			
**Trifolium repens*	White Clover		•					•												•	
Fabaceae: Mimosoideae																					
Acacia brownii	Heath Wattle							•		•											
Acacia falcata						•		•						•							
Acacia floribunda	White Sally											•									

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Acacia implexa	Hickory Wattle			•							•	•									
Acacia irrorata	Green Wattle		•	•				•		•	•	•		•				•			•
Acacia longifolia	Sydney Golden Wattle							•	•				•	•		•					
Acacia longissima	Long-leaf Wattle					•					•	•		•			•	•		•	
Acacia maidenii	Maidens Wattle					•						•				•					
Acacia myrtifolia	Red Stemmed Wattle					•							•								
Acacia ulicifolia	Prickly Moses			•		•	•	•		•		•	•	•		•	•	•		•	
Pararchidendron pruinosum var. *pruinosum*	Snow Wood	•																			
Flacourtiaceae																					
Scolopia braunii	Flintwood	•		•																	
Gentianaceae																					
**Centaurium erythraea*	Common Centaury							•			•			•						•	•
Geraniaceae																					
Geranium homeanum			•	•				•													
Geranium potentilloides											•										
Geranium solanderi	Native Geranium							•	•		•	•									
Goodeniaceae																					
Dampiera stricta																•					
Goodenia heterophylla subsp. *heterophylla*						•				•		•		•		•					
Goodenia paniculata	Branched Goodenia							•		•								•		•	
Haloragaceae																					
Gonocarpus oreophilus				•																	
Gonocarpus tetragynus	Raspwort							•						•			•	•			
Gonocarpus teucrioides	Raspwort					•		•	•			•						•			
Lamiaceae																					
Ajuga australis	Austral Bugle																	•			
Clerodendrum tomentosum	Hairy Clerodendrum	•		•	•	•					•	•									
Mentha satureioides	Creeping Mint										•										
Plectranthus argentatus	Silver Plectranthus			•								•									
Plectranthus parviflorus	Cockspur Flower		•								•										
Prostanthera incana	Velvet Mint Bush			•																	
Lauraceae																					
Cassytha glabella	Devil's Twine															•					
**Cinnamomum camphora*	Camphora Laurel		•																		
Cryptocarya microneura	Murrogun	•			•																
Litsea reticulata	Bolly Gum	•																			
Neolitsea dealbata	White Bolly Gum	•		•	•																
Lobeliaceae																					
Pratia purpurascens	Whiteroot		•	•		•		•	•	•	•	•		•			•	•		•	•

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Loganiaceae																					
Logania albiflora				•																	
Loranthaceae																					
Amyema pendulum			•																		
Lythraceae																					
Lythrum hyssopifolia	Hyssop Loosestrife							•												•	
Malaceae																					
**Malus pumila*	Apple		•																		
Malvaceae																					
**Modiola caroliniana*	Red-flowered Mallow		•					•													
**Sida rhombifolia*	Paddy's Lucerne		•					•		•	•						•			•	
Hibiscus heterophyllus	Native Rosella	•		•	•																
Meliaceae																					
Dysoxylum fraserianum	Rosewood	•																			
Melia azedarach	White Cedar		•	•																	
Synoum glandulosum	Scentless Rosewood			•																	
Menispermaceae																					
Sarcopetalum harveyanum	Pearl Vine			•	•							•									
Stephania japonica	Snake Vine		•	•	•																
Monimiaceae																					
Daphnandra apatela	Common Socketwood	•																			
Hedycarya angustifolia	Native Mulberry			•																	
Wilkiea huegeliana	Veiny Wilkiea	•			•																
Moraceae																					
Ficus coronata	Sandpaper Fig	•			•			•						•							
Ficus rubiginosa	Port Jackson Fig			•																	
Maclura cochinchinensis	Cockspur Thorn	•	•						•												
Streblus brunonianus	Whalebone Tree	•	•	•	•																
Trophis scandens subsp *scandens*	Burny Vine	•																			
Myrsinaceae																					
**Anagallis arvensis*	Scarlet Pimpernel		•								•	•						•			
Embelia australiana		•																			
Myrsine howittiana	Brush Muttonwood							•	•												
Myrsine variabilis	Muttonwood			•							•	•									
Myrtaceae																					
Acmena smithii	Lilly Pilly				•																
Angophora costata	Smooth-barked Apple						•									•		•			
Angophora subvelutina	Broad-leaved Apple		•	•				•		•				•		•					
Backhousia myrtifolia	Grey Myrtle	•	•	•	•									•							

