Vegetation and Floristics

of

Naree and Yantabulla

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A Report to the Bush Heritage Australia

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Introduction

1.1 Objectives

Dr John T. Hunter prepared this report to accompany the mapping of vegetation within *Naree* and *Yantabulla*. The survey included the collation of available existing information and the survey of additional flora survey sites. This report represents the findings of this study. The collated information is to be used as a guide for management purposes.

The requirements of the investigation were:

1. Collate available existing information from previous vegetation surveys conducted within the conservation areas.
2. Site placement to be based on selected environmental variables and be distributed based on the area they occupy.
3. Identify *EPB&C* Act and *TSC* Act species and their occurrence.
4. Provide known fire ecology information on species and communities.
5. Construction of a vegetation map based on communities as defined by classification.

Methodology

2.1 Site and species information

Site location and altitude was derived from a Garmin GPSMap60CS with reference to topographic maps. Datum used was AMG94. The on-ground floristic survey contained two components; full floristic survey sites and Rapid Data Points (RDPs). The full floristic sites were sampled in order to provide data amenable for statistical multivariate analysis to assist in community circumscription and mapping. Species were scored in accordance with a modified Braun-Blanquet (1982) cover abundance six ranking scale. Cover codes are as follows:

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%

To further assist in mapping both vegetation communities and their habitat quality Rapid Data Points (RDPs) were collected between full floristic survey sties. RDPs are a comparatively new method to assist in the accuracy and spatial delineation of community distribution and features. Underlying the use of RDPs is an acknowledgement that accuracy of the predicted distribution of communities within a landscape declines logarithmically with increasing distance from each survey site. Thus every direct on-ground observation point significantly increases mapping accuracy, but collecting data from full floristic survey sites is expensive. RDPs allow for a smaller amount of information to be collected from areas of vegetation or habitat quality change, thereby reducing costs. The information collected from RDPs is not however incorporated within statistical analysis. It's primarily use is to increase the accuracy of the final mapping product. Each RPD location was recorded using a GPS and as a minimum the information collected included the three dominant species in decreasing order of importance within the canopy layer, the shrub layer and ground layer where present

2.2 Data management

'Paradox 12 for Windows' (Corel 2006) 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. Field data collected during a single field trip were added either at night in the field on a 'note book' computer or immediately on the days after returning from the field on the main computer. Thus, discrepancies could be sorted out while the relevant survey sites were fresh in the mind. Sorted data was exported to EXCEL spreadsheets prior to analysis. All site and species attributes are presented in EXCEL spreadsheets and included in the electronic form of this document that is held with the Narrabri office of the New South Wales National Parks and Wildlife Service and Information and Assessment Section Dubo (along with copies of all field datasheets).

2.3 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; Belbin 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; Faith 1991; Belbin 1995a). 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; Belbin 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).

The number of groups to be recognised can be based on a number of a priori methods. The point at which a leveling of a scree plot of dissimilarity and number of fusion points occurs can be an indication of the optimal cut off point. At such a point, many clusters are formed at essentially the same linkage distance.

2.4 Significant vascular plant taxa and threatened communities within Naree and Yantabulla

Two main sources of information were used initially to assess the significance, in terms of rarity, of any taxa found within *Naree* and *Yantabulla*. The federal *Environmental Protection & Biodiversity Conservation Act* (EPBC Act) and the New South Wales *Threatened Species Conservation* Act 1995 (TSC Act) were used as a primary indicator of national and state significance. The regional significance of taxa was assessed with reference to other flora survey publications. Finally, local botanical knowledge as expressed in unpublished survey reports and the personal experience of the author and other botanists was used as a source of information.

2.5 Mapping

Current methods for the circumscription of vegetation mapping units fall generally into two distinct camps; that of the mapping of pre-defined units (PCTs), and the analysis and creation of specific entities based on available data from within the site. The former is not a scientific process but one that is often necessary as both landscape planning and management require a consistent set of units that can used by all in order to enable effective cross comparison. It is important that the purposes of the investigation dictate which form of community description and mapping is more relevant and if both may be required. Within this investigation mapping polygons were assigned community names and their boundaries delineated based on explicit results from floristic analysis and but allocation was also given within two higher inclusive floristic levels: sub-element and element.

Floristic analysis of locally collected site data reveals nuances in local species associations that are generally lost from formal descriptions of communities based on pre-determined broader geographic treatments. It also aids in the determination of the origin of derived types (such as grasslands). However there is utility in these broader formal descriptions (PCTs) for understanding landscape issues and for enabling others who are less familiar with the analysis methodology and results to understand contextually what the answers represent.

Pre-defined regional or state wide types are increasingly based on a broad analysis of floristic data and therefore there is an attempt to have a scientific basis underpinning the formation of these circumscribed units. This process is useful and attempts at a compromise between the two types of community delineation described above. While this is both necessary and commendable it is not a fully scientific process but only partially so. This is because the results obtained are only truly relevant, in a scientific sense, for the data available at the time, the methodology used for analysis (which may not be relevant to some projects at the scale at which the analysis was performed). Land managers necessarily need to understand that both of the methodologies outlined are not interchangeable even though there can be overlap in the general description of units and their component floras and also in the fact that each method can inform on each other. However perceived overlap in the circumscription of units should not be confused with replaceability of one form over another.

The analysis of cover/abundance scores which takes into consideration all species present, the scores given to them, co-occurrence and richness and is termed phytosociology. For this reason overstorey species, ones that are the most commonly seen, are only part of a defined 'community' or assemblage. Overstorey species can often be common across many floristic units. Furthermore the overstorey may change yet the understoreys can be largely similar. In the former instance what may appear to be a similar community because it contains the same overstorey trees may have an entirely different understorey. It is important to recognise these differences as the understorey comprises most of the floristic diversity. To ignore most species in favour of a single life form (trees for instance) will severely underestimate the diversity in a landscape. Furthermore how management occurs within floristic units should be directed to the overall composition not only on one component (such as the overstorey). It is therefore highly important to recognise floristically analysed units even though reliance on overstorey dominants may be easier for non-specialist recognition. For specific purposes other forms of interpretation that rely less of floristic analysis may be useful especially when comparing data surveyed under different seasons, intensities or by a variety of methods. For example the process of relying on floristic analysis cannot be used solely to help define some highly important management units such as Threatened Ecological Communities (TECs). In general non-quantitative methods rely on more arbitrary decisions, and are more often than not, used to assist us in delineating units that are thought to be present when statistical inference suggests otherwise.

The analysis procedure treats all species within a site as equally important. This is essential as an individual species may or may not be present at any given site due to the randomness of nature, such as opportunistic germination and establishment or localised extinction. Thus an analysis procedure may group sites even though the overstorey may contain different species as long as the majority of species and their cover within sites is largely the same. The opposite may also be true, where some generally common understorey species within a community may inexplicably be missing however the majority of other species and their cover are very similar.

Unfortunately floristic analysis of locally derived data often does not correspond directly to Threatened Ecological Communities (TECs) listed on the *Environmental Protection and Biodiversity Act* and the New South Wales *Threatened Species Conservation Act*. In some instances a listed TEC may form part of many floristic units defined by analysis or several TECs may be defined within a single analysed floristic unit. For example derived grasslands may have originated from more than one TEC though analysis would suggest that currently they are the same unit as most of the current dominant species are the same. As many TECs also include their derived forms it is important to map separate grassland units based the potential progenitor TEC even though at this present time there is no floristic difference. Unfortunately condition criteria are sometimes included within the delineation of TECs that cannot be incorporated in general floristic analysis, for example the method used here. As such it is nearly impossible to delineate TEC units which have condition criteria based on analysis methods. Further confusion occurs when similar TECs are listed on both the *TSC* and the *EPBC* Acts but different criteria are used to define the TEC boundaries and patch. In addition some TECs are defined largely not on the flora contained but on their occurrence within specific environments or locations (such as certain soil types, geologies, flood levels etc). In many of these situations only a subjective approach based on the experience of the surveyor can be used in delineating mapping boundaries.

The results of the multivariate analysis techniques were used in order to circumscribe vegetation communities. The identity of each defined vegetation assemblage was tagged to the full floristic and rapid survey sites within the database. The locations of the identified communities where then re-projected onto SPOT5 imagery within ArcGIS 10.1. These sites, notes taken on traverses and structural characterisitcs seen on SPOT5 imagery along with projected topographical information was used to assist in delineation of vegetation communities for mapping. This methodology follows the guidelines for vegetation mapping provided within the *Native Vegetation Interim Type Standard* (Sivertsen 2009) and considered by Benson (2004) to be the highest standard of technique for vegetation circumscription and mapping.

2.6 Mapping caveats

It is impossible to assess all locations on-ground; consequently most of the landscape in any mapping program is remotely assessed. This remote assessment is largely based on features visible on satellite imagery and on known landscape features to fill in gaps between on-ground survey sites. The ability to remotely assess is not only based on the amount of on-ground data collected but on the quality of the remote information available. The resolution of the satellite imagery affects how well and accurately patterns in the landscape can be discerned.

It is also important to note that any imagery is but a snapshot in time and a number of land use changes may have occurred between the time the imagery was taken and the mapping. Importantly, there is potential for areas mapped as intact and high quality vegetation to no longer exist having been subsequently cleared for a change of land use. Also the inclusion of derived grasslands within some TECs requires an assessment of the ground cover at the most opportune time of the year, to assess if the cover is over 50% native species and/or whether tree seedlings are present.

Results

3.1 Site stratification

Initially 34 full floristic survey sites were surveyed in locations previously set aside for long term monitoring during the 20th to the 22nd of June 2014. An additional 172 full floristic survey sites along with 233 rapid survey sites (dominant species in each structural layer recorded only) were placed between the 16th to the 24th of April 2015. Thus a total of 206 full floristic and 233 rapid survey sites were placed across *Naree* and *Yantabulla*. All modified botanal plots are photographed and are 1x1 m in size (1022 in total). Reference botanal samples taken seperately from plots. Stratification and survey design was as follows:

1. 34 monitoring Sites set up by Bush Heritage on takeover. Full floristics completed in 2012. These sites were revisited and full floristics were redone in 2014. These sites had 10 (every 5 m) modified botanal plots photographed in 2014 which were re-photographed in 2015.

2. 49 long term monitoring plots. 20 x 20 m plots nested within 20 x 50 m plot. Within each of these the following treatments were applied:

   Full floristics recorded in Braun-blanquet.
   Each with 5 modified botanal plots. One in each corner and one in the centre.
   Dung removed sorted and weighted out of each botanal plot.
   All shrubs under 1.5 m identified, counted, height within a 5 x 5 m subplot.
   Central 10 m strip on each side (4) point intercept method for ground cover natives, introduced, bareground, litter etc etc.
   All shrubs over 1.5 m but under 5 cm dbh counted in entire plot and identified.
   15 closest individuals over 5 cm dbh from the centre of the plot identfied, dbh measured, distance from centre measured, height, hollow presence recorded.
   All logs over 10 cm dbh measured over 20 x 50 m plot and number of hollows counted.
   Count of all hollows in standing stems across entire 20 x 50 m plot.
   Three soil sub-samples randomly taken and placed in a single bag and air dried.

3. 127 Full floristic (Braun-blanquet) sites with 3 random modified botanal plots within each. Structural layers cover recorded.
4. 232 Rapid floristic sites that record dominants in each layer only each with 1 random botanal plot. Structural layers cover recorded.

3.2 Floristics

Currently through field work and opportunistic sightings a total of 354 vascular plant taxa have been found within the two properties. These 354 taxa were from 52 Families and 178 Genera. A total of 22 (6%) of the flora is exotic in origin. Based on the full floristic survey sites the number of species recorded is higher than the predicted number but within the upper limit of 410 taxa based on the 95% confidence limit around the mean (Figure 1). This analysis is based largely on the single survey period and therefore does not take into account seasonal differences which account for the actual known number being higher the mean predicted number. It is suggested based on known species, potential seasonal differences and the analyses performed that over 400 species are likely to occur within the two properties.

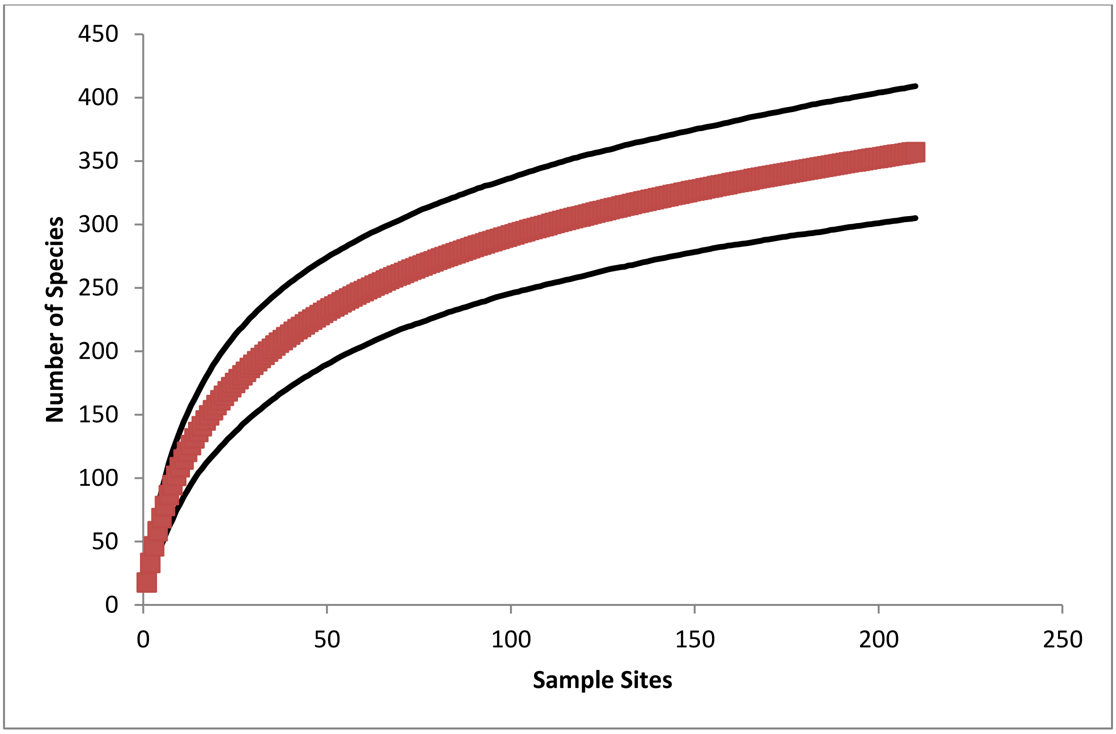

Figure 1: Coleman rarefaction curves of predicted number of species within *Naree* and *Yantabulla* bounded by 95% confidence limits after 1000 iterations of the dataset. Turnover between sites estimates that the predicted number of species based on differences between full floristic survey sites would be 340 with an upper limit of 410 (95% confidence).

Table 1: Comparison of selected attributes between floristic surveys conducted within western districts of New South Wales.

Number of Taxa	Introduced Species	Number of Sites	Mean Richness	*EPB&C – TSC –* RoTAP	Regional Diversity Index	Area Covered by Survey
325	11%	50	22/0.04 ha	2	89	Narran Lake Nature Reserve (Hunter *et al.* 2001). 20 x 20 m sites.
422	14%	125	25/0.09 ha	?	85	Peery National Park (Westbrooke *et al.* 2002). 30 x 30 m sites.
354	**6%**	**206**	**20/0.04 ha**	**1**	**78**	**Naree and Yantabulla (*ibid.*). 20 x 20 m sites.**
131	23%	20	26/0.04 ha	0	58	Carrabear Nature Reserve (Hunter 2012). 20x20 m sites.
215	10	53	23/0.04 ha	0	52	Warrambool SCA (Hunter 2012). 20x 20 m sites.
240	8%	42	28/0.04 ha	1	51	Culgoa National Park (Hunter 2005). 20 x 20 m sites.
155	17%	22	37/0.1 ha	2	49	Kirramingly Nature Reserve (Clarke *et al.* 1998). 33 x 33 m nested sites.
235	26%	200	18/0.09 ha	?	48	Mungo National Park (Westbrooke & Miller 1995). 30 x 30 m sites.
200	?	?	?	?	47	Macquarie Marshes Nature Reserve (NSW NPWS).
127	1%	16	32/0.04 ha	1	46	Weetalibah Nature Reserve (Porteners 1998). 20 x 20 m sites.
215	20%	92	?	?	45	Mallee Cliffs National Park (Morcom & Westbrooke 1990). 10 x 20 m sites.
185	5%	40	12/0.04 ha	1	44	Ledknapper Nature Reserve (Hunter & Fallavollita 2003). 20 x 20 m sites.
227	4%	184	?	?	44	Nombinnie NP & Round Hill NR (Cohn 1995). 30 x 30 m sites.
174	9%	59	15/0.04 ha	1	40	Thilta Karra section Paroo Darling NP (Hunter & Fallavollita 2003). 20 x 20 m sites
107	8%	15	25/0.04 ha	0	39	Careunga Nature Reserve (Hunter 2006). 20 x 20 m sites.

3.3 Community definition

C1: ***Acacia aneura – Eucalyptus populnea - Eremophila longifolia***

C2: ***Acacia aneura - Eucalyptus populnea - Acacia brachystachya***

C3: ***Eremophila sturtii - Dodonaea viscosa - Senna*** **sp. 'zygophylla'**

C4: ***Eremophila sturtii - Acacia victoriae - Myoporum montanum***

C5: ***Eremophila sturtii – Dodonaea viscosa - Olearia pimeloides***

C6: ***Casuarina pauper - Alectryon oleifolius - Eremophila sturtii***

C7: ***Acacia excelsa - Flindersia maculosa - Ventilago viminalis***

C8: ***Eucalyptus ochrophloia - Eucalyptus largiflorens - Acacia stenophylla***

C9: ***Eucalyptus coolabah - Acacia stenophylla - Eucalyptus ochrophloia***

C10: ***Sporobolus mitchellii - Eragrostis lacunaria - Sporobolus caroli***

C11: ***Sporobolus mitchellii - Eragrostis lacunaria - Portulaca oleracea***

C12: ***Pratia darlingensis - Sporobolus mitchellii - Eleocharis pusilla***

C13: ***Eragrostis australasica - Panicum decompositum - Sporobolus mitchellii***

C14: ***Glinus lotoides - Senecio runcinifolius - Duma florulenta***

C15: ***Eucalyptus populnea - Acacia aneura - Eucalyptus coolabah***

C16: ***Eucalyptus largiflorens - Eucalyptus populnea - Teucrium racemosum***

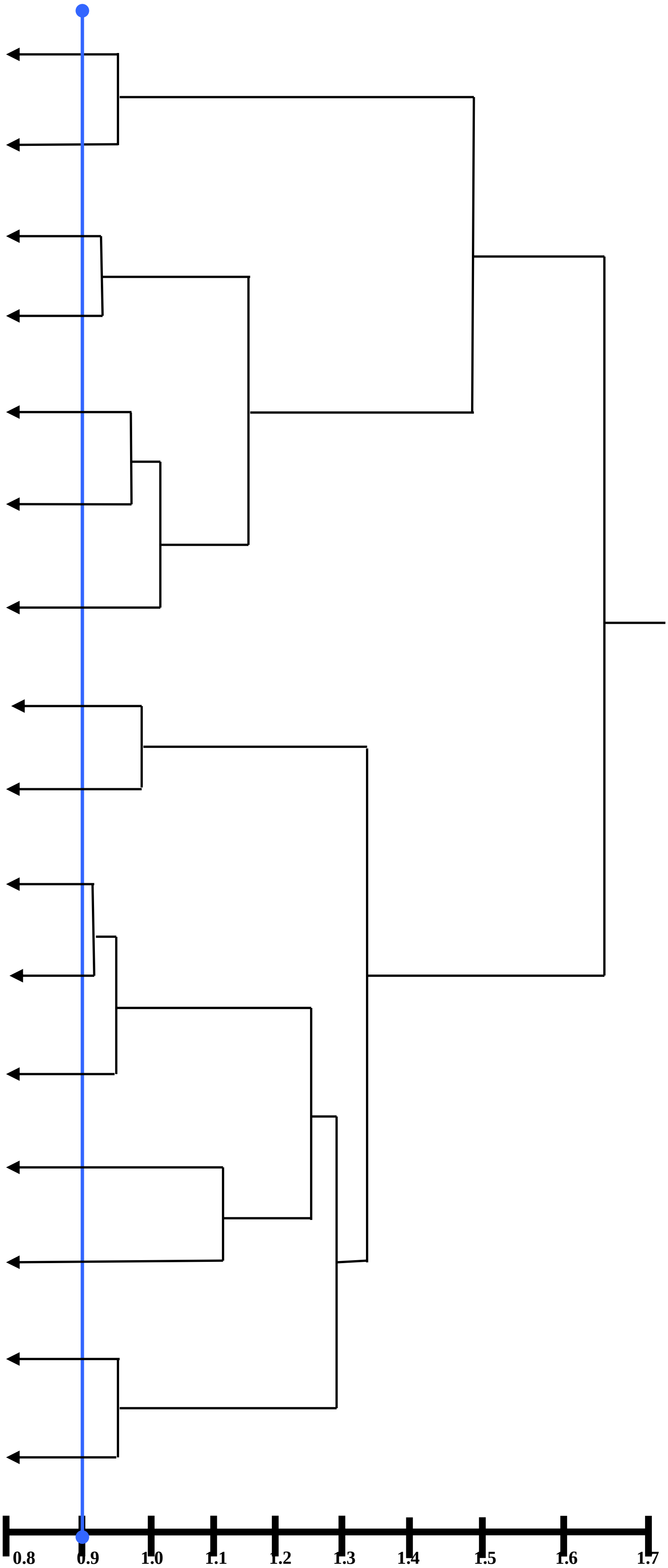

Figure 2: Summary dendrogram .Communities defined at a dissociation of *c.* 0.9.

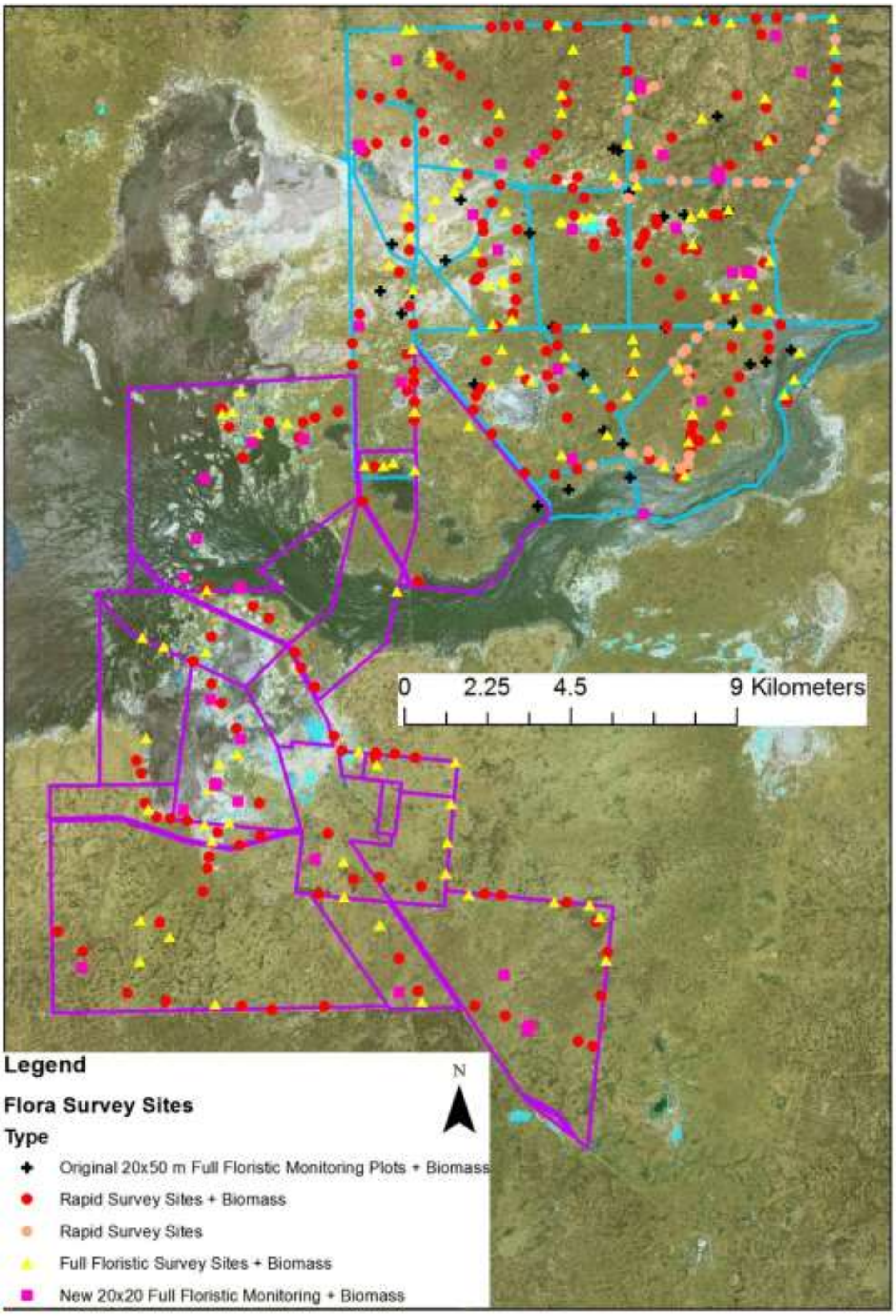

Figure 3: Location of full floristic and rapid surveys sites at *Naree* and *Yantabulla*.

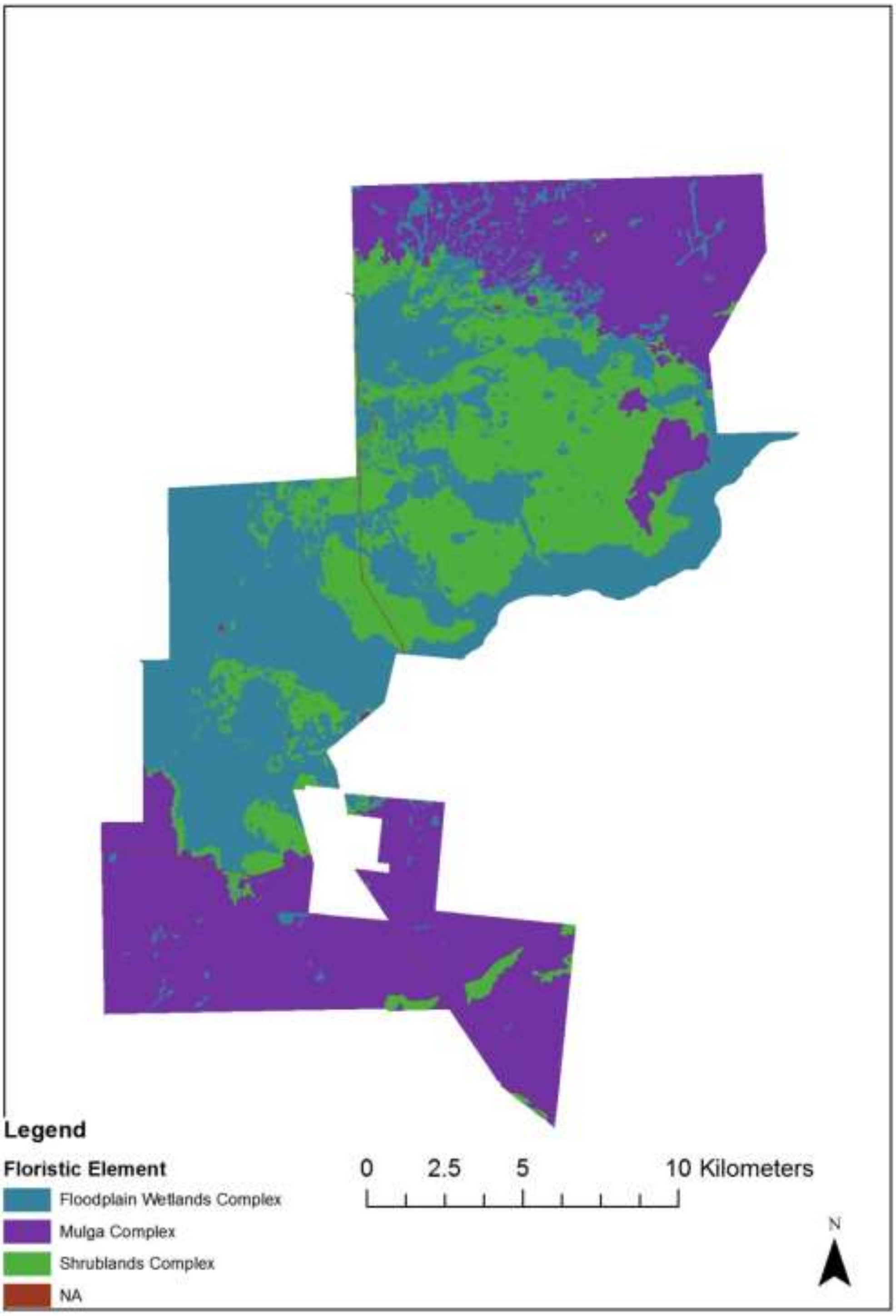

Figure 4: Mapped distribution of the three major floristic elements within *Naree* and *Yantabulla*.

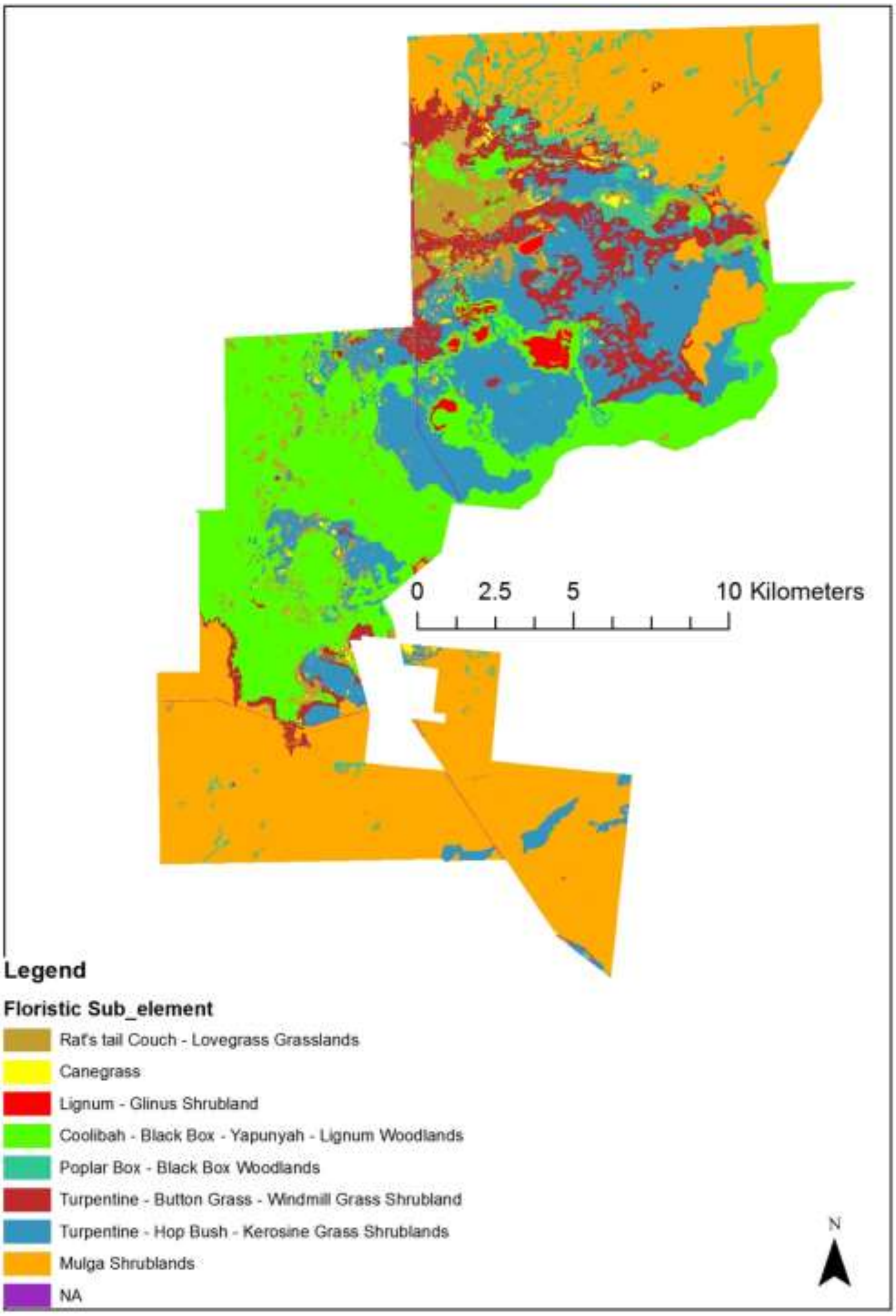

Figure 5: Mapped distribution of all eight floristic sub-elements within *Naree* and *Yantabulla*.

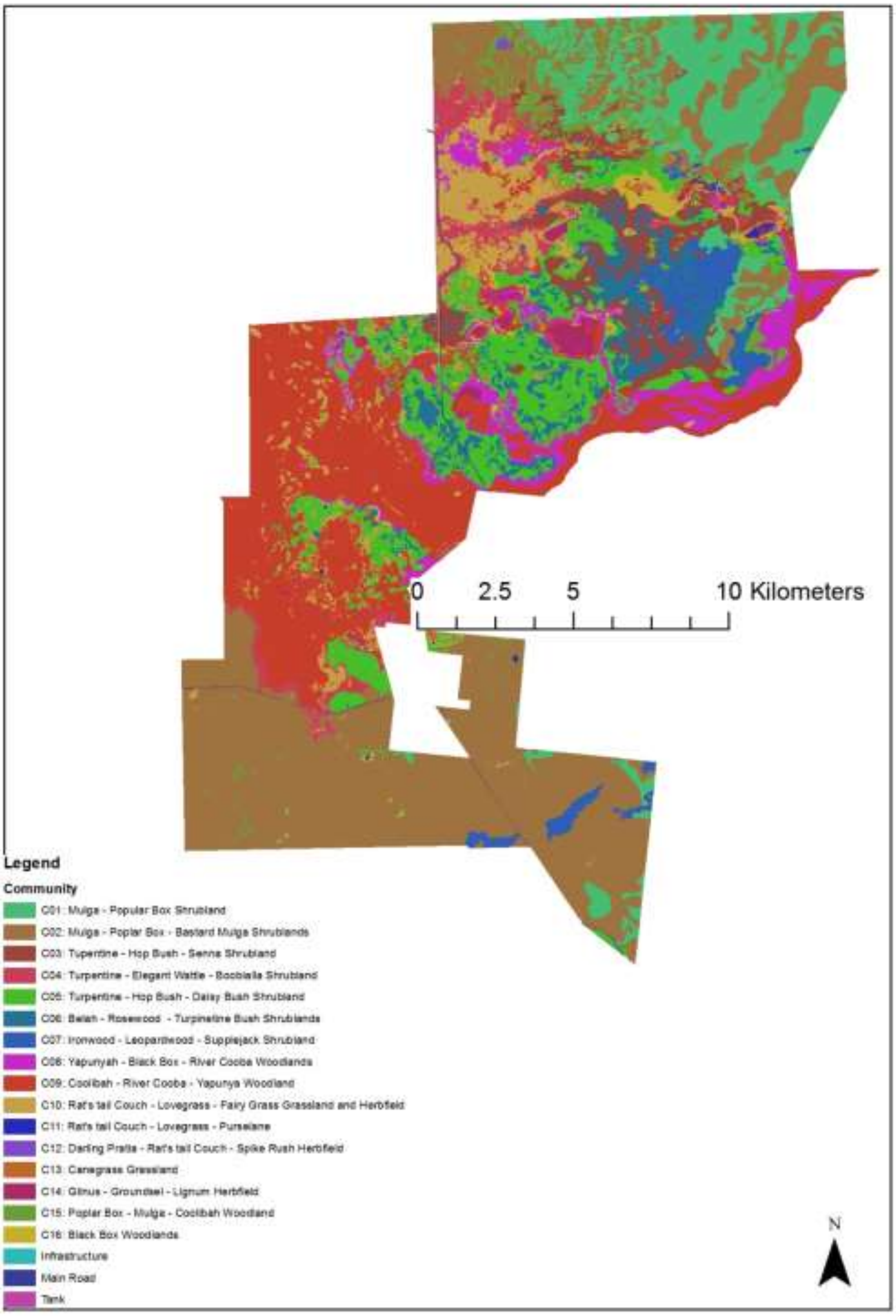

Figure 6: Mapped distribution of all floristic communities within *Naree* and *Yantabulla*.

3.4 Description of floristic plant communities

The plants of the region have developed three major strategies to cope with the frequent periods of drought. They are either drought evaders (annual and perennial) or drought resisters Neldner (1991). Annual drought evaders or ephemerals complete their life cycle in periods of brief high soil moisture (e.g. *Tripogon loliiformis, Rhodanthe floribunda, Eriochlamys* sp.). They survive the intervening dry times by dormant seeds. Some short-lived perennials can act as ephemerals if droughts persist. As such, factors that affect flowering, seed set, germination and establishment are important for perpetuating the species. Perennial drought evaders have aerial parts that die during periods of drought (e.g. *Bulbine* sp., *Portulaca oleracea*). They recover by vegetative regrowth primarily from underground organs (Neldner 1991). The perennial drought resistant plants maintain above ground foliage during drought but do not grow (e.g. most trees and perennial shrubs). They resume growth when moisture returns (Neldner 1991). Such species often have morphological adaptations such as small and/or narrow leaves.