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Backhousia sciadophora	Shatterwood	•																			
Callistemon linearis	Narrow-leaved Bottlebrush													•							
Callistemon rigidus	Stiff Bottlebrush									•											
Callistemon salignus	White Bottlebrush		•					•		•		•									
Corymbia maculata	Spotted Gum			•							•	•									
Eucalyptus acmenoides	White Mahogany		•	•								•		•							
Eucalyptus amplifolia	Cabbage Gum		•					•	•	•				•						•	
Eucalyptus canaliculata	Large-fruited Grey Gum					•						•									•
Eucalyptus carnea	Thick-leaved Mahogany			•		•						•		•	•						
Eucalyptus crebra	Narrow-leaved Ironbark											•									
Eucalyptus fibrosa	Red Ironbark													•							
Eucalyptus globoidea	White Stringybark					•	•			•		•	•	•		•					
Eucalyptus largeana	Craven Grey Box							•													
Eucalyptus microcorys	Tallow Wood	•		•		•						•									•
Eucalyptus molucanna	Grey Box							•	•					•							
Eucalyptus propinqua	Small-fruited Grey Gum							•							•						
Eucalyptus punctata	Grey Gum				•																
Eucalyptus resinifera	Red Mahogany		•			•		•													
Eucalyptus rudderi	Rudder's Box						•														
Eucalyptus saligna	Sydney Bluegum	•		•	•					•											
Eucalyptus siderophloia	Grey Ironbark		•	•		•			•	•	•	•	•	•	•			•			
Eucalyptus tereticornis	Forest Red Gum							•		•	•	•									
Kunzea ambigua	Tick Bush						•														
Leptospermum polygalifolium subsp. *cismontanum*	Tantoon					•						•						•			
Leptospermum polygalifolium subsp. *polygalifolium*	Tantoon								•				•			•				•	
Leptospermum trinervium	Slender Tea-tree															•					
Lophostemon confertus	Brush Box	•		•	•							•									
Melaleuca decora	A Honeymyrtle							•	•	•				•		•			•		
Melaleuca linariifolia	Flax-leaved Paperbark					•		•	•	•				•				•	•		
Melaleuca nodosa	Prickly-leaved Paperbark									•				•							•
Melaleuca sieberi														•		•					
Melaleuca styphelioides	Prickly-leaved Tea Tree			•										•							
Melaleuca thymifolia	Thyme Honey-myrtle									•											
Rhodamnia rubescens	Scrub Turpentine	•										•									
Syncarpia glomulifera	Turpentine				•	•	•					•									
Syzygium australe	Brush Cherry	•																			
Syzygium smithii	Lilly Pilly		•	•						•											
Oleaceae																					
**Ligustrum lucidum*	Large Leaved Privet		•	•																	

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
**Ligustrum sinense*	Small Leaved Privet		•	•				•	•	•				•						•	
Notelaea longifolia	Large Mock-olive	•		•	•	•		•	•			•		•							
Notelaea venosa	Veined Mock Olive		•		•							•									
Onagraceae																					
Ludwigia peploides subsp. *montevidensis*	Water Primrose													•					•		
Oxalidaceae																					
Oxalis exilis								•		•				•				•		•	•
Oxalis perennans	Creeping Oxalis					•				•	•	•		•	•					•	
Peperomiaceae																					
Peperomia blanda var. *floribunda*		•																			
Phyllanthaceae																					
Breynia oblongifolia	Coffee Bush	•		•	•	•		•	•		•	•		•							•
Glochidion ferdinandi var. *ferdinandi*	Cheese Tree	•		•	•	•	•		•			•	•								
Phyllanthus gunnii	Scrubby Spurge											•									
Phyllanthus hirtellus	Thyme Spurge					•						•		•		•					
Poranthera microphylla						•					•	•									
Phytolaccaceae																					
**Phytolacca octandra*	Inkweed		•																		
Pittosporaceae																					
Billardiera scandens var. *scandens*	Hairy Apple Berry					•			•		•	•		•		•					
Bursaria spinosa	Boxthorn							•		•		•		•				•			
Hymenosporum blavum	Native Frangipani	•		•																	
Pittosporum multiflorum	Orange Thorn	•	•		•			•													
Pittosporum revolutum	Hairy Pittosporum	•		•	•	•						•		•							
Pittosporum undulatum	Sweet Pittosporum			•																	
Plantaginaceae																					
**Plantago lanceolata*	Lamb's Tongues		•	•				•	•	•				•	•		•	•		•	•
**Plantago major*	Large Plantain		•					•													
Polygonaceae																					
Muehlenbeckia gracillima	Slender Lignum										•										
Persicaria decipiens	Slender Knot-weed		•							•									•		
Persicaria hydropiper	Waterpiper		•					•		•				•					•		
**Polygonum aviculare*	Wireweed																			•	
Rumex brownii	Swamp Dock		•								•										
**Rumex conglomeratus*	Clustered Dock		•											•				•			
**Rumex crispus*	Curled Dock		•															•	•	•	
Proteaceae																					
Banksia spinulosa var. *collina*	Hairpin Banksia															•					
Grevillea robusta	Silky Oak		•																		