In arid and semi-arid communities the composition and turnover of annual and short lived perennial species varies from year to year (Porteners *et al.* 1997). The composition of the ground layer is largely determined by the amount and seasonal distribution of rainfall (Fox 1991) and/or flooding events. Different frequencies of flooding and its duration are known to significantly alter the dominant species of these systems. Grasslands can turn to shrublands and vice versa and trees such as *Eucalyptus largiflorens*, *Eucalyptus coolabah* and *Eucalyptus populnea* can regeneration in large co-horts or suffer extensive die back. This is not to say that the communities described within this report are not ‘natural’ entities, but a general framework of the dominants and the common understorey species as derived here may have significant mosaic shifts in their ephemeral floras over the short term or long term encroachments and retractions some overstorey species in the long term.

Given this general picture some taxa appear to be changing little in their population dynamics across the semi-arid regions of Australia. These include many recognisable overstorey taxa such as *Alectryon oleifolius, Acacia aneura, Pittosporum angustifolium, Casuarina pauper, Acacia oswaldii, Hakea tephrosperma*, & *Hakea* *leucoptera* (Parsons 1989; Batty & Parsons 1992; Auld & Denham 2001). Many species in western New South Wales regenerate primarily by suckering, this can be seen readily in the many stands of Rosewood and *Hakea* which show obvious clumping and many exposed root systems. Recruitment via seed is considered a rare event for many western species. Since rabbit and goat populations have been in high numbers favourable events such as good rains are taken advantage of by these species which often decimate the few seed recruitment events (Auld & Denham 2001). Auld & Denham (2001) suggest that the western districts are on the verge of a major episode of decline and local extinction of plant species and communities. As a short term solution

3.4.1 Element 1: Mulga Complex

3.4.1.1 Sub-element: Mulga Shrublands

Area: 12,350 ha (38.5%)

Common Overstorey: *Acacia aneura, Eucalyptus populnea, Acacia brachystachya, Hakea ivoryi, Corymbia tumescens*
Common Mid-storey: *Eremophila longifolia, Eremophila gilesii, Senna* sp. 'zygophylla', *Senna* sp. 'filifolia', *Eremophila sturtii, Dodonaea viscosa.*
Common Understorey: *Eragrostis eriopoda, Digitaria brownii, Aristida jerichoensis, Monachather paradoxa, Aristida holathera, Fimbristylis dichotoma, Solanum cleistogamum, Cheilanthes sieberi, Panicum effusum, Eragrostis laniflora, Thyridolepis mitchelliana*.

Restricted to the higher physiographic positions both within the northern quarter of Naree and the southern quarter of Yantabulla. This complex incorporates the sub-element of Mulga Shrublands and includes two floristic communities. Due to past intensive clearing activities along with the poor resolution of the SPOT5 imagery these two communities have been difficult to separate in many cases. The reprojection of analysed sites onto the SPOT5 imagery showed clearly that the majority of Mulga lands within Yantabulla were of the single type (Community 2) while Naree had a distinct but difficult to separate mixture of both Community 1 and 2. *Acacia* *brachystachya* was a common associate within Community 2 within Yantabulla but was very rare within Naree. Some similar allied assemblages are described as occurring from the Nombinnie and Round Hill areas to far south and Nocoleche and Currawinya NPs and Ledknapper NR.

Acacia aneura associations have a very wide range they do not form a single assemblage (Boyland 1984). Groving is common within arid and semi-arid areas and rare along the eastern margin of the species distribution (Boyland 1984; Pickard & Norris 1994). Assemblages with similar overstorey taxa are widespread, particularly throughout the Mulga Lands Bioregion. Soils are generally red earths and lithosols and can be sandy with subsurface layers of iron hydroxide or clay (Beadle 1981). Soils are usually acid to neutral and the presence of calcium carbonate will limit the density of Mulga. Structurally similar communities in the broad sense probably occur throughout Central Western Queensland and to south of Cobar. However, High soil temperatures have been shown to inhibit the germination of *Acacia aneura* seeds (Burrows 1973) and such Mulga Lands could be in a transition with expected climate change. There is also evidence suggesting that there is a need for a winter component of rainfall for *A. aneura* to survive (Preece 1971; Boyland 1984) and that both winter and summer rainfall events are necessary (Beadle 1981). Growth occurs after rain at any time of the year with flowering occurring throughout the year after rain but only late summer rain leads to seed formation (Beadle 1981). Preece (1971) estimated to successful establishment could only occur once in every six years. Populations are usually of single co-horts of age classes suggesting only periodic recruitment events. The taproots can be long and the root mass under *Acacia aneura* can be extensive in the subsurface soil (Beadle 1981). *Acacia aneura* is usually found in soils low in nitrogen (Aldis 1987). Beadle (1981) states that *Acacia aneura* probably has a lifespan of a few hundred years and may take up to 100 years to reach maturity. The conservation status of Mulga woodlands is poor across its range (Neldner 1984; Neldner 1991). Thinning of *Acacia aneura* may lead to sheet and wind soil erosion (Boyland 1984). Once thinned, these assemblages often rapidly deteriorate and are colonised by pioneering native shrubs (‘woody weeds’) such as *Dodonaea* and *Eremophila* (Boyland 1984). Clearing along trails should be kept to a minimum. Mulga areas are susceptible to natural erosion around their margins and therefore future regeneration efforts should be focused on scalds on the edge of patches. *Acacia* *aneura* communities have undergone considerable degeneration across their range (Boyland 1984) and old growth mature stands are rare even with conservation areas.

Although there appears to be a perception that Mulga landscape have thickening at a great rate, at least 1% per year being normal (Burrows *et al.* 2002), however actual measurements of thickening within south-western Queensland has shown that the rate of Mulga thickening over the last 50 years was around 0.072% per year (Witt *et al.* 2009).

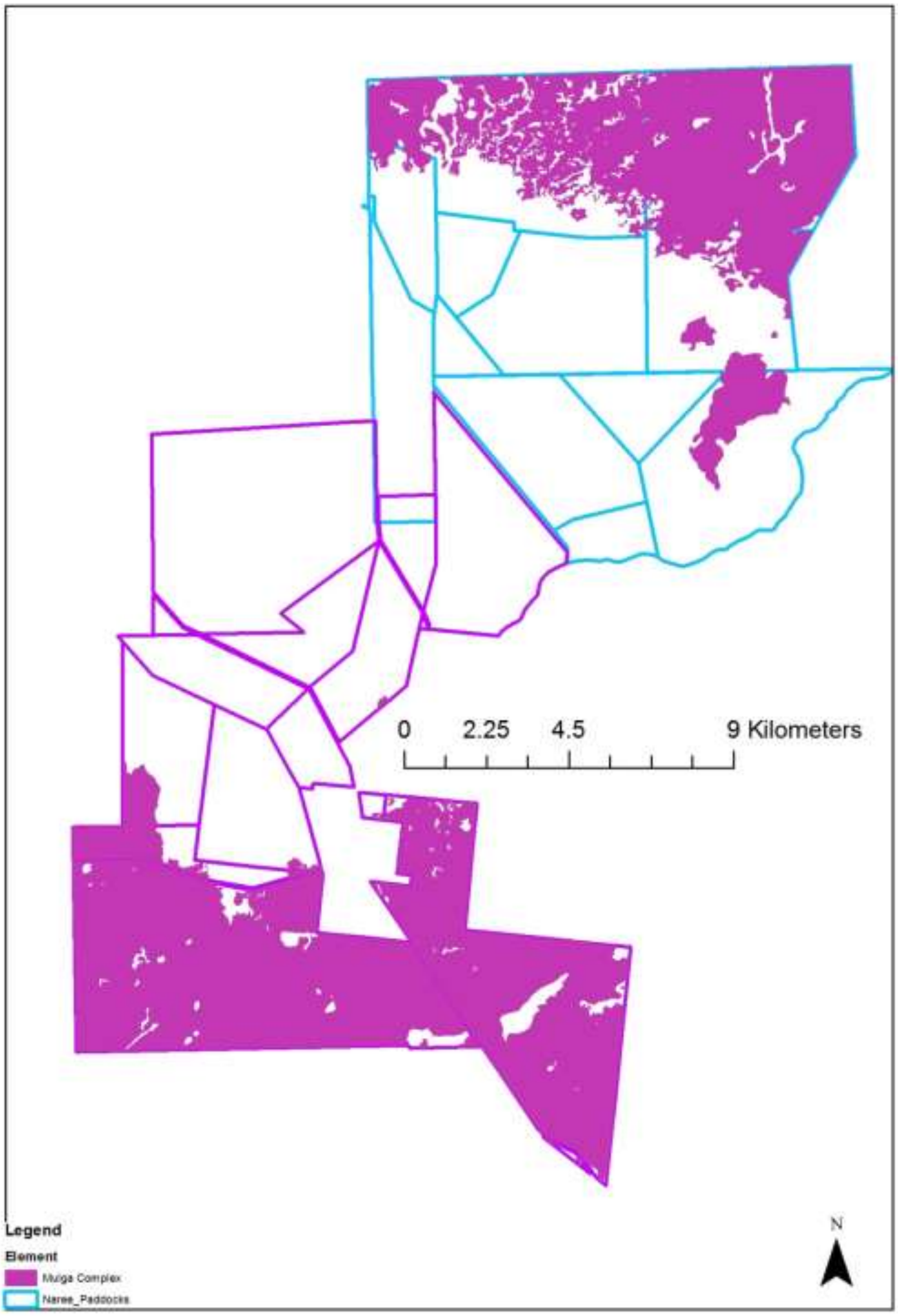

Figure 7: Mapped distribution of the Mulga Complex/Mulga Shrublands within *Naree* and *Yantabulla*.

3.4.1.1 Community 1: Mulga – Poplar Box Woodland and Shrubland

Acacia aneura (Mulga) – *Eucalyptus populnea* (Poplar Box) Woodland and Shrubland

Full floristic sites (14): NE01, NE02, NE03, NE04, NE22, NE23, NEY006, NEY019, NEY089, NEY099, NRE18, NRE37, NRE38, NRE49.

Rapid survey sites (32): NER010, NER013, NER014, NER015, NER016, NER018, NER019, NER020, NER021, NER025, NER026, NER044, NER055, NER059, NER061, NER063, NER065, NER074, NER144, NER164, NERR014, NERR015, NERR017, NERR018, NERR020, NERR021, NERR022, NERR024, NERR027, NERR030, NERR032, NERR034.

Number of hectares: 2,908 **Proportion of property:** 9%

Environmental relationships: found primarily of red soils on higher topographic positions such as ridges and low plateau areas. Soils can be hard red clay pans and gibber/red clay/red sand landscapes.

Distribution within Naree & Yantabulla: largely restricted to *Naree* within the north and north eastern portion of the property with some occurrences within the south east of *Yantabulla*. Many areas of both properties have been cleared.

Structure: generally a tall shrubland but occasionally a shrubland to low open woodland or layered woodland.

- Tall shrub or low tree layer: (3) 5-7 (12) m tall. (5) 25-35 (70)% cover.
- Shrub layer: 1-2 (-7) m tall. 10-20 (60)% cover. Rarely absent.
- Low shrub layer very rare present.
- Understorey layer: 0.1-0.5 m tall. (10) 30-35 (70)% cover.

No. of taxa: 132 **No. of taxa per plot:** 10-**24.5**-48.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Acacia aneura, Eucalyptus populnea, Hakea ivoryi, Corymbia tumescens*.

Shrubs: *Eremophila longifolia*, *Solanum cleistogamum, Senna* sp. 'filifolia', *Solanum parvifolium, Thryptomene hexandra, Senna* sp. 'coriacea', *Maireana brevifolia, Solanum cinereum, Senna* sp. 'zygophylla', *Sclerolaena diacantha*, *Hakea eryeana*, *Eremophila gilesii*.

Climbers & trailers: *Convolvulus clementii, Glycine canescens, Convolvulus remotus.*

Ground cover: *Fimbristylis dichotoma, Cheilanthes sieberi, Panicum effusum, Digitaria brownii, Calotis inermis, Calotis hispidula, Tripogon loliiformis, Aristida jerichoensis, Aristida holathera, Enneapogon avenaceus, Pimelea trichostachya, Nicotiana simulans, Monachather paradoxa, Erodium crinitum, Centipeda thespidioides, Vittadinia cuneata, Goodenia glabra,, Chenopodium melanocarpum, Digitaria divaricatissima, Dactyloctenium radulans, Eragrostis leptocarpa, Digitaria ammophila, Chamaesyce drummondii, Calandrinia eremaea, Wahlenbergia tumidifructa, Thyridolepis mitchelliana, Ptilotus gaudichaudii, Omphalolappula concava, Eragrostis setifolia, Enneapogon nigricans, Calotis lappulacea, Velleia arguta, Trachymene ochracea, Sida trichopoda, Sida fibulifera, Ptilotus polystachyus, Portulaca oleracea, Paspalidium constrictum, Oxalis perennans, Goodenia cycloptera, Dysphania rhadinostachya, Digitaria hystrichoides, Aristida leptopoda, Triraphis mollis, Swainsona affinis, Solanum esuriale, Solanum ellipticum, Solanum coactiliferum, Sclerolaena convexula, Ptilotus leucocoma, Plantago turrifera, Hibiscus sturtii, Eragrostis lacunaria, Enneapogon intermedius, Chloris truncata, Centipeda crateriformis, Tragus australianus, Trachymene glaucifolia, Themeda triandra, Stuartina muelleri, Streptoglossa liatroides, Pycnosorus thompsonianus, Perotus rara, Panicum simile, Marsilea drummondii, Evolvulus alsinoides, Eragrostis parviflora, Eragrostis leptostachya, Eragrostis eriopoda, Enteropogon acicularis, Einadia trigonos, Dianella porracea, Crassula sieberiana, Aristida latifolia, Aristida contorta, Aristida calycina, Abutilon oxycarpum*.

Introduced taxa: *Malvastrum americanum, Cenchrus ciliaris, Ammi majus.*

Percent of species introduced: 2%

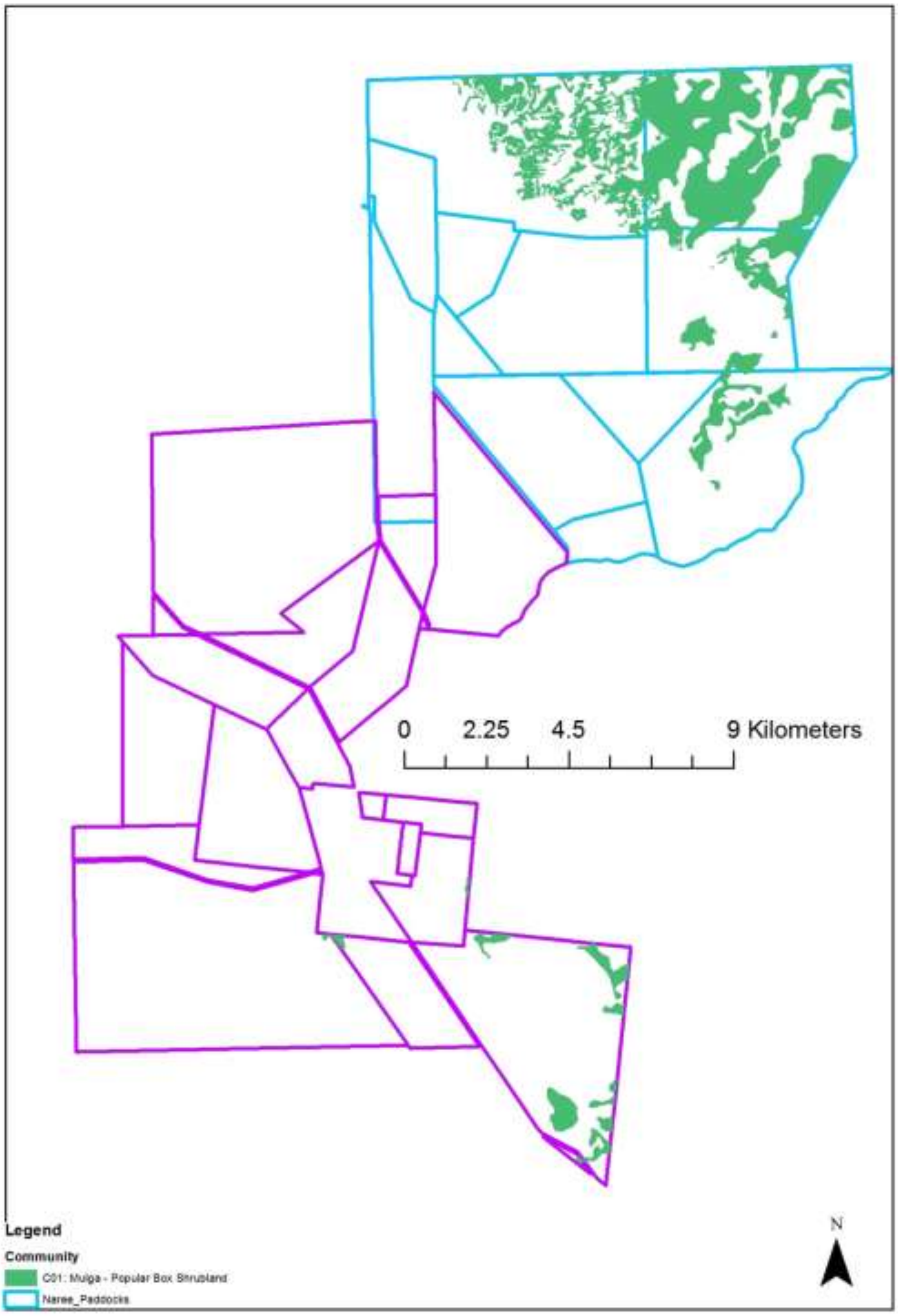

Figure 8: Mapped distribution of Community 1.

Plate 1: Photographs of Community 1. Above NEY019; below NEY089.

Plate 2: Photographs of Community 1. Above NRE037; below Site NRE049.

3.4.1.1.2 Community 2: Mulga – Popular Box – Bastard Mulga Woodland and Shrubland

Acacia aneura (Mulga) - *Eucalyptus populnea* (Poplar Box) – *Acacia brachystachya* (Bustard Mulga) Woodland and Shrubland

Full floristic sites (40): NEY001, NEY007, NEY009, NEY009, NEY010, NEY011, NEY012, NEY013, NEY016, NEY018, NEY037, NEY039, NEY040, NEY041, NEY046, NEY087, NEY097, NEY098, NEY100, NEY101, NEY102, NEY103, NEY111, NEY112, NEY114, NEY115, NEY117, NEY118, NRE005, NRE006, NRE007, NRE011, NRE017, NRE020, NRE023, NRE036, NRE039, NRE040, NRE047, NRE048.

Rapid survey sites (37): NER002, NER003, NER024, NER048, NER051, NER060, NER064, NER067, NER141, NER142, NER145, NER146, NER147, NER149, NER150, NER151, NER152, NER153, NER154, NER155, NER165, NER166, NER167, NER168, NER169, NER170, NER172, NER173, NER174, NER175, NER176, NERR019, NERR023, NERR028, NERR029, NERR031, NERR035.

Number of hectares: 9,442 **Proportion of property:** 29.4%

Environmental relationships: found primarily of red soils on higher topographic positions such as ridges and low plateau areas. Soils can be hard red clay pans and gibber/red clay/red sand landscapes.

Distribution within Naree & Yantabulla: largely restricted to *Yantabulla* where the community dominates the plateau area along the southern third of the property. Also occurs in the north and north east quarter of *Naree* where it intermingles considerably with Community 1. Extensively cleared throughout *Yantabulla* and in many locations within *Naree*.

Structure: usually a tall shrubland but often a shrubland and low open woodland or layered woodland.

- Tall shrub or low tree-layer: 4-7 (14) m tall. (2) 20-30 (80)% cover.
- Shrub layer: 1.5-2.5 (9.5) m tall. (2) 15-25 (50)% cover. Rarely absent.
- Low shrub-layer very rarely present.
- Understorey layer: 0.1-1 m tall. (5) 30-35 (70)% cover.

No. of taxa: 126 **No. of taxa per plot:** 8-**15.2**-28.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Acacia aneura, Eucalyptus populnea, Acacia brachystachya, Hakea ivoryi, Corymbia tumescens, Grevillea striata, Callitris glaucophylla, Acacia ramulosa, Eucalyptus melanophloia, Acacia excelsa*.

Shrubs: *Solanum cleistogamum, Eremophila longifolia, Eremophila gilesii, Senna* sp. 'zygophylla', *Maireana villosa, Dodonaea viscosa, Eremophila sturtii, Senna* sp. 'filifolia', *Sclerolaena convexula, Thryptomene hexandra, Sclerolaena diacantha, Sclerolaena birchii, Solanum ferocissimum, Solanum ellipticum, Eremophila bowmanii, Solanum parvifolium, Eremophila latrobei*.

Climbers & trailers: *Convulvus remotus.*

Ground cover: *Eragrostis eriopoda, Aristida jerichoensis, Digitaria brownii, Monachather paradoxa, Aristida holathera, Eragrostis parviflora, Panicum effusum, Fimbristylis dichotoma, Hibiscus sturtii, Eriachne helmsii, Cheilanthes sieberi, Thyridolepis mitchelliana, Digitaria divaricatissima, Calotis cuneifolia, Enneapogon avenaceus, Triraphis mollis, Dactyloctenium radulans, Tripogon loliiformis, Ptilotus gaudichaudii, Omphalolappula concava, Sida trichopoda, Perotus rara, Panicum simile, Tragus australianus, Dysphania rhadinostachya, Calotis lappulacea, Thyridolepis xerophila, Pimelea trichostachya, Sporobolus actinocladus, Sida filiformis, Paspalidium constrictum, Goodenia cycloptera, Chamaesyce drummondii, Centipeda thespidioides, Amphipogon caricinus, Velleia arguta, Leptorhynchos baileyi, Enneapogon cylindricus, Aristida contorta, Sida platycalyx, Sida cunninghamii, Ptilotus polystachyus, Ptilotus leucocoma, Mollugo cerviana, Gypsophyla tubulosa, Eriachne mucronata, Eragrostis lacunaria, Eragrostis kennedyae, Enteropogon acicularis, Cymbopogon ambiguus, Boerhavia coccinea, Aristida nitidula, Aristida blakei.*

Introduced taxa: *Sisymbrium erysimoides, Ammi majus, Eragrostis cilianensis.*

Percent of species introduced: 2.6%

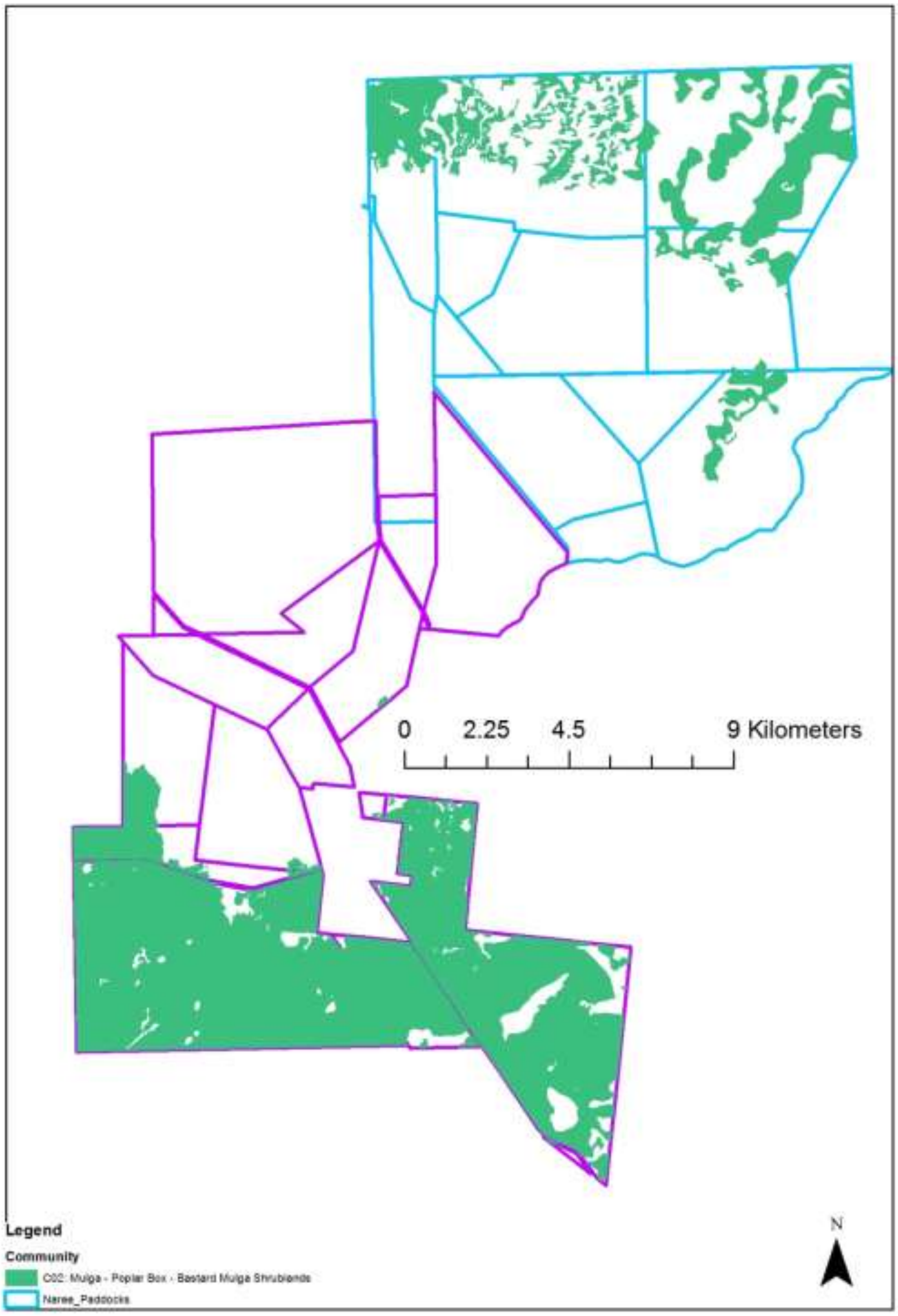

Figure 9: Mapped distribution of Community 2.

Plate 3: Photographs of Community 2. Above NEY009; below NEY012.

Plate 4: Photographs of Community 2. Above NEY040; below NEY114.

Plate 5: Photographs of Community 2. Above NEY115; below NRE007.

3.4.2 Element 2: Shrubland Complex

Area: 7,960 ha (24.8%)

Common Overstorey: *Acacia excelsa, Alectryon oleifolius, Casuarina pauper, Ventilago viminalis, Flindersia maculosa*.
Common Mid-storey: *Eremophila sturtii, Dodonaea viscosa, Senna* sp. 'zygophylla', *Olearia pimeloides, Eremophila deserti, Acacia victoriae.*
Common Understorey: *Aristida holathera, Enteropogon acicularis, Enneapogon avenaceus, Eragrostis eriopoda, Dissocarpus paradoxus, Sclerolaena diacantha, Enchylaena tomentosa, Dactyloctenium radulans, Sclerolaena diacantha, Eragrostis laniflora*.

Structure varies considerably from open to dense shrublands to open shrubby woodlands. The assemblages within this Element are generally distinguished by their often dense cover of native 'woody weeds', particularly of Turpentine, Hop Bush and Senna. In some instances the remnants of original tropical woodlands remain but it is also likely that dense shrublands of these types were also present in some form prior to agricultural intervention. These remnants are the southern distribution of many taxa derived originally from tropical monsoonal and or rainforest species left behind in the drying of the continent. These taxa become increasingly less common further south within temperate and winter dominant rainfall zones of New South Wales.

These shrub dominated assemblages have increased in distribution since clearing and grazing was introduced. 'Woody weeds' are generally accepted as a form of land degradation and anecdotal evidence has been reported that soil erosion is greater under these stands (Porteners *et al.* 1997). However, others have found little evidence for increased erosion and their presence is not thought to cause any problems with respect to biodiversity (Pickard & Norris 1994; West 2000). Woody encroachment is a worldwide phenomenon and may be a results of long-term fluctuations in rainfall and atmospheric CO_2, combined with overgrazing and potential alteration of fire regimes (Archer 2010). While much speculation about the effects of this transition have centred on the process being a form of desertification or landscape degradation there has been little or no empirical support to suggest this is actually the case. If fact the body of evidence produced over the last two decades suggests that woody encroachment in western New South Wales is in fact largely a beneficial process that improves landscape health and soil functional on almost all measured variables and/or neutral on many (Elkins *et al.* 1986; Bhark & Small 2003; Eldridge & Fruedenberger 2005; Pintado *et al.* 2005; Maestre *et al.* 2009; Roth *et al* 2009; Collard & Fisher 2010; Eldridge *et al.* 2011; Smit & Ruifrok 2011; Smith 2012; Daryanto *et al.* 2012; Daryanto *et al.* 2013; Howard *et al.* 2012; Eldridge *et al.* 2013; Soliveres & Eldridge 2013; Eldridge & Soliveres 2014; Eldridge *et al.* 2014; Soliveres *et al.* 2014; Eldridge *et al.* 2015). In 35 study sites across western New South Wales no declines in plant, vertebrate and invertebrate richness was found with increasing woody encroachment (Ayres *et al.* 2001). It appears that grazing is the cause of any recorded decline in functionality of soils; productivity and landscape serviceability while shrubs are largely ameliorate the damage caused by overgrazing (Eldridge *et al.* 2013; Eldridge & Solivares 2015; Eldridge *et al.* 2015). Overgrazing in shrublands leads to a redistribution of resources by moving eroded interspace soil into shrub patches reinforcing a distinction between shrub patch and interpatch properties (Okin *et al.* 2009). Data from sites where goat s and rabbits have been controlled indicate that shrubs density have a much less impact on grass biomass than grazing (Robson 1995; Daryanto & Eldridge 2010). The state and transition model presented by Eldridge and Soliveres (2015) suggests that intensive grazing and mechanical removal may lead to very dense shrublands with highly modified soil characteristics that could take up to 100 years to naturally recover even with the removal of grazing and good rainfall. Whereas moderately dense shrubland with a sparse understorey without blade ploughing and exclusion of grazing may only require 10 years to return to a diverse state with a diverse understorey depending on seed banks and rainfall (Eldridge & Soliveres 2015). The greatest pastural values are likely to occur under moderate shrub cover due to facilitation (Eldridge & Soliveres 2015). Shrublands that are open to moderate density dominated by more than one species with a stable soil surface provide the highest overall ecosystem service values (Eldridge & Soliveres 2015). The overall evidence suggests that if grazing then it is a better strategy for long term viability to manage grazing stocking rates rather than focussing on the physical or chemical removal of shrubby vegetation (Eldridge *et al.* 2013). Woody species play a highly important role as refugia from grazing and harsh environmental conditions within arid environments and their removal should not be taken lighting in management practices which wish to promote biodiversity and ecosystem functioning (Howard *et al.* 2012). Eldridge *et al.* (2011) state clearly that shrub encroachment must be decoupled from the concept of degradation.

Below represents hypothesized mechanisms underlying known changes in landscape metrics associated with shrub encroachment as presented by Eldridge *et al.* (2005) with additions and modifications:

- Greater litter cover, depth and decomposition under shrubs (Daryanto *et al.* 2012).
- Shrubs enhance macroporisty of soil (Bhark & Small 2003; Eldridge & Freudenbergre 2005).
- Shrubs provide physical protection against trampling by herbivores; grazing induced trampling compacts soil surface, reducing macro-porosity; trampling reduces biocrust cover and composition, enhanced nutrient imputs by N-fixing and C-fixing lichens in biocrusts; grazing-induced surface disturbance reduces C and N levels (Laycock & Conrad 1981; Eldridge 1998; Barger *et al.* 2006; Daryanto *et al.* 2012; Eldridge *et al.* 2013; Smith & Ruifrok 2011; Dettwiler-Robinson *et al.* 2013).
- Shrubs are facilitors in arid environments and provide shelter and improved microclimate for understorey species during drought stress (Prider & Facelli 2004; Eldridge *et al.* 2015).
- Shrub canopies intercept rainfall funnelling it towards the base where litter accumulates and reduces the force impact on the soil surface, however this ability is reduced when shrubs are browsed (Mills *et al.* 2009).
- Plant diversity and ecosystem multifunctionality are highest at intermediate density/cover of shrubs in arid lands (Soliveres *et al.* 2014; *Eldridge* & Soliveres 2015)
- Denser soils have lower biological activity and reduced C and N concentrations (Smith *et al.* 2012).
- Litterfall and enhanced decomposition under shrubs enhance soil C and N levels (Daryanto *et al*. 2012).
- Shrub litter retards water flow (Daryanto *et al.* 2013) and high litter cover supports functional termite populations and macropore flow (Elkins *et al.* 1986).
- Shrub litter dissipates raindrop energy at the surface, thereby reducing the of soil to form a physical crust (Geddes & Dunkerley 1999).
- Shrub-litter dams increase surface detention and the area of which water can infiltrate (Eddy *et al.* 1999).
- Decomposition of shrub litter increases soil structure protecting it against erosion (Teague *et al.* 2011).
- Shrub leaf litter shown to be strong facilitators of grasses and forbs enhancing soil carbon (Han *et al.* 2008; Howard *et al.* 2012)

Shrubs enhance total infiltration by increasing soil macropores (Bhark & Small 2003).

Dung deposition beneath woody canopies (Macropods etc) enhances soil nutrients (Eldridge & Rath 2002).

Closed woody canopies are more likely to support vulnerable and declining birds (Smallbone *et al.* 2014).

Infiltration 20 times greater under shrubs than in adjacent bare interspaces, with soil moisture following rain events higher under vegetation. Shrubs likely modify the soil physical environment. Infiltration beneath canopies due to enhanced organic matter and litter recycling under canopy (Scholte 1989; Bhark & Small 2007; Katra *et al.* 2007; Wilcox *et al.* 2012; Eldridge *et al.* 2014).

Shrub encroachment consistently associated with increases in above and below-ground carbon (Eldridge *et al.* 2011).

Non-shrub interspace soils characterized by surfaces indicative of dysfunctional processes (Eldridge *et al.* 2015).

Deep-rooted C_3 shrubs may be more physiologicall active in dry conditions than shallow-rooted C_4 grasses (Throop *et al.* 2012).

Shrubs may quicken recovery of degraded lands by facilitation due to their ability to modify the effects of drought, salinity and frost (Richmond & Chinnock 1994; Booth *et al.* 1996; Padilla & Pugnaire 2006).

Shrub encroachment promoted an increase in the richness of vascular plant species particularly under low rainfall conditions (Eldridge *et al.* 2011).

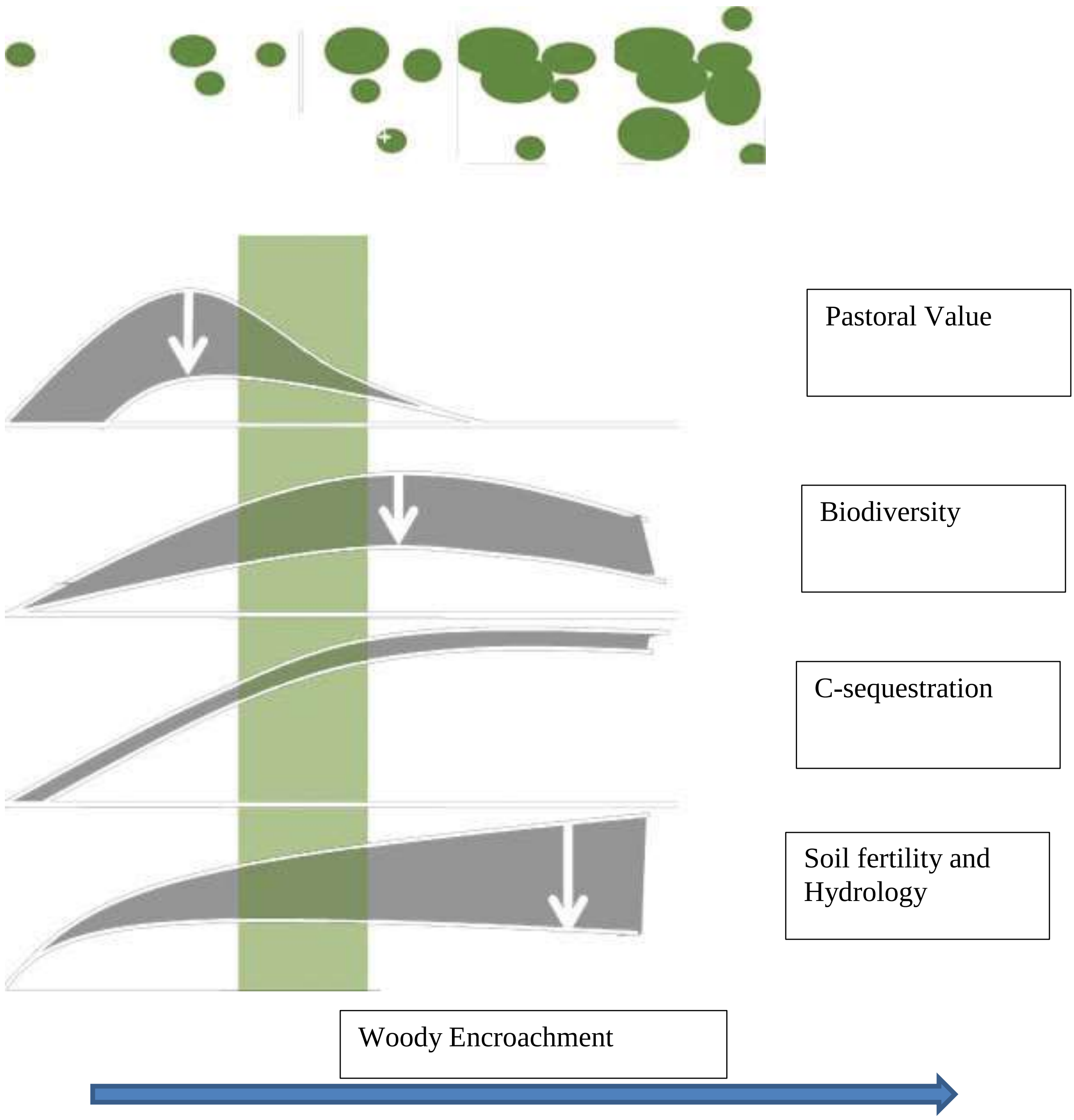

Figure 10: Landscape level effects of woody plant encroachment taken from Eldridge *et al.* (2015). The downward pressure within the grey envelope represents the depressed range of values due to increased grazing pressure.