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Lomatia silaifolia	Crinkle Bush											•									
Persoonia linearis	Narrow-leaved Geebung			•		•	•	•				•	•	•		•					
Stenocarpus salignus	Beef Wood	•																			
Xylomelum pyriforme	Woody Pear					•															
Putranjivaceae																					
Drypetes deplanchei	Yellow Tulipwood	•																			
Quintiniaceae																					
Quintinia verdonii	Grey Possumwood	•																			
Ranunculaceae																					
Clematis aristata	Old Man's Beard			•					•		•	•		•							
Clematis glycinoides	Headache Vine		•			•				•		•									
Ranunculus inundatus	River Buttercup							•	•	•				•					•		
Ranunculus lappaceus	Common Buttercup							•										•			
Ranunculus plebeius	Water Buttercup			•																	
Rhamnaceae																					
Alphitonia excelsa	Red Ash	•			•			•				•		•							
Pomaderris ferruginea	Rusty Pomaderris						•														
Pomaderris lanigera	Woolly Pomaderris					•						•									
Rosaceae																					
**Rubus fruticosus*			•					•		•			•					•			•
Rubus moluccanus var. *trilobus*	Molucca Bramble							•				•									
Rubus parvifolius	Native Raspberry	•	•			•		•	•	•	•	•						•			
Rubiaceae																					
Cyclophyllum longipetalum	Coast Canthium	•																			
Galium binifolium	Bedstraw			•								•									
Galium leptogonium			•																		
Galium propinquum	Maori Bedstraw										•	•									
Morinda jasminoides	Sweet Morinda	•																			
Opercularia diphylla						•		•			•	•		•							
Pomax umbellata	Pomax					•						•									
**Richardia stellaris*								•													
Rutaceae																					
Acronychia oblongifolia	White Aspen	•	•		•																
Boronia polygalifolia	Dwarf Boronia							•				•		•							
**Citrus x taitensis*	Bush Lemon	•	•																		
Correa reflexa	Common Correa											•									
Geijera salicifolia var. *latifolia*		•																			
Melicope micrococca	Hairy-leaved Doughwood	•																			
Sarcomelicope simplicifolia	Big Yellow Wood			•																	

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		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Zieria smithii	Sandfly Zieria			•								•									
Salicaceae																					
**Populus nigra*	Lombardy Poplar		•																		
**Salix babylonica*	Weeping Willow		•																		
**Salix fragilis*	Crack Willow		•																		
**Salix viminalis*	Basket Willow		•																		
Santalaceae																					
Exocarpos cupressiformis	Native Cherry		•	•		•	•	•	•		•	•		•							
Exocarpos strictus	Dwarf Cherry							•				•									
Sapindaceae																					
Alectryon subcinereus	Native Quince				•							•									
Diploglottis cunninghamii	Native Tamarind	•			•																
Dodonaea triquetra	Large-leaf Hop-bush			•		•	•					•	•								
Dodonaea viscosa subsp. *angustifolia*	Sticky Hop-bush													•							
Elattostachys nervosa	Beetroot Tree	•			•																
Guioa semiglauca	Guioa	•		•	•							•									
Sapotaceae																					
Planchonella australis	Black Apple	•																			
Scrophulariaceae																					
Veronica plebeia	Trailing Speedwell							•	•	•	•			•	•						
Solanaceae																					
Duboisia myoporoides	Corkwood		•	•																	
Solanum brownii	Violet Nightshade													•							
**Solanum mauritianum*	Wild Tobacco Bush		•	•	•					•				•	•		•				•
**Solanum nigrum*	Black-berry Nightshade		•	•				•		•	•				•						
Solanum prinophyllum	Forest Nightshade										•			•							
**Solanum pseudocapsicum*	Madeira Winter		•																		
Solanum stelligerum	Devil's Needles											•									
Sterculiaceae																					
Brachychiton acerifolius	Flame Tree				•																
Brachychiton populneus	Kurrajong		•								•										
Commersonia fraseri	Brush Kurrajong			•																	
Heritiera actinophylla	Black Booyong	•																			
Thymelaeaceae																					
Pimelea linifolia subsp.*linifolia*	Slender Rice Flower							•		•		•	•	•		•		•			
Ulmaceae																					
Aphananthe philippinensis	Rough-leaved Elm	•																			
Trema tomentosa var. *aspera*	Peach-leaf Poison-bush		•																		
Urticaceae																					