These assemblages corresponds well to a number that have been described in the literature, all other occurrences have been considered of low conservation priority as they are of a derived nature and are increasing in the landscape. Some stands however may have moderate conservation status in regards to their faunal assemblages. Furthermore where many of the original tropical overstorey species survive there is potential for the reestablishment of many of these slow growing and increasingly rare in the landscape species with some hope that vestiges of original composition and structure may form over time. Beadle (1981) placed many of these assemblages within his relict Rainforest-derived communities of summer dominant Semi-arid and arid zones. Many of these relict species appear to reproduce rarely from seed and often develop monodominant stands due to suckering of root stocks. Benson (2006) considers such tropical woodlands to be near threatened within New South Wales by unsustainable grazing and shrub invasion and is inadequately protected across their distribution.

Flindersia maculosa (Leopardwood) is an occasional co-dominant within some of these assemblages and Beadle (1981) included Leopardwood within is *Geijera parviflora – Flindersia maculosa – Alectryon oleifolius* Alliance which occurs on texture contrast soils on ancient river alluviums. In particular Leopardwood can occur in pure stands or in association with *Geijera parviflora, Eremophila sturtii/mitchellii* or *Atalaya hemiglauca* (Beadle 1980). Leopardwood generally occur on low elevated areas where the sandy surface soil overlies a clay subsoil with a high lime content (Beadle 1980). These soils are susceptible to erosion of the sandy layer which stimulates suckering. *Alectryon oleifolius* (Rosewood) requires disturbance such as fire to produce root suckers and rarely regenerates from seed (Wisniewski & Parsons 1986). Most stands of Rosewood within the properties are clumps of a single individual that has suckered from its roots. Rosewood suckers are highly palatable to sheep, rabbits and goats and suckers are often absent due to this. Beadle (1981) describes an *Atalaya hemiglauca* (Whitewood) - *Grevillea striata* (Beefwood) - *Ventilago viminalis* (Supplejack) Alliance that occurs in areas with rainfalls between 300 and 600 mm predominantly during summer. *Casuarina pauper* (Belah) woodlands have a relatively non-flammable understorey and sometimes do not burn even when nearby eucalypt woodlands will (Westbrooke *et al.* 1998). *Casuarina pauper* assemblages are most commonly described in conjunction with *Alectryon* *oleifolius* both of which sucker extensively. *Casuarina pauper* assemblages have been described commonly in western New South Wales and parts of adjacent areas of South Australia and western Queensland. *Casuarina pauper* does not maintain a soil stored seed bank and relies on annual seed production and rainfall to promote germination and establishment (Auld 1995). It is likely that fires would be detrimental to this assemblage particularly if of high frequency and intensity. *Casuarina pauper* generally occurs on alkaline grey and brown clays which often crack on drying and/or are gilgated within north and central New South Wales (Beadle 1981). *Acacia excelsa* can be a small tree to 12 m tall. Its main area of occurrence is between Cobar and Bourke where the rainfall is around 280-350 mm per annum. When it occurs further east it is usually associated with *Eucalyptus populnea*. Soils where Ironwood occurs are usually of sandy soils or pans with or without lateritic gravel.

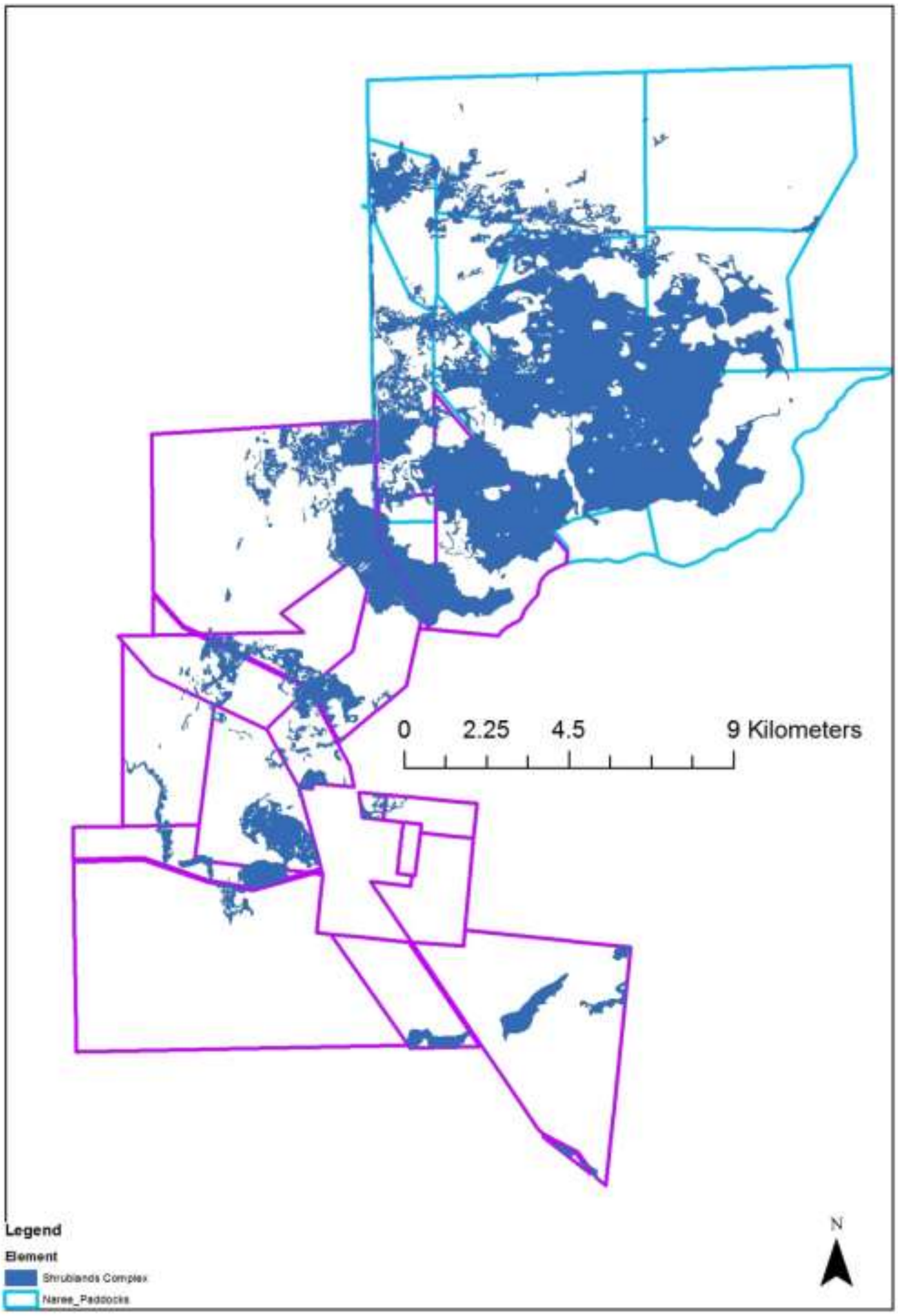

Figure 11: Mapped distribution of the Shrublands Complex within *Naree* and *Yantabulla*.

3.4.2.1 Sub-element: Turpentine – Button Grass – Windmill Grass Shrubland

Area: 2,616 ha (8.2%)

Common Overstorey: *Acacia excelsa, Casuarina pauper, Alectryon oleifolius*. (Rarely present).
Common Mid-storey: *Eremophila sturtii, Dodonaea viscosa, Senna* sp. ‘zygophylla’, *Olearia pimeloides, Dodonaea viscosa, Myoporum montanum, Acacia victoriae.*
Common Understorey: *Dactyloctenium radulans, Enteropogon acicularis, Portulaca oleracea, Abutilon otocarpum, Chenopodium cristatum, Eragrostis setifolia, Enneapogon avenaceus, Enchylaena tomentosa, Tragus australianus, Sclerolaena diacantha, Aristida jerichoensis*.

Generally found on lower physiographic positions often associated with wetland, playa lake and swamp margins. Soils can be sandy to clayey red brown earths but often with higher clay content. This sub-assemblage also occurs areas of wind and water erosion where alternating patches of red dune sand occur with flats of calcium carbonate near the surface.

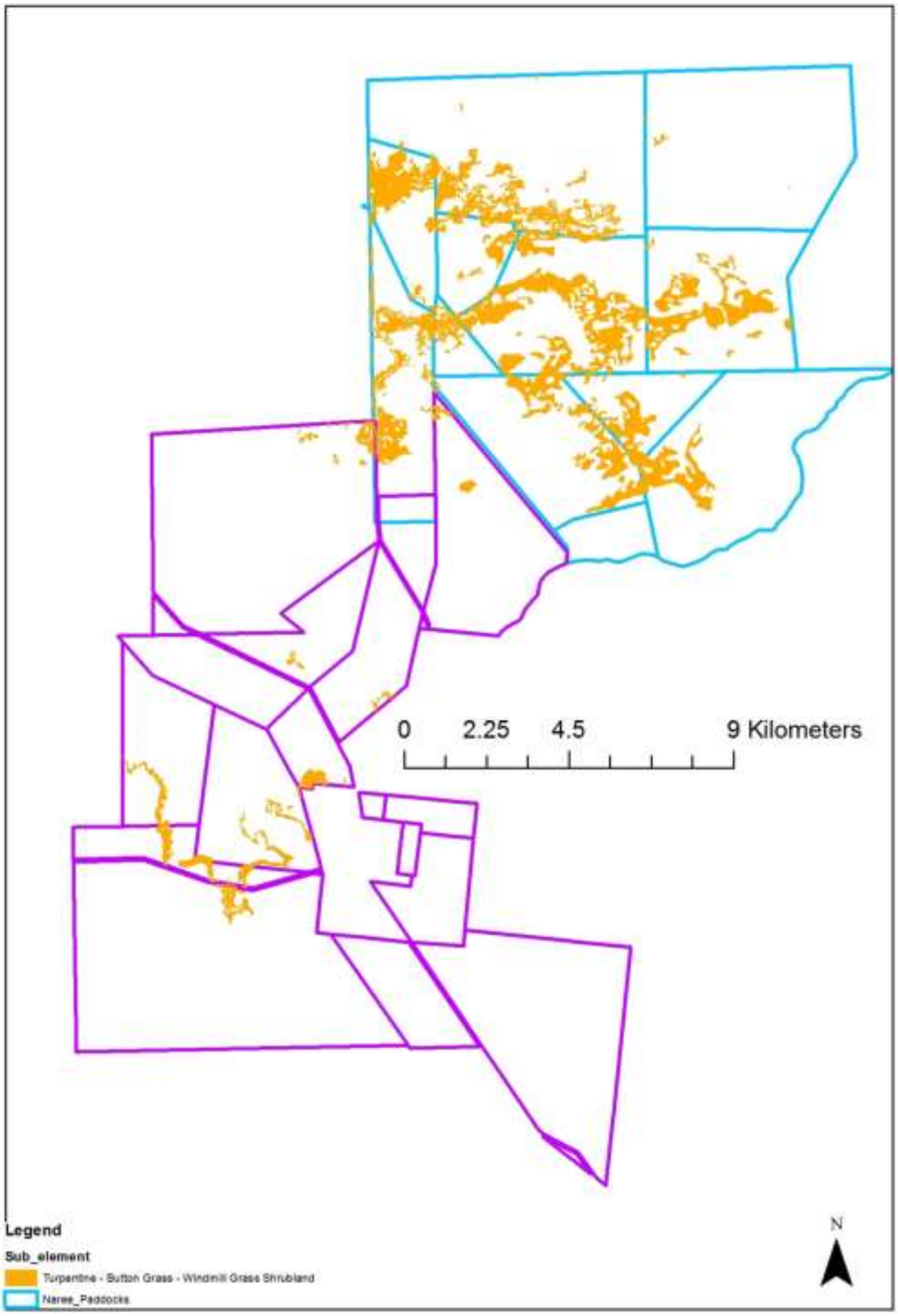

Figure 12: Mapped distribution of the Sub-element Turpentine – Button Grass – Windmill Grass Shrubland within *Naree* and *Yantabulla*.

3.4.2.1.1 Community 3: Turpentine Bush – Hop Bush Shrubland

Eremophila sturtii (Turpentine Bush) – *Dodonaea viscosa* (Hop Bush) Shrubland

Full floristic sites (6): NE05, NE06, NE07, NE08, NE31, NE34.

Rapid survey sites (19): NER027, NER036, NER042, NER057, NER062, NER076, NER080, NER088, NER098, NER111, NER116, NER134, NER189, NER191, NERR001, NERR002, NERR007, NER016, NER033.

Number of hectares: 1,545 **Proportion of property:** 4.8%

Environmental relationships: found associated with minor dunes around playa lakes and wetland systems.

Distribution within *Naree and Yantabulla*: primarily restricted to the *Naree* property.

Structure: a low shrubby woodland or shrubland to open grassy shrubland.

- Tall shrub-layer: (1) 3-6 m (8) tall. (5) 20-30 (70) % cover.
- Shrub layer: 1-3 (5) m tall. (15) 30-40 (70)% cover.
- Low shrub layer rarely present.
- Understorey layer: 0.1-0.5 (0.8) m tall. (10) 20-30 (60)% cover.

No. of taxa: 90 **No. of taxa per plot:** 24-**29.8**-41.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Acacia excelsa, Casuarina pauper, Alectryon oleifolius*.

Shrubs: *Eremophila sturtii, Dodonaea viscosa, Senna* sp. 'zygophylla', *Olearia pimeloides, Dissocarpus paradoxa, Solanum coactiliferum, Sclerolaena lanicuspis, Sclerolaena bicornis, Senna* sp. 'sturtii', *Sclerolaena muricata, Sclerolaena convexula, Myoporum montanum, Chenopodium desertorum, Atriplex limbata, Senna* sp. 'filifolia', *Pimelea microcephala, Maireana triptera, Maireana brevifolia*.

Climbers & trailers: *Jasminum lineare.*

Ground cover: *Enteropogon acicularis, Dactyloctenium radulans, Portulaca oleracea, Chenopodium cristatum, Abutilon otocarpum, Eragrostis setifolia, Enneapogon avenaceus, Enchylaena tomentosa, Tragus australianus, Aristida jerichoensis, Aristida holathera, Trianthema triquetra, Digitaria brownii, Wahlenbergia tumidifructa, Triraphis mollis, Sida filiformis, Sida fibulifera,* *Eragrostis microcarpa, Calandrinia eremaea, Perotus rara, Paspalidium constrictum, Monachather paradoxa, Eragrostis parviflora, Cheilanthes sieberi, Chamaesyce drummondii, Boerhavia coccinea, Zygophyllum iodocarpum, Sida trichopoda, Ptilotus polystachyus, Pimelea trichostachya, Omphalolappula concava, Hibiscus sturtii, Goodenia glabra, Brachyscome ciliaris.*

Introduced taxa: *Eragrostis cilianensis, Tribulus terrestris, Cucumis myriocarpus, Cenchrus ciliaris.*

Percent of species introduced: 4.4%

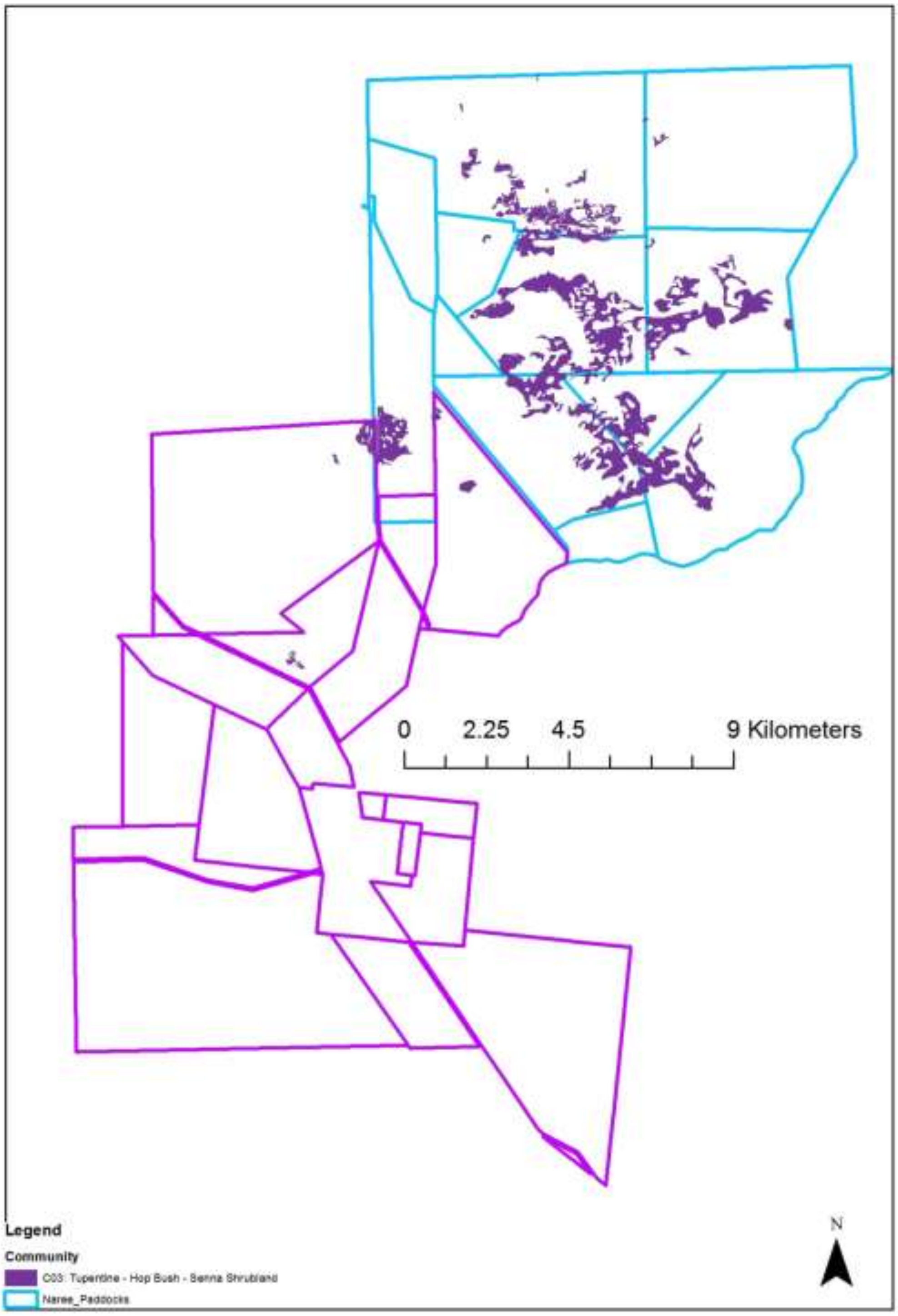

Figure 13: Mapped distribution of Community 3.

Plate 6: Photographs of Community 3. Above NE05; below NE06.

Plate 7: Photographs of Community 3. Above NE08; below NE34.

3.4.2.1.2 Community 4: Turpentine – Elegant Wattle Shrubland

Eremophila sturtii (Turpentine Bush) – *Acacia victoriae* (Elegant Wattle) Shrubland

Sample sites (6): NEY021, NEY045, NEY057, NRE033, NRE034, NRE035.

Rapid survey sites (14): NER023, NER066, NER071, NER072, NER084, NER099, NER137, NER156, NER157, NER158, NER160, NER163, NER177, NER178.

Number of hectares: 1,071 **Proportion of property:** 3.3%

Environmental relationships: strongly associated with lower dunal positions and surrounding playa lakes and wetland areas which have often been damaged by water and wind erosion, however also common in undisturbed situations. Usually with less sandy material and higher clay and calcium carbonate content within the soil profile than Community 3.

Distribution within *Naree and Yantabulla*: nearby wetland areas throughout both properties.

Structure: shrubland and often a very open shrubland to herbaceous or grassy shrubland, sometimes with very little above ground biomass at all.

- Shrub-layer: (1) 2-5 m tall. 5-25 (80)% cover.
- Understorey layer: 0.1-0.5 (1) m tall. (1) 20-30 (70)% cover.

No. of taxa: 27 **No. of taxa per plot:** 7-**9.6**-14.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: none apparent.

Shrubs: *Eremophila sturtii, Sclerolaena birchii, Atriplex pseudocampanulata, Atriplex eardleyae, Acacia victoriae, Myoporum montanum, Maireana villosa, Eremophila deserti, Dodonaea viscosa, Atriplex stipitata*.

Climbers & trailers: none apparent.

Ground cover: *Dactyloctenium radulans, Eragrostis dielsii, Eleocharis pusilla, Cyperus difformis, Cynodon dactylon, Echinochloa turneriana, Marsilea costulifera, Fimbristylis dichotoma, Abutilon otocarpum, Sporobolus mitchellii, Sida intricate, Sida goniocarpa, Eragrostis parvifolia, Enteropogon acicularis, Einadia nutans.*

Introduced taxa: *Eragrostis cilianensis.*

Percent of species introduced: 4%

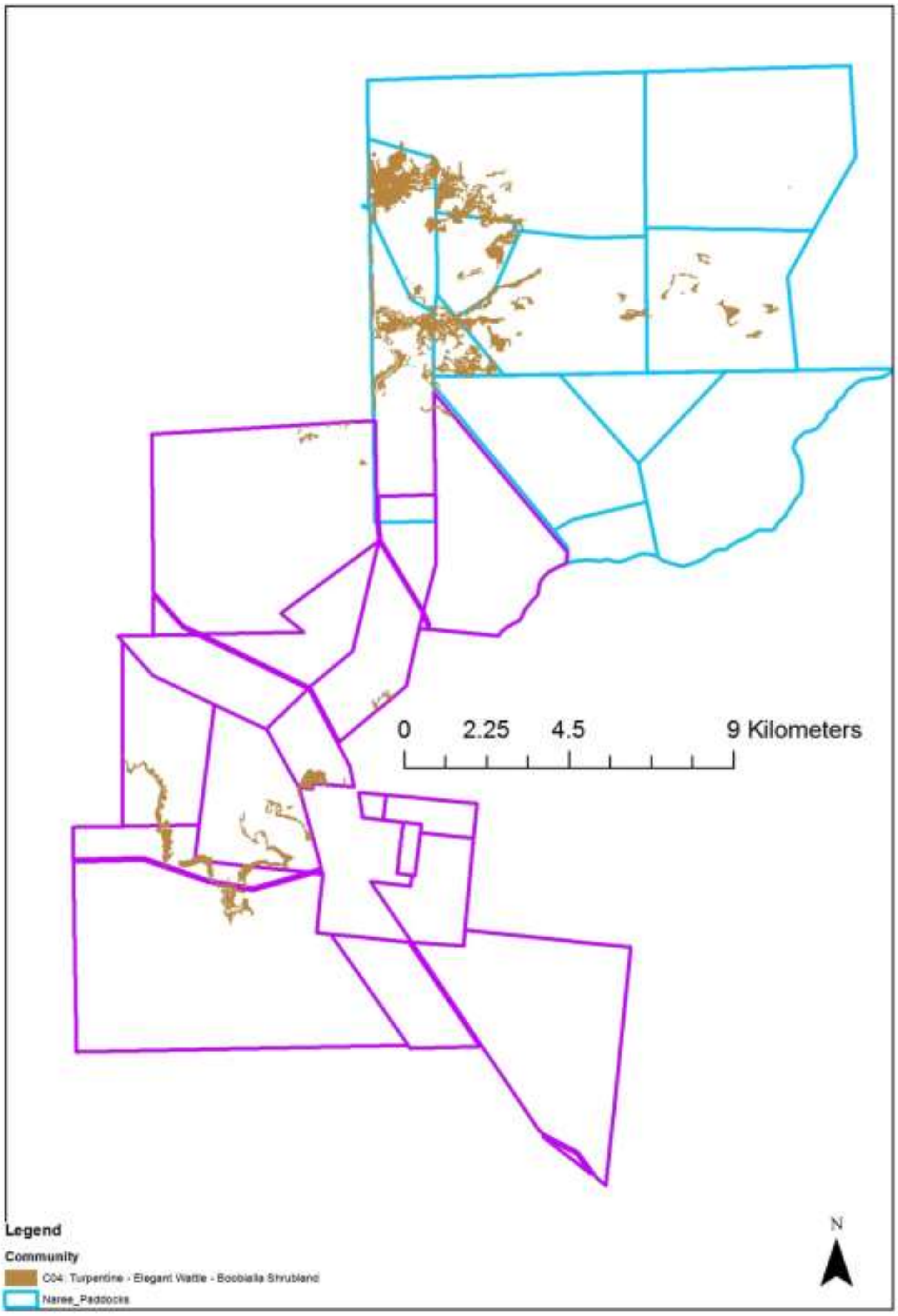

Figure 14: Mapped distribution of Community 4.

Plate 8: Photographs of Community 4. Above NEY21; below NEY45.

Plate 9: Photographs of Community 4. Above NEY57; below NRE34.

3.4.2.2 Sub-element: Turpentine – Hop Bush – Kerosine Grass Shrubland

Area: 5,354 ha (16.9%)

Common Overstorey: *Acacia excelsa, Alectryon oleifolius, Casuarina pauper, Ventilago viminalis, Flindersia maculosa, Acacia aneura*.
Common Mid-storey: *Eremophila sturtii, Dodonaea viscosa, Eremophila deserti, Olearia pimeloides, Senna* sp. 'zygophylla', *Acacia victoriae, Acacia tetragonophylla, Eremophila glabra.*
Common Understorey: *Aristida holathera, Enteropogon acicularis, Eragrostis eriopoda, Enneapogon avenaceus, Dissocarpus paradoxus, Eragrostis laniflora, Sclerolaena convexula, Sclerolaena diacantha, Monachather paradoxa*.

Generally layered shrublands found on sandier soils on higher physiographic positions than the previous sub-element. Though often includes areas of internal drainage where clays are deposited above sandier soils.

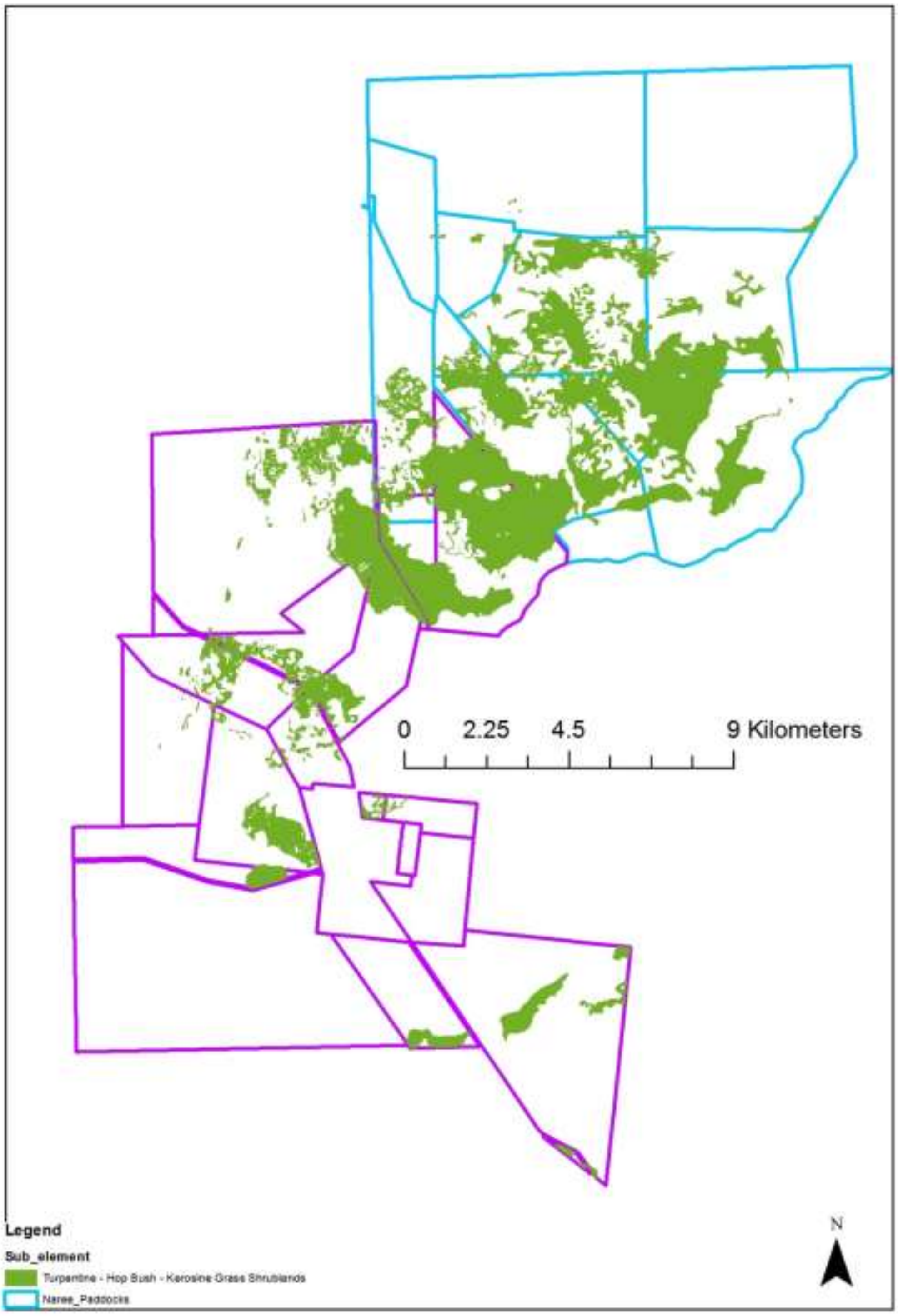

Figure 15: Mapped distribution of the Sub-element Turpentine – Hop Bush – Kerosine Grass Shrubland within *Naree* and *Yantabulla*.

3.4.2.2.1 Community 5: Turpentine Bush – Hop Bush Shrubland

Eremophila sturtii (Turpentine Bush) – *Dodonaea viscosa* (Hop Bush) Shrubland

Full floristic sites (17): NEY026, NEY029, NEY050, NEY066, NEY069, NEY073, NEY081, NEY082, NEY086, NEY091, NEY095, NEY096, NEY125, NRE001, NRE002, NRE015, NRE031.

Rapid survey sites (23): NER005, NER046, NER053, NER091, NER092, NER095, NER101, NER105, NER109, NER122, NER130, NER133, NE135, NER179, NER180, NER181, NER183, NER186, NER192, NER197, NERR006, NERR008, NERR025.

Number of hectares: 3,133 **Proportion of property:** 9.8%

Environmental relationships: similar to Community 2 but generally on higher physiographic positions.

Distribution within *Naree and Yantabulla*: common throughout both properties on red and red brown earths.

Structure: usually a shrubland to open shrubland.

- Tall shrub layer: (2) 4-6.5 (12) m tall. (5) 15-25 (70)% cover.
- Shrub layer: 1-3 (5) m tall. (5) 30-40 (50)% cover. Rarely absent.
- Low shrub layer rare present.
- Ground layer: 0.1-0.4 m (1) tall. (2) 15-20 (50)% cover.

No. of taxa: 93 **No. of taxa per plot:** 8-**13.9**-22.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Alectryon oleifolius, Atalaya hemiglauca, Ventilago viminalis, Eucalyptus coolabah, Casuarina pauper, Acacia aneura*.

Shrubs: *Eremophila sturtii, Dodonaea viscosa, Olearia pimeloides, Dissocarpus paradoxus, Eremophila deserti, Acacia victoriae, Acacia tetragonophylla, Sclerolaena diacantha, Sclerolaena decurrens, Sclerolaena convexula, Senna* sp. 'zygophylla', *Sclerolaena birchii, Chenopodium desertorum, Atriplex turbinate, Sclerolaena tricuspis, Sclerolaena lanicuspis, Myoporum montanum, Eremophila mitchellii, Eremophila longifolia, Enchylaena tomentosa, Atriplex eardleyae, Salsola* *australis, Pimelea microcephala, Maireana villosa, Hakea tephrosperma, Hakea leucoptera, Eremophila glabra, Atriplex nessorhina*.

Climbers & trailers: none apparent.

Ground cover: *Aristida holathera, Enteropogon acicularis, Enneapogon avenaceus, Eragrostis laniflora, Eragrostis parviflora, Eragrostis eriopoda, Fimbristylis dichotoma, Eragrostis lacunaria, Tripogon loliiformis, Sida trichopoda, Sida filiformis, Cymbopogon ambiguus, Triraphis mollis, Panicum simile, Evolvulus alsinoides, Eragrostis basedowii, Enneapogon cylindricus, Digitaria brownii, Vittadinia dissecta, Trianthema triquetra, Solanum esuriale, Sida ammophila, Einadia nutans, Digitaria hystrichoides, Dactyloctenium radulans.*

Introduced taxa: *Eragrostis cilianensis, Cenchrus ciliaris.*

Percent of species introduced: 2%

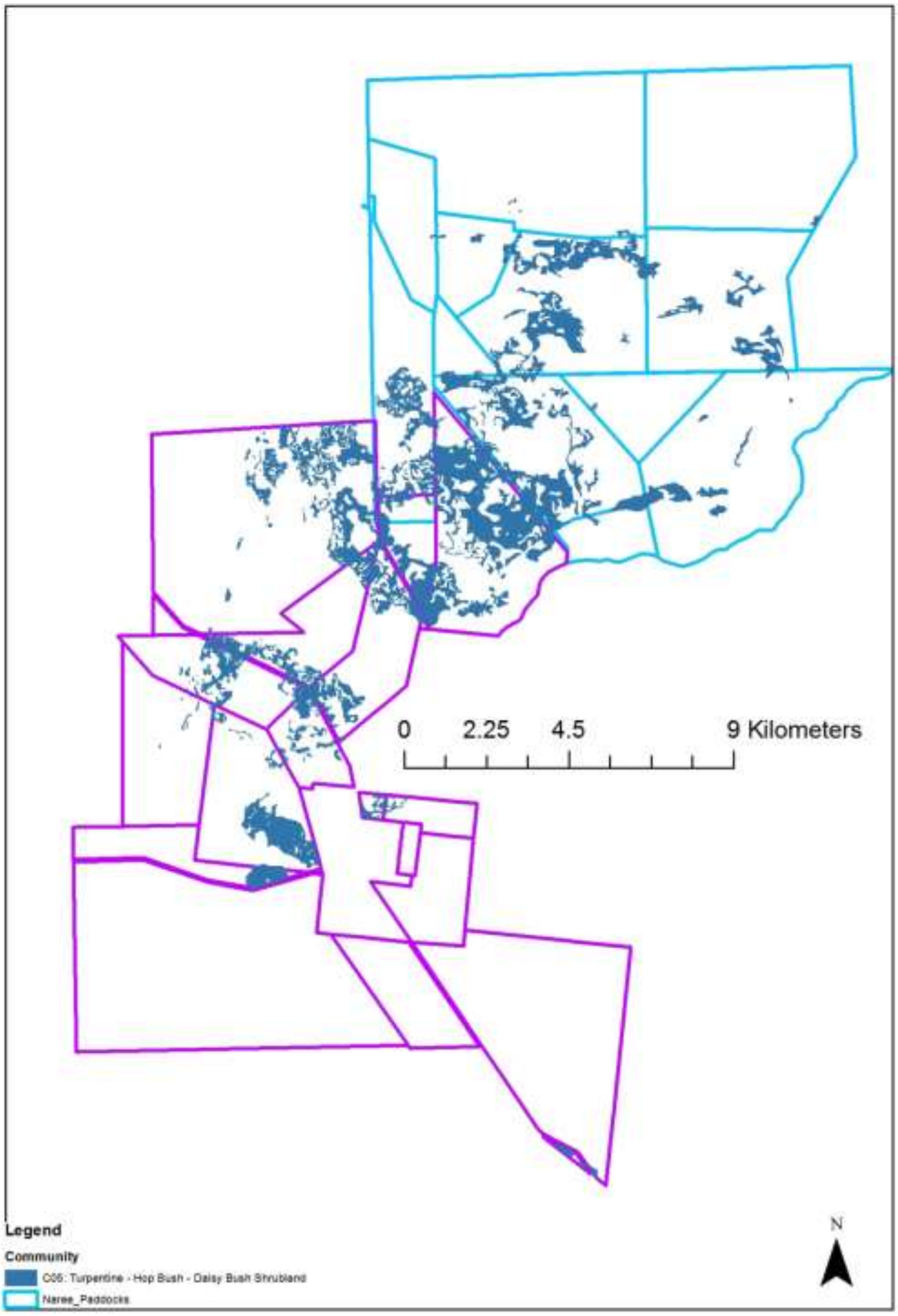

Figure 16: Mapped distribution of Community 5.