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Dendrocnide excelsa	Giant Stinging Tree	•																			
Urtica urens	Small Nettle		•																		
Verbenaceae																					
**Lantana camara*	Lantana	•	•	•	•	•			•	•	•	•	•	•				•		•	•
**Verbena bonariensis*	Purpletop		•	•				•	•	•	•				•			•		•	•
**Verbena caracasana*			•															•			
**Verbena quadrangularis*								•													
**Verbena rigida*	Purpletop										•							•		•	
**Verbena supina*	Trailing Verbena																	•			
Violaceae																					
Hybanthus monopetalus	Slender-violet Bush													•							
Melicytus dentatus	Tree Violet		•					•		•											
Viola betonicifolia	Native Violet					•		•				•		•							
Viola hederacea	Ivy-leaved Violet							•		•				•	•					•	
**Viola odorata*	Sweet Violet		•																		
Vitaceae																					
Cayratia clematidea	Native Grape	•	•	•																	
Cissus antarctica	Water Vine	•	•	•	•	•					•	•									
Cissus hypoglauca	Five-leaf Water Vine	•						•				•									
Cissus sterculiifolia	Yaroong	•																			
Tetrastigma nitens				•	•																
SUBCLASS LILIIDAE																					
Anthericaceae																					
Arthropodium milleflorum	Pale Vanilla-lily					•				•		•		•							
Caesia parviflora var. *parviflora*	Pale Grass-lily													•							
Laxmannia gracilis	Slender Wire Lily													•							
Tricoryne elatior	Yellow Autumn-lily							•		•			•	•			•	•			
Araceae																					
Gymnostachys anceps	Settlers' Twine	•		•	•							•									
Commelinaceae																					
Aneilema biflorum		•																			
Commelina cyanea	Native Wandering Jew		•		•			•		•	•				•						
Murdannia graminea								•													
**Tradescantia fluminensis*	Wandering Jew																				
Cyperaceae																					
Baumea articulata	Jointed Twig-rush																		•		
Carex appressa	Tall Sedge					•		•	•	•				•					•		
Carex breviculmis						•		•				•									
Carex gaudichaudiana	Tufted Sedge														•						

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Carex inversa														•	•						
Carex longebrachiata	A Sedge		•					•		•								•			
**Cyperus brevifolius*										•	•									•	
**Cyperus congestus*																				•	
Cyperus difformis										•					•				•		
Cyperus enervis											•										
**Cyperus eragrostis*			•					•		•										•	
Cyperus gracilis	Slender Flat-sedge									•					•						
Cyperus haspan			•																		
Cyperus polystachyos			•					•		•										•	
Cyperus procerus								•													
Cyperus rotundus	Nutgrass							•													
Cyperus sanguinolentus																				•	
**Cyperus sesquiflorus*																			•	•	
Cyperus sphaeroideus								•													
Eleocharis cylindrostachys			•																		
Eleocharis dietrichiana								•		•									•		
Eleocharis sphacelata																			•		
Fimbristylis dichotoma	Common Fringe-sedge							•		•	•							•		•	
Gahnia clarkei	Tall Saw-sedge															•					
Gahnia radula																•					
Isolepis sp.			•																		
Lepidosperma concavum				•																	
Lepisosperma laterale						•	•	•				•		•							
Ptilothrix deusta	Ptilothrix															•					
Schoenoplectus mucronatus			•											•					•		
Schoenoplectus validus																			•		
Schoenus apogon	Common Bog-rush							•		•		•									
Dioscoreaceae																					
Dioscorea transversa	Native Yam	•	•	•	•							•									
Hydrocharitaceae																					
Ottelia ovalifolia subsp. *ovalifolia*	Swamp Lily																		•		
Hypoxidaceae																					
Hypoxis hygrometrica	Golden Weather Grass									•	•										
Patersonia glabrata	Purple Flag											•									
Petersonia sericea	Silky Purple Flower											•									
Juncaceae																					
**Juncus articulatus*								•													
**Juncus cognatus*																				•	

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Juncus continuus								•		•									•	•	
Juncus prismatocarpus																			•		
Juncus sp.			•																		
Juncus usitatus	Common Rush		•					•	•	•					•			•	•	•	
Lomandraceae																					
Lomandra confertifolia subsp. *rubiginosa*						•					•	•		•							
Lomandra cylindrica						•		•				•									
Lomandra filiformis subsp. *coriacea*	Wattle Mat-rush													•							
Lomandra filiformis subsp. *filiformis*	Wattle Mat-rush							•		•				•				•			
Lomandra glauca	Pale Mat-rush											•				•					
Lomandra longifolia	Spiny-headed Mat-rush		•	•	•	•	•	•	•	•		•	•	•							
Lomandra multiflora subsp. *multiflora*	Many-flowered Mat-rush					•		•		•		•		•				•			
Lomandra spicata		•																			
Luzuriagaceae																					
Eustrephus latifolius	Wombat Berry	•	•		•	•					•	•									
Geitonoplesium cymosum	Scrambling Lily	•	•	•	•	•			•		•	•									
Orchidaceae																					
Acianthus fornicatus	Pixie Caps											•									
Arthrochilus prolixus	An Elbow Orchid							•													
Cymbidium suave	Snake Flower											•									
Dendrobium gracilicaule	Bush Orchid			•																	
Dendrobium linguiforme	Tongue Orchid		•																		
Dendrobium schoeninum	Pencil Orchid			•																	
Plectorrhiza tridentata	Tangle Orchid	•																			
Pterostylis grandiflora	Cobra Greenhood					•															
Pterostylis nutans	Nodding Greenhood											•									
Sarchchilus hillii		•																			
Thelymitra sp.																•					
Philydraceae																					
Philydrum lanuginosum	Woolly Waterlily							•		•									•	•	
Phormiaceae																					
Dianella caerulea var. *caerulea*	Blue Flax-lily			•		•		•		•	•	•		•							
Dianella caerulea var. *cinerascens*				•																	
Dianella caerulea var. *producta*	Blue Flax-lily								•												
Dianella longifolia var. *longifolia*								•	•	•				•							
Dianella revoluta var. *revoluta*	Blue Flax-lily					•		•				•				•		•		•	
Dianella tasmanica	Tasman Flax Lily										•	•		•							
Stypandra glauca	Nodding Blue Lily			•																	
Poaceae																					

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		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Agrostis sp.																				•	
**Andropogon virginicus*	Whisky Grass					•		•	•	•		•	•	•			•	•		•	
**Anthoxanthum odoratum*	Sweet Vernal Grass							•													
Aristida ramosa var. *ramosa*	Purple Wiregrass																	•			
Aristida vagans	Three-awned Speargrass			•		•	•	•				•	•	•		•		•			
Austrodanthonia fulva	Wallaby Grass							•													
Austrodanthonia racemosa var. *racemosa*				•							•										
Austrodanthonia tenuior				•				•													
Austrostipa pubescens																•					
Austrostipa setacea	Corkscrew Grass							•								•					
**Axonopus fissifolius*	Narrow-leafed Carpet Grass		•	•				•		•			•	•	•		•	•		•	•
Bothriochloa bladhii	Forest Blue Grass							•													
Bothriochloa macra	Red Grass																	•		•	•
**Briza minor*	Shivery Grass																			•	
**Bromus catharticus*	Prairie Grass		•					•		•										•	
Capillipedium parviflorum	Scented-top Grass										•							•			
Capillipedium spicigerum	Scented-top Grass		•														•	•		•	
**Chloris gayana*	Rhode's Grass		•						•		•									•	
Chloris truncata	Windmill Grass																	•			
**Chloris virgata*	Feathertop Rhode's Grass										•							•			
Cymbopogon refractus	Barbed Wire Grass		•	•		•		•		•	•	•		•	•			•		•	
Cynodon dactylon	Couch		•					•		•					•					•	•
Dichelachne micrantha	Shorthair Plumegrass							•			•	•	•	•				•			
**Digitaria ciliaris*	Summer Grass																			•	
Digitaria parviflora	Small Flowered Finger Grass							•					•					•		•	
Digitaria ramularis						•					•	•									
**Digitaria sanguinalis*	Summer Grass																			•	
**Echinochloa crus-galli*	Barnyard Grass																			•	
Echinopogon caespitosus	Tufted Hedgehog Grass		•	•		•		•		•		•	•	•	•	•		•			•
Echinopogon ovatus	Forest Hedgehog Grass		•					•	•	•	•										
**Ehrharta erecta*	Panic Veldtgrass									•											
Entolasia marginata	Bordered panic		•	•		•		•	•	•		•	•					•		•	
Entolasia stricta	Wiry Panic			•		•	•	•		•		•		•	•	•					
Eragrostis brownii	Common Lovegrass			•		•	•	•		•	•		•	•		•		•		•	
**Eragrostis cilianensis*	Stinkgrass									•											
**Eragrostis curvula*	African Lovegrass							•												•	
Eragrostis leptostachya	Paddock Lovegrass							•		•				•	•	•		•			•
Eragrostis parviflora	Weeping Lovegrass							•													
Hemarthria uncinata var. *uncinata*	Matgrass									•											