Plate 10: Photographs of Community 5. Above NEY69; below NEY82.

Plate 11: Photographs of Community 5. Above NEY96; below NRE15.

3.4.2.2.2 Community 6: Black Oak – Rosewood Shrubland

Casuarina pauper (Black Oak) – *Alectryon oleifolius* (Rosewood) Shrubland

Full floristic sites (6): NEY005, NEY059, NEY067, NEY070, NEY076, NEY078.
Rapid survey sites (8): NER096, NER104, NER106, NER112, NER113, NER120, NERR005, NERR010.
Number of hectares: 1,414 **Proportion of property:** 4.4%
Environmental relationships: found within internal drainage areas within red and red brown earth and dunal areas.
Distribution within *Naree* and *Yantabulla*: found across both properties.
Structure: generally an open layered woodland to layered shrubland. The herbaceous understorey is generally very sparse within Belah populations.

- Tall shrub layer: (3) 6-10 (15) m tall. (10) 20-30 (50)% cover.
- Shrub layer: 1-3 m tall. (10) 30-35 (70)% cover.
- Understorey layer: 0.1-0.4 m tall. (5) 10-15 (30)% cover.

No. of taxa: 48 **No. of taxa per plot:** 9-**12.7**-20.
Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).
Trees: *Casuarina pauper, Alectryon oleifolius, Eucalyptus populnea, Acacia excelsa, Flindersia maculosa, Acacia aneura*.
Shrubs: *Eremophila sturtii, Dodonaea viscosa, Dissocarpus paradoxus, Sclerolaena diacantha, Salsola australis, Eremophila deserti, Sclerolaena tricuspis, Eremophila mitchellii, Enchylaena tomentosa, Atriplex stipitata, Pimelea microcephala, Myoporum montanum, Eremophila glabra, Chenopodium desertorum, Atriplex limbata, Senna* sp. 'zygophylla', *Sclerolaena birchii, Santalum acuminatum, Olearia pimeloides, Capparis mitchellii*.
Climbers & trailers: none apparent.
Ground cover: *Enteropogon acicularis, Paspalidium constrictum, Eragrostis lacunaria, Boerhavia coccinea, Sida filiformis, Chenopodium cristatum, Abutilon otocarpum, Solanum cleistogamum, Sida cunninghamii, Eragrostis parviflora, Enneapogon avenaceus, Einadia nutans, Einadia hastata, Chenopodium*

melanocarpum, Centipeda thespidioides, Atriplex eardleyae, Aristida jerichoensis, Aristida holathera.

Introduced taxa: *Eragrostis cilianensis, Lycium ferocissimum, Cenchrus ciliaris.*

Percent of species introduced: 6%

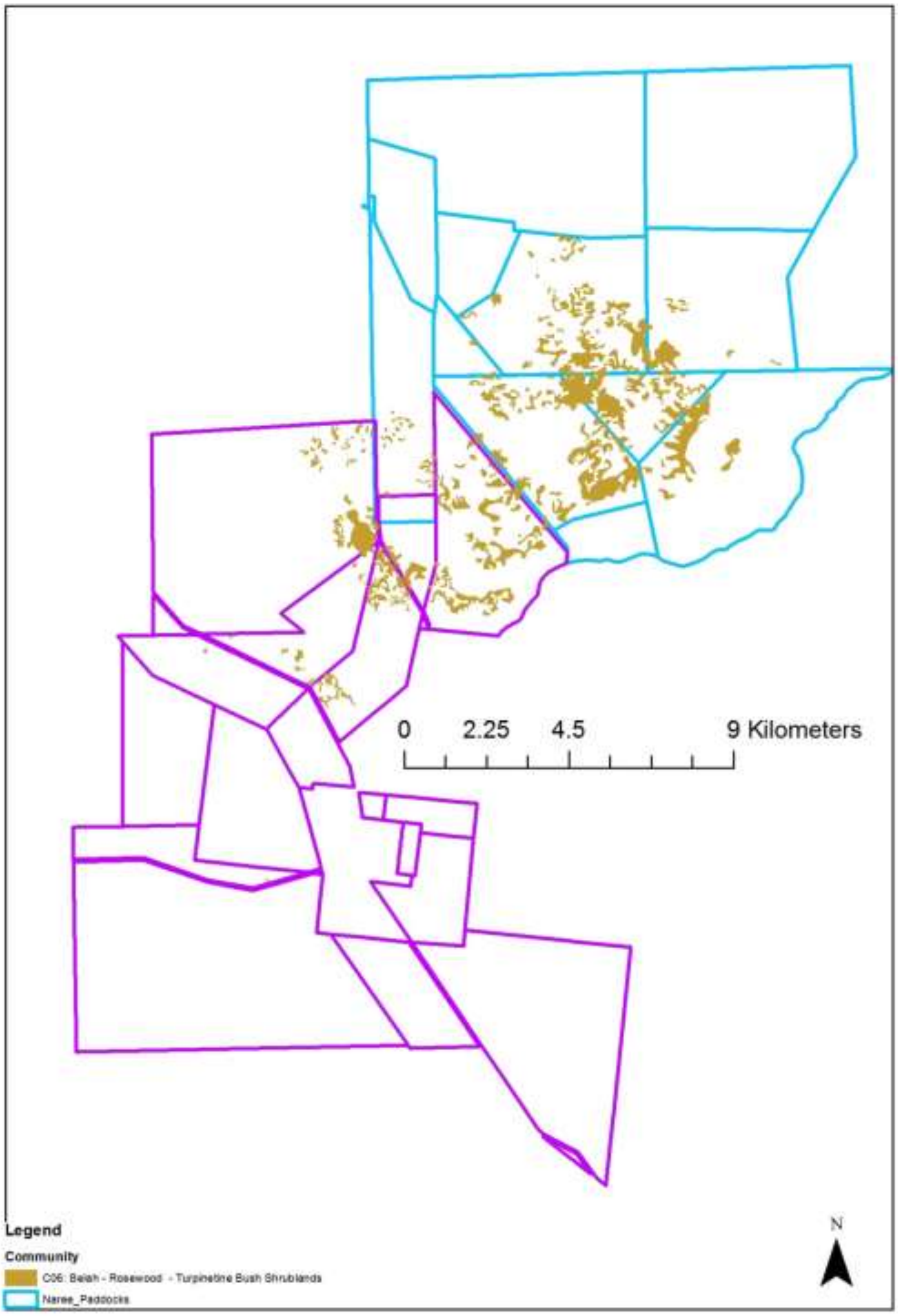

Figure 17: Mapped distribution of Community 6.

Plate 13: Photographs of Community 6. Above NEY005; below NEY059.

Plate 13: Photographs of Community 6. Above NEY071; below NEY078.

3.4.2.2.3 Community 7: Ironwood – Leopardwood – Supplejack Shrubland

Acacia excelsa (Ironwood) – *Flindersia maculosa* (Leopardwood) – *Ventilago viminalis* (Supplejack) Shrubland

Full floristic sites (11): NEY014, NEY028, NEY035, NEY071, NEY072, NEY074, NEY104, NEY105, NEY113, NRE019, NRE022.

Rapid survey sites (10): NER004, NER011, NER040, NER054, NER123, NER148, NER187, NERR009, NERR011, NERR013, NERR026.

Number of hectares: 810 **Proportion of property:** 2.5%

Environmental relationships: generally found on deeper sandy and larger dunal situations.

Distribution within *Naree* and *Yantabulla*: found within both properties but more prevalent within *Naree*.

Structure: generally a layered low open woodland or tall open shrubland.

- Tall shrub layer: (4) 5-9 (12) m tall. (5) 10-15 (30)% cover.
- Shrub layer: 1-3 (4) m tall. (5) 35-40 (65)% cover. Rarely absent.
- Low shrub layer rarely present.
- Understorey layer: 0.1-0.5 (1) m tall.(10) 25-30 (65)% cover.

No. of taxa: 75 **No. of taxa per plot:** 11-**17.2**-25.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Acacia excelsa, Flindersia maculosa, Ventilago viminalis, Callitris glaucophylla, Acacia aneura, Grevillea striata, Corymbia tumescens, Acacia brachystachya, Hakea ivoryi*.

Shrubs: *Eremophila sturtii, Senna* sp. ‘zygophylla’, *Sclerolaena convexula,, Eremophila deserti*, *Enchylaena tomentosa*, *Dodonaea viscosa*, *Senna* sp. ‘filifolia’, *Olearia pimeloides*, *Chenopodium desertorum*, *Sclerolaena muricata, Eremophila glabra, Dodonaea boroniifolia, Eremophila longifolia, Dissocarpus paradoxus, Alstonia constricta*.

Climbers & trailers: none apparent.

Ground cover: *Aristida holathera, Eragrostis eriopoda, Monachather paradoxa, Aristida jerichoensis, Eragrostis laniflora, Enteropogon acicularis, Enneapogon* *avenaceus, Abutilon otocarpum, Solanum cleistogamum, Ptilotus leucocoma, Evolvulus alsinoides, Eriachne aristidea, Chamaesyce drummondii, Boerhavia coccinea, Tragus australianus, Sida filiformis, Ptilotus polystachyus, Hibiscus sturtii, Eragrostis parviflora, Digitaria brownii, Calotis lappulacea, Calocephalus sonderi, Velleia arguta, Thyridolepis mitchelliana, Sida platycalyx, Panicum simile, Eragrostis kennedyae, Digitaria divaricatissima, Cheilanthes sieberi, Calotis cuneifolia, Brachyscome ciliaris, Aristida contorta, Solanum ferocissimum, Solanum esuriale, Sida trichopoda, Ptilotus sessilifolius, Pimelea trichostachya, Perotus rara, Panicum effusum, Gnephosis arachnoidea, Fimbristylis dichotoma, Enneapogon polyphyllus, Calotis erinacea, Bulbine alata, Aristida leptopoda.*

Introduced taxa: *Cenchrus ciliaris.*

Percent of species introduced: 1%

Taxa of conservation importance: *Dodonaea boroniifolia*.

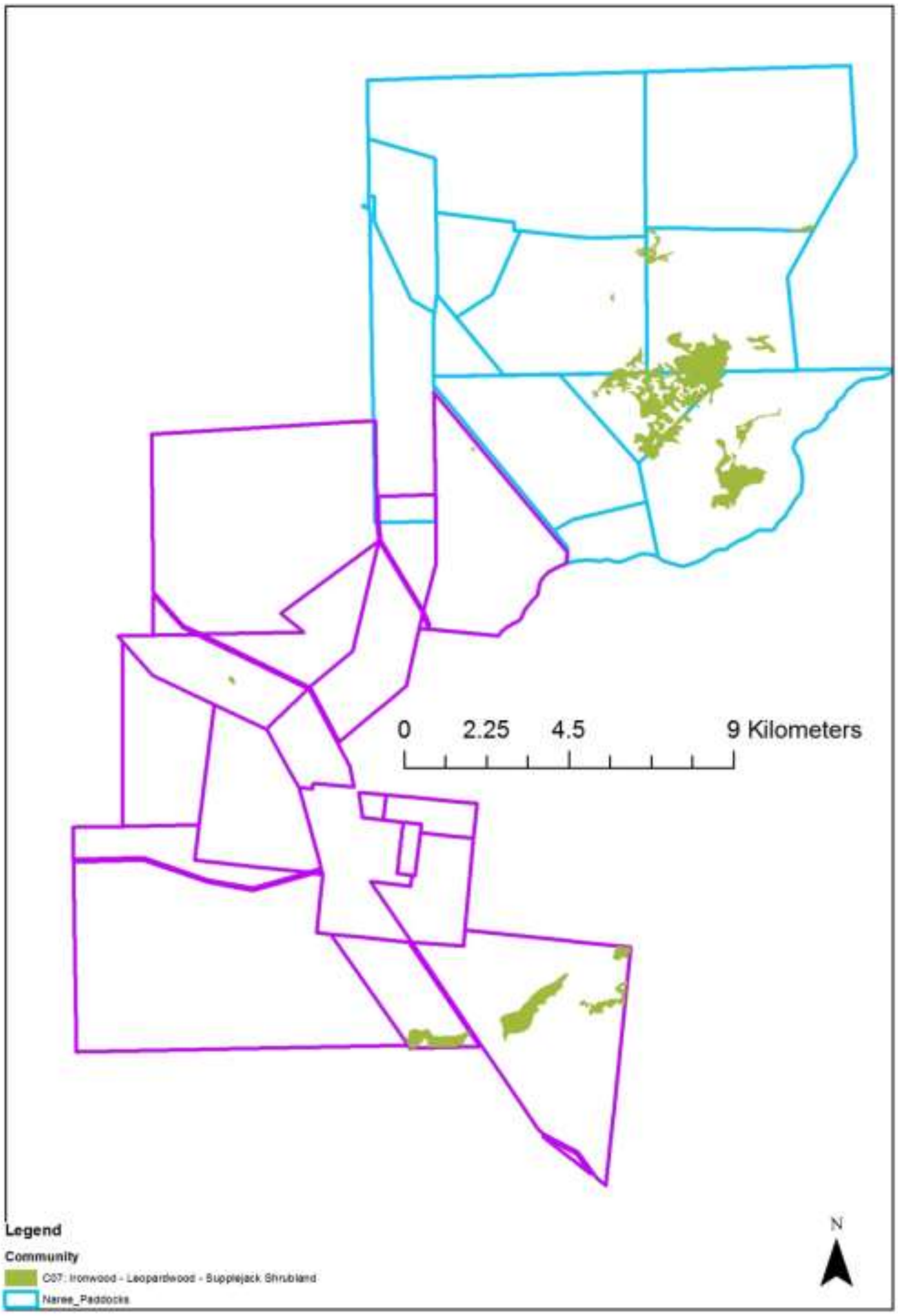

Figure 18: Mapped distribution of Community 7.

Plate 14: Photographs of Community 7. Above NEY014; below NEY104.

Plate 15: Photographs of Community 7. Above NEY105; NEY113.

3.4.3 Element 3: Floodplain Wetlands Complex

Area: 11,680 ha (36%)

Common Overstorey: *Eucalyptus coolabah, Acacia stenophylla, Eucalyptus largiflorens, Eucalyptus ochrophloia, Eucalyptus populnea*.
Common Mid-storey: *Duma florulenta, Sclerolaena birchii, Teucrium racemosum, Myoporum montanum, Sclerolaena muricata, Acacia victoriae, Eremophila bignoniiflora.*
Common Understorey: *Sporobolus mitchellii, Eragrostis lacunaria, Paspalidium jubiflorum, Portulaca oleracea, Alternanthera nodiflora, Sporobolus caroli, Centipeda thespidioides, Solanum esuriale, Marsilea drummondii, Eleocharis pusilla, Glinus lotoides, Trianthema triquetra, Eragrostis dielsii, Dactyloctenium radulans, Chamaesyce drummondii, Atriplex eardleyae, Pterocaulon sphacelatum, Sporobolus actinocladus, Chenopodium melanocarpum, Cyperus gilesii, Atriplex angulata, Sida goniocarpa, Eragrostis australasica*.

Floodplains are considered to be some of the most threatened communities in the world (Parsons & Thoms 2013). The species found within dryland floodplain landscapes are adapted to the unpredictable and variable nature of rainfall and flooding and possess adaptive traits that enable them to persist in seed banks or below ground storage organs and respond quickly to favourable environments (Capon & Broack 2006; Reid *et al.* 2011; Hunter 2015). The water regime determines which species germinate and the seed bank influences the abundance of emergent (Webb *et al.* 2006). It is the duration, timing and frequency of inundation, antecedent conditions along with water quality including salinity and turbidy that are the selective forces that select which species may germinate and develop (Moore & Keddy 1988; Porter & Kingsford 2007) as most species are present across all zones but the abundance within seed banks is stratified based on zone (Webb *et al.* 2006). Species associated with higher flood frequencies are likely to be more palatable to vertebrates (e.g. *Sporobolus mitchellii*) as opposed to those from lower flood frequency areas (e.g. *Sclerolaena*), thus under extended declines in flood frequency and duration more palatable species may be depleted (Reid *et al.* 2011). In rarely flooded habitats greater spatial variation in floristics is likely due to factors additional to flooding such as mortality, granivory and secondary dispersal and frequently inundated areas may have more even distribution and homogeneity of propagule dispersal (James *et al.* 2015). Webb *et al.* (2006) found that waterlogged soils within the Narran Lake system produced the greatest germination richness as opposed to inundation. James *et al.* (2007) have shown that frequently flooded locations had the least species richness and were compositionally homogeneous presumably because few species could complete their life cycles under such conditions. Greatest species diversity was seen in intermediately flooded habitats as these were likely to contain a range of species adapted to different temporary habitats and species that responded to a larger range of conditions including rainfall events in dry periods (James *et al.* 2007).

Thus within western floodplain systems it is not just the structural features that cause heterogeneity within the landscape but also the variability of presence and absence of water that generates functional vegetation heterogeneity (Parson & Thoms 2013). However there is also a difference in how wetting is achieved as Reid *et al.* (2011) showed that wetting by rainfall did not produce as a substantial response as does flooding, presumably as the latter wets the profile to a greater degree. Parsons & Thoms (2013) suggest that flood inundation is the fundamental driver of productivity in large, semi-arid unconfined floodplains. Within unconfined wetlands the riparian zone responds in a similar way to the floodplain itself during flooding events but tends to extend productivity for longer periods than the larger floodplains (Parsons & Thoms 2013).

Thapa *et al.* (2015) have shown within the Narran floodplain that western floodplains may show a hysteretic pathway between wetting and drying phases. This is where the return path to the original state is different from the path taken during the initial entry a different state, thus the dry to wet phase is different from the wet to dry phase (Figure 19).

Major changes are likely to occur both seasonally and over much longer periods due to variation in rainfall and/or flooding events. The density of *Duma florulenta* (Lignum) for instance is due largely to the longevity of ponding. *Duma florulenta* is maintained by flooding every three to ten years with large dense lignum stands requiring the highest frequency (Beadle 1981a; Scott 1992; Smith 1993). Although requiring flooding, long periods of water logging will kill *Duma florulenta* and it will be replaced with ephemeral herbs until the next cohort of *Duma florulenta* grows (Pickard & Norris 1994). Lignum is maintained by flooding every three to ten years with the large dense lignum stands requiring the highest frequency (Beadle 1981a; Scott 1992; Smith 1993). Germination is inhibited by constant temperatures of 12 and 24°C (4.0–4.8% success) and continuous darkness (6.0–56.0% success), but increases on return to light. Seed viability is depressed by burial in soil over winter. Seeds don't persist for long on the mother plant or in the soil. The persistence of lignum in environments prone to erratic droughts and floods appears to depend mainly on its capacity to tolerate drought, maintain vegetative growth and respond quickly to watering (Chong & Walker 2005). Fire kills *Duma florulenta* but it is known to regenerate under favourable conditions and if fire is subsequently excluded.). It is estimated that 40% of Lignum areas have been cleared in the last 20 years, with much of the remainder being grazed and disturbed by feral pigs (Scott 1992; Porteners 1993; Porteners *et al.* 1997).