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		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Imperata cylindrica	Blady Grass		•	•		•	•	•	•	•	•	•	•	•	•		•	•		•	•
Isachne globosa	Swamp Millet									•											
Joycea pallida	Silvertop Wallaby Grass											•		•		•					
**Lolium multiflorum*	Italian Ryegrass		•																		
**Lolium temulentum*	Darnel																			•	
Microlaena stipoides var. *stipoides*	Weeping Grass		•	•				•		•		•		•	•	•	•	•		•	•
Ottochloa gracillima			•																		
Oplismenus aemulus	Basket Grass					•		•	•	•	•	•			•						
Oplismenus imbecillis	Basket Grass	•	•	•	•	•		•	•		•	•		•							
Panicum effusum	Hairy Panic										•										
Panicum simile	Two-coloured Panic					•				•		•		•		•				•	
Paspalidium distans	Panic		•					•		•	•			•							•
**Paspalum dilatatum*	Paspalum		•	•				•		•				•	•			•	•	•	•
Paspalum distchum	Water Couch		•																•		
**Paspalum urvillei*	Vasey Grass		•																		
**Pennisetum clandestinum*	Kikuyu Grass		•							•										•	
Poa affinis								•			•										
Poa labillardierei var. *labillardierei*	Tussock Grass							•		•	•	•		•	•			•			
Poa sieberiana var. *sieberiana*	Fine-leaved Tussock Grass							•										•			
**Setaria parviflora*																				•	
**Setaria pumila*	Pale Pigeon Grass		•	•				•					•							•	
**Setaria sphacelata*	South African Pigeon Grass							•		•	•									•	
**Sporobolus africanus*	Parramatta Grass											•			•					•	•
Sporobolus creber	Western Rat-tail Grass							•										•		•	
Sporobolus elongatus	Slender Rat's Tail Grass							•													
**Sporobolus fertilis*	Giant Parramatta Grass		•	•																•	
**Sporobolus pyramidalis*																				•	
Sporobolus sessilis								•													
**Stenotaphrum secundatum*	Buffalo Grass							•													
Themeda australis	Kangaroo Grass			•		•	•	•		•	•	•	•	•	•			•		•	
Ripogonaceae																					
Ripogonum album	White Supplejack		•																		
Smilacaceae																					
Smilax australis	Lawyer Vine	•		•	•	•						•									
Smilax glyciphylla	Sweet Sarsaparilla			•	•							•									
Typhaceae																					
Typha orientalis	Broadleaf Cumbungi													•					•		
Uvulariceae																					
Tripladenia cunninghamii		•		•	•																

Scientific Name	Common Name	Community																		Map Unit	
		1	2	3	3a	4	4a	5	5a	5b	6	7	7a	8	8a	9	10	11	12	A	B
Xanthorrhoeaceae																					
Xanthorrhoea glauca subsp. *glauca*				•										•		•					
No. Native Species	407	92	91	108	55	91	26	133	43	91	72	145	22	116	28	47	10	61	21	47	19
No. Introduced Species	102	6	59	19	4	5	1	38	9	24	19	9	5	17	13	0	7	19	3	45	12
Total No. of Species	509	98	150	127	59	95	27	171	52	115	91	154	27	133	41	47	17	80	24	92	31

*Introduced Species.

ATTACHMENT H

COMPARISON OF THE VEGETATION COMMUNITIES ON THE STUDY AREA AND OFFSET AREAS

Comparison of the Vegetation Communities on the Study Area and Offset Area

Number	Vegetation Types	FloraSearch Vegetation Community Mapping (this report)			Australian Museum Business Services Vegetation Community Mapping (Attachment B)	
		Map Unit	Formation	Community Name	Map Unit	Community Name
Rainforest						
1	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin.	1	Rainforest	Dry Subtropical Rainforest		N/A
2	Weeping Lilly Pilly – Water Gum Riparian Rainforest of the Southern North Coast (HU651)			N/A	**7**	White Stringybark – Spotted Gum – Red Ironbark Forest and Woodland
Riparian Forest						
3	River Oak riparian woodland of the North Coast and Northern Sydney Basin	2	Riparian Forest	River Sheoak Riparian Forest		N/A
Wet Sclerophyll Forests						
4	Tallowwood - Brush Box - Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast (HU642)	3	Wet Sclerophyll Forests	Blue Gum Moist Forest		N/A
		3a	Wet Sclerophyll Forests	Disturbed Community 3		N/A
5	Grey Gum – Tallowwood – Spotted Gum Forest and Woodland			N/A	**8**	Grey Gum – Tallowwood – Spotted Gum Forest and Woodland
6	Tallowwood - Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (HU644)	4	Wet Sclerophyll Forests	Tallowwood - Turpentine – Thick-leaved Mahogany Shrub/Grass Forest	**4**	Thick-leaved Mahogany – Spotted Gum – Forest Oak Forest and Woodland
		4a	Wet Sclerophyll Forests	Disturbed Community 4		N/A
7	Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland			N/A	**9**	Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland
Grassy Woodlands						
8	Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526)	5	Coastal Valley Grassy Woodlands	Cabbage Gum Paperbark Sedge/Grass Forest	**6**	Forest Red Gum – Cabbage Gum – Broad-leaved Apple Woodland
		5a	Coastal Valley Grassy Woodlands	Paperbark Thicket		
		5b	Coastal Valley Grassy Woodlands	Disturbed Community 5		
9	Grey Box - Forest Red Gum - Grey Ironbark open forest of the hinterland ranges of the North Coast (HU549)	6	Coastal Valley Grassy Woodlands	Forest Red Gum – Box Grassy Woodland	**5**	Forest Red Gum – Grey Ironbark – Thick-leaved Mahogany Forest and Woodland

Number	Vegetation Types	FloraSearch Vegetation Community Mapping (this report)			Australian Museum Business Services Vegetation Community Mapping (Attachment B)	
		Map Unit	Formation	Community Name	Map Unit	Community Name
Dry Sclerophyll Forests						
10	Spotted Gum - Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630)	7	Dry Sclerophyll Forests	Spotted Gum – Thick-leaved Mahogany Grass/Shrub Forest	**1**	Grey Ironbark – Spotted Gum – White Stringybark Forest and Woodland
		7a	Dry Sclerophyll Forests	Disturbed Community 7		N/A
		8	Dry Sclerophyll Forests	White Stringybark – Grey Ironbark Grass/Shrub Forest	**3**	Spotted Gum – White Stringybark – Grey Ironbark Forest and Woodland
				N/A	**2**	Grey Ironbark – Grey Gum Forest
		8a	Dry Sclerophyll Forests	Disturbed Community 8		N/A
11	Smooth-barked Apple – White Stringybark Shrubby Forest	9	Dry Sclerophyll Forests	Smooth-barked Apple – White Stringybark Shrubby Forest		N/A
12	Rough-barked Apple Grassy Open Forest on Valley Flats of the North Coast and Sydney Basin (HU605).			N/A	10c	Rough-barked Apple – Broad-leaved Apple Woodland
Cleared Land						
13	Derived Grasslands in Coastal Valleys (HU670)	11		Derived Native Grassland/Shrubland		N/A
14	Acacia Regeneration	10		Acacia Regeneration		N/A
15	Artificial Wetlands	12		Artificial Wetlands		Dams - Artificial Wetlands
Map Unit A	Introduced Pasture with Scattered Native Trees	A		Introduced Pasture with Scattered Native Trees	**10a**	Derived Grassland - Largely Introduced
Map Unit B	Planted Trees	B		Planted Trees	**10b**	Spotted Gum Plantation

ATTACHMENT I

DETAILED QUANTIFICATION OF VEGETATION TYPES IN THE DISTURBANCE AND OFFSET AREAS

Quantification of Vegetation Types in the Disturbance and Offset Area

Vegetation Type	Approximate Area to be Cleared	Approximate Area to be Offset[1]
1: Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and Northern Sydney Basin.	0	0.7 ha *(comprising 0.7 ha of Dry Subtropical Rainforest [FloraSearch Vegetation Community 1].*
2: Weeping Lilly Pilly – Water Gum Riparian Rainforest of the Southern North Coast (HU651)	0	8.5 ha *(comprising 8.5 ha of* White Stringybark – Spotted Gum – Red Ironbark Forest and Woodland *[Australian Museum Business Services (AMBS) Vegetation Community 7]).*
3: River Oak riparian woodland of the North Coast and Northern Sydney Basin	0	0
4: Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast (HU642)	0.2 ha *(comprising 0.1 ha of Blue Gum Moist Forest [Vegetation Community 3] and 0.03 ha of Disturbed Community 3 [Vegetation Community 3a])*	20 ha *(comprising 15.3 ha of Blue Gum Moist Forest [Vegetation Community 3] and 4.8 ha of Disturbed Community 3 [Vegetation Community 3a]).*
5: Grey Gum – Tallowwood Spotted Gum Forest and Woodland	0	18 ha *(comprising 18.2 ha of Grey Gum – Tallowwood – Spotted Gum Forest and Woodland [AMBS Vegetation Community 8]).*
6: Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast (HU644)	19 ha *(comprising 18.8 ha of Tallowwood – Turpentine – Thick-leaved Mahogany Shrub/Grass Forest [Vegetation Community 4] and 0.09 ha of Disturbed Community 4 [Vegetation Community 4a])*	194.5 ha *(comprising 178.8 ha of Thick-leaved Mahogany – Spotted Gum – Forest Oak Forest and Woodland [AMBS Vegetation Community 4] and 16 ha of Tallowwood – Turpentine – Thick-leaved Mahogany Shrub/Grass Forest [Vegetation Community 4]).*
7: Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland	0	16.5 ha *(comprising 16.5 ha of Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland [AMBS Vegetation Community 9]).*
8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands (HU526)	13.5 ha *(comprising 6.7 ha of Cabbage Gum Paperbark Sedge/Grass Forest [Vegetation Community 5], 0.2 ha of Paperbark Thicket [Vegetation Community 5a] and 5.3 ha of Disturbed Community 5 [Vegetation Community 5b])*	30 ha *(comprising 30 ha of Forest Red Gum – Cabbage Gum – Broad-leaved Apple Woodland (HU526) [AMBS Vegetation Community 6]).*
9: Grey Box – Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast (HU549)	0	50 ha *(comprising 43.5 ha of Forest Red Gum – Grey Ironbark – Thick-leaved Mahogany Forest and Woodland (HU549) [AMBS Vegetation Community 5] and 6.5 ha of Forest Red Gum – Box Grassy Woodland [Vegetation Community 6]).*
10: Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast (HU630)	65 ha *(comprising 14.5 ha of Spotted Gum – Thick-leaved Mahogany Grass/Shrub Forest [Vegetation Community 7], 1.2 ha of Disturbed Community 7 [Vegetation Community 7a], 48.2 ha of White Stringybark – Grey Ironbark Grass/Shrub Forest [Vegetation Community 8] and 2.8 ha of Disturbed Community 8 [Vegetation Community 8a].*	142 ha *(comprising 30.5 ha of White Stringybark – Grey Ironbark Grass/Shrub Forest [Vegetation Community 8], 66.8 ha of Spotted Gum – Thick-leaved Mahogany Grass/Shrub Forest [Vegetation Community 7], 5 ha of Spotted Gum – White Stringybark – Grey Ironbark Forest and Woodland [AMBS Vegetation Community 3], 39 ha of Grey Ironbark – Spotted Gum – White Stringybark (Forest and Woodland) [AMBS Vegetation Community 1] and 0.7 ha of Grey Ironbark – Grey Gum Forest [AMBS Vegetation Community 2]).*

Quantification of Vegetation Types in the Disturbance and Offset Area (Continued)

Vegetation Type	Approximate Area to be Cleared	Approximate Area to be Offset[1]
11: Smooth-barked Apple – White Stringybark Shrubby Forest	0	0
12: Rough-barked Apple Grassy Open Forest on Valley Flats of the North Coast and Sydney Basin (HU605)	0	3.5 ha *(comprising 3.5 ha of Rough-barked Apple – Broad-leaved Apple Woodland [AMBS Vegetation Community 10c]).*
13: Derived Grasslands in Coastal Valleys (HU670)	5.5 ha *(comprising 5.2 ha of Derived Native Grassland/Shrubland [Vegetation Community 11])*	0
14: Acacia Regeneration	0.5 ha *(comprising 0.5 of Acacia Regeneration [Vegetation Community 10])*	2 ha *(comprising 2 ha of Acacia Regeneration [FloraSearch Vegetation Community 10]).*
15: Artificial Wetlands	0	8 ha *(comprising 8 ha of Dams – Artificial Wetlands [AMBS Vegetation Community])*
Total	**103.7 (rounded to 105 ha)**	**493.7 ha (rounded to 490 ha)**

[1] These areas have been rounded down conservatively, consistent with Table 31 and 32 of the main text.

Clearance of Each Map Unit within the Study Area

Map Unit Type	Approximate Area to be Cleared	Approximate Area to be Offset[1]
Map Unit A: Introduced Pasture with Scattered Native Trees	190 ha *(comprising 187.5 ha of Introduced Pasture with Scattered Native Trees [Map Unit A])*	436.6 ha (rounded to 435 ha) *(comprising 436.6 ha of Derived Grassland – Introduced [AMBS Vegetation Community 10a]).*
Map Unit B: Planted Trees	1.3 ha *(comprising 0.07 ha of Planted Trees [Map Unit B])*	9.9 ha *(comprising 8.1 ha of Spotted Gum Plantation (NA) [AMBS Vegetation Community 10b] and 1.9 ha of Planted Trees [FloraSearch Map Unit B])*
Total	**191.3 (rounded to 195 ha)**	**446.5 ha (rounded to 445 ha)**

[1] These areas have been rounded down conservatively, consistent with Table 31 and 32 of the main text.