Eragrostis australasica prefers heavy soils which can be slightly saline and which are waterlogged for several months. Although the species can withstand floods and drought it will die off after long periods of drought or if continuously flooded (Young 2001). *Eucalyptus largiflorens* grows on intermittently flooded areas of major river floodplains above the level of the more frequently flooded riverine forests that are usually dominated by *Eucalyptus camaldulensis*. Regeneration is subject to inundation with heavy recruitment occurring as floods subside. Germination is best if flooding occurs during winter months and two month old *Eucalyptus largiflorens* can withstand flooding for a month, but growth is reduced if flooding lasts longer. Most stands contain trees of a similar size and may represent past establishment patterns (Fox 1991). Mature *Eucalyptus largiflorens* are less tolerant of flooding but more tolerant of prolonged dry conditions. These trees can use water from throughout the soil profile and can use saline water by removing salt (Young 2001). *Eucalyptus largiflorens* tends to be healthy where they are flooded for four to six months every four to five years. Where ponding occurs twice in an 18 month period the trees may die (Shepheard 1992).

Cox *et al.* (2001) describe Coolibah Woodlands as occurring on grey cracking clay soils on floodplains and closed depressions. Despite the many new reserved areas *Eucalytpus coolabah* assemblages have been extensively cleared and modified. During the period between 1985 and 2000 14.5% of the remaining Coolibah Woodland stands of this assemblage were cleared in the Northern Wheatbelt leaving 73,550 ha. Potentially 60-70% of these systems are thought to have been cleared. Ringbarking and poisoning has been prominent in many areas of the Western Division. *Eucalyptus coolabah* (Coolibah) regeneration in dense thickets occurs in many areas particularly in large scattered patches within *Yantabulla*, some of these may have originated from a major germination event following favourable flooding the middle parts of this century (Dick & Andrew 1993), and other patches however are more recent and have occurred within the last few decades. *Eucalyptus coolabah* is at its southern distribution limit within northern New South Wales and is replaced further south by *Eucalyptus largiflorens*.

Eucalyptus populnea dominated communities span 14° of latitude in eastern Australia (Neldner 1984). In western Queensland similar associations are widespread occur (Boyland 1984; Neldner 1984; Neldner 1991). *Eucalyptus populnea* and can occur as far east as Inverell and as far west as the Paroo (Hunter & Fallavollita 2003) and across 14° of latitude in eastern Australia (Neldner 1984). However this broadly occurring association is an artificial grouping of a larger number of floristic assemblages that just happen to have Poplar Box. In these most western occurrences *Eucalyptus populnea* is always restricted to the margins of wetlands or in and around internal drainage depressions when in large numbers or as scattered individuals within the general Mulga matrix as seen in the Mulga Complex.

Acacia stenophylla (River Cooba) requires flooding events every three to seven years and for durations of two to three months. River Cooba is often found on rivers creeks, intermittent water courses and swamps. It is often found on alkaline heavy cracking clay soils and saline clays often low in nitrogen. While it is salt tolerant growth and establishment is retarded. *Acacia stenophylla* can regenerate by suckering around older trees especially if roots are damaged near the surface. The species flowers mainly within Summer to Autumn and the pods mature around September to

December. The seeds of *Acacia stenophylla* are some of the largest for *Acacia* in Australia and these are often attacked by insects reducing viability. *Acacia stenophylla* shrublands appear to be in decline across their range and although seedlings can be abundant after flooding events few survive to maturity.

The widespread modification of the floodplain by the construction of diversion banks, channels, levees, drains and upstream extraction of water for irrigation has seen considerable changes to seasonality, periodicity, duration, frequency, depth and pattern of flood regimes. Many remnants of these flood-dependent communities may be in protracted decline, as individuals of long-lived woody species may persist for many years, but may not be replaced by new plants when they eventually die. Weeds may dominate in spring in some areas. If flooding does not occur key species in this community may die back over time. Pigs are known to cause significant damage to this community type (Porteners *et al.* 1997). The community is in general at risk from high grazing pressure. After prolonged drought examples of this community did not recovery after high grazing pressure and removal of stock and subsequently only recovered after a reduction in Kangaroo numbers (Westbrooke *et al.* 1998).

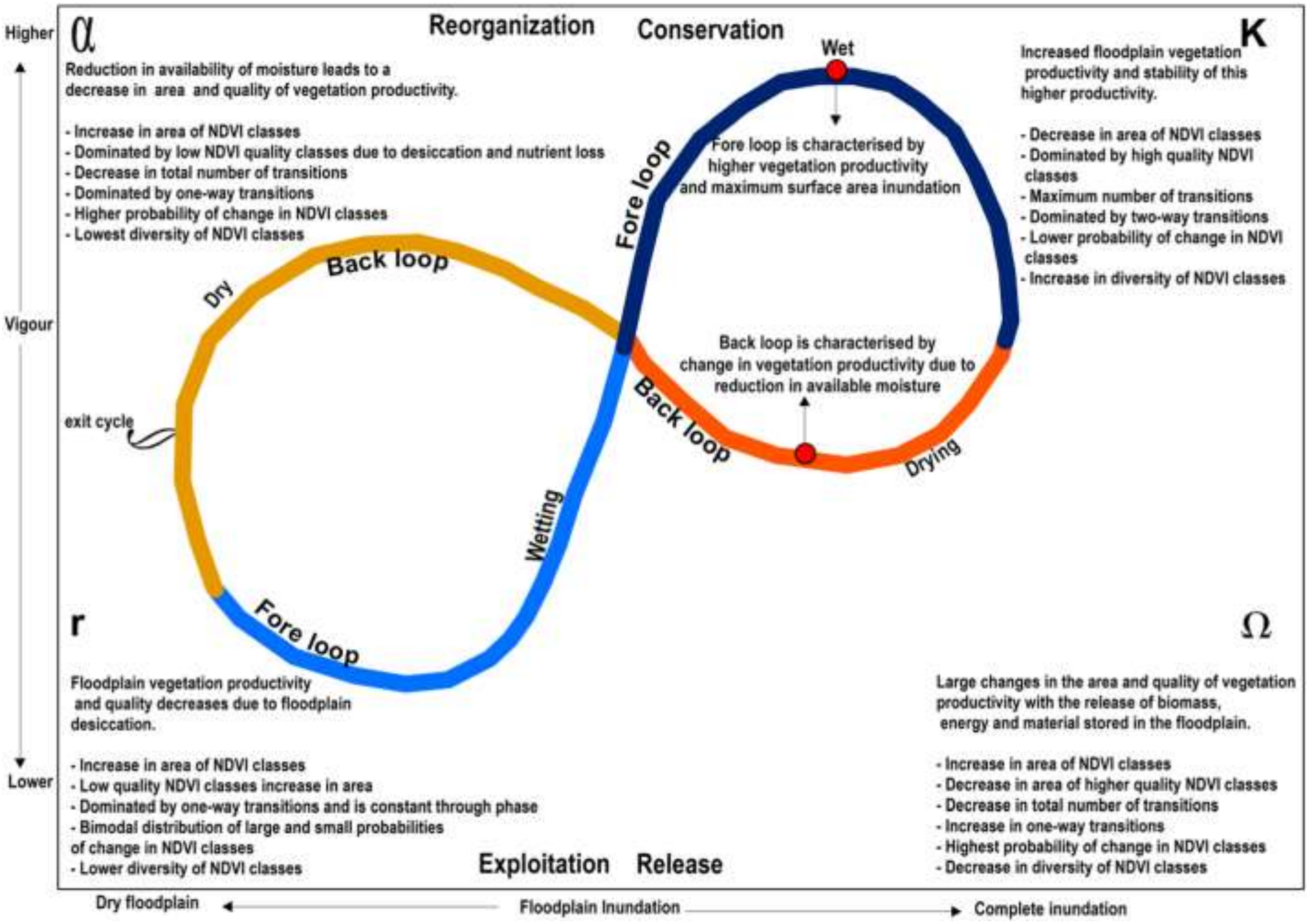

Figure 19: Hypothesized adaptive cycle model for the more eastern Narran Floodplain based on hydrology and vegetation productivity (NDVI). Taken from Thapa *et al.* (2015).

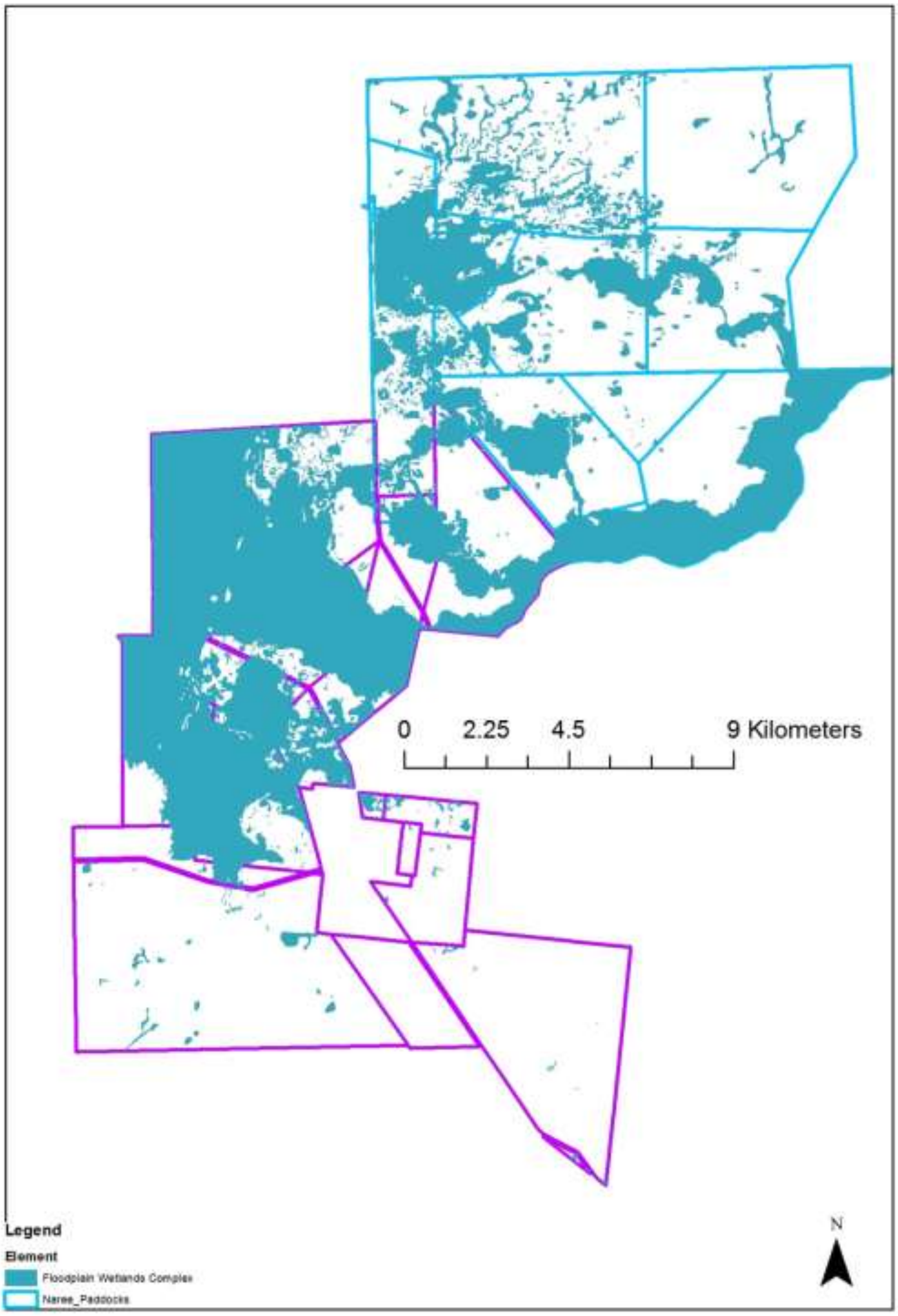

Figure 20: Mapped distribution of the Floodplain Wetlands Complex Complex within *Naree* and *Yantabulla*.

3.4.3.1 Sub-element: Coolibah – Black Box - Yapunyah – Lignum Woodlands

Area: 7,784 ha (24%)

Common Overstorey: *Eucalyptus coolabah, Acacia stenophylla, Eucalyptus ochrophloia, Eucalyptus largiflorens*.
Common Mid-storey: *Duma florulenta, Sclerolaena birchii, Sclerolaena muricata, Myoporum montanum, Teucrium racemosum, Acacia victoriae, Eremophila bignoniiflora, Atriplex eardleyae, Atriplex angulata, Atriplex limbata*.
Common Understorey: *Sporobolus mitchellii, Eragrostis lacunaria, Paspalidium jubiflorum, Portulaca oleracea, Alternanthera nodiflora, Sporobolus caroli, Centipeda thespidioides, Marsilea drummondii, Eleocharis pusilla, Trianthema triquetra, Eragrostis dielsii, Dactyloctenium radulans, Chamaesyce drummondii, Solanum esuriale, Cyperus gilesii*.

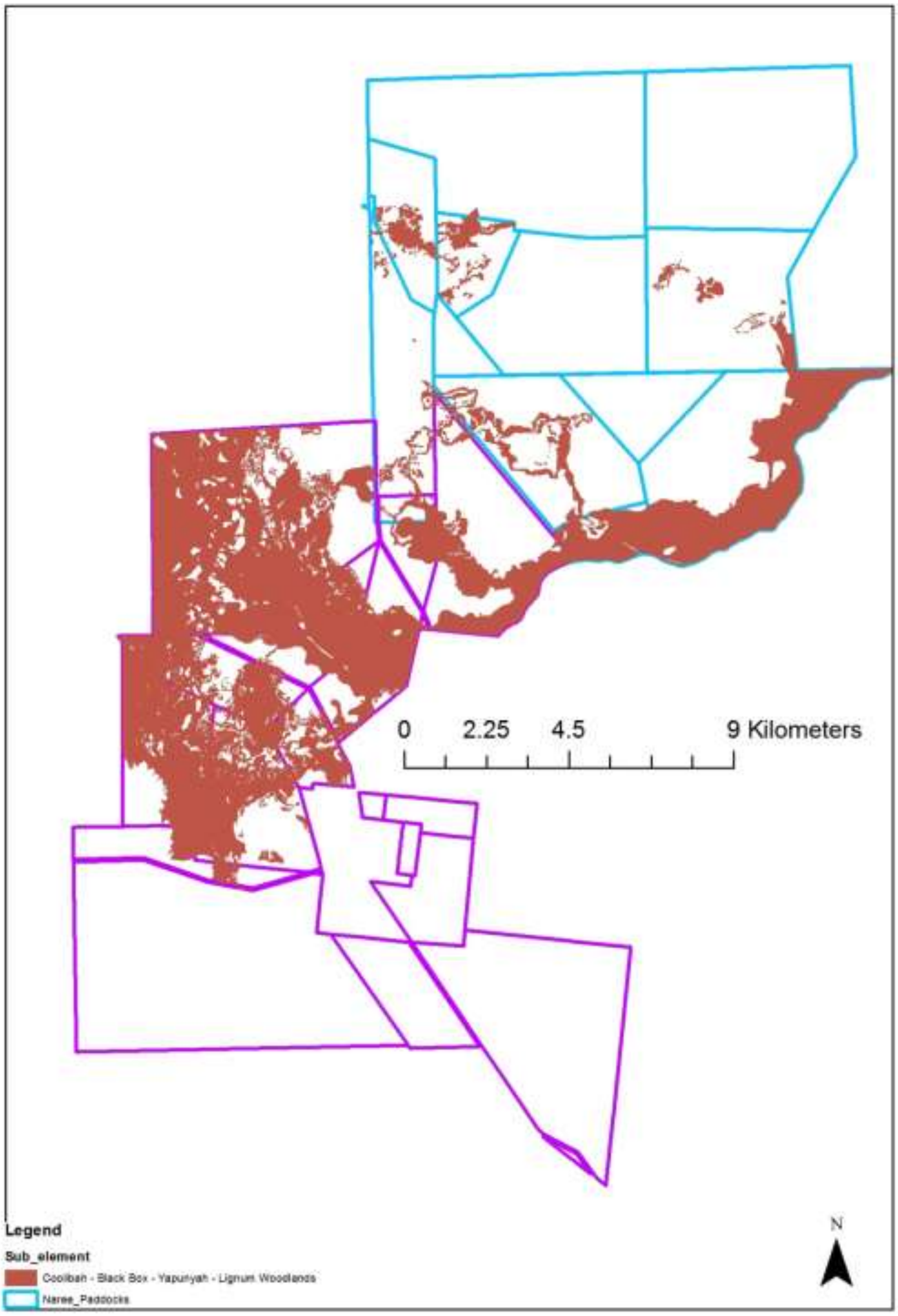

Figure 21: Mapped distribution of the Sub-element Coolibah – Black Box – Yapunyah – Lignum Woodlands within *Naree* and *Yantabulla*.

3.4.3.1.1 Community 8: Yapunya – Black Box – River Cooba Woodland and Forest

Eucalyptus ochrophloia (Yapunya) – *Eucalyptus largiflorens* (Black Box) – *Acacia stenophylla* (River Cooba) Woodland and Forest

Full floristic sites (22): NE10, NE11, NE12, NEY003, NEY004, NEY030, NEY031, NEY044, NEY049, NEY051, NEY058, NEY060, NEY068, NEY075, NEY077, NEY079, NEY080, NEY092, NEY093, NEY106, NRE014, NRE032.

Rapid survey sites (11): NER007, NER009, NER029, NER032, NER033, NER049, NER085, NER103, NER194, NERR003, NERR036

Number of hectares: 1,536 **Proportion of property:** 4.8%

Environmental relationships: restricted primarily to frequently inundated locations particularly along the margins of open floodplains and along ephemeral watercourses. Degree and density of overstorey woodland component highly variable and often may not include a distinct overstorey.

Distribution within *Naree* and *Yantabulla*: primarily found along Cuttaburra Creek, the margins of Yantabulla Swamp and larger playa lakes.

Structure: open shrubland to low open woodland or open woodland.

- Tree layer: (3) 5-9 (16) m tall. (5) 20-25 (45)% cover. Not always present.
- Shrub layer: (0.5) 1-2.5 (4) m tall. (2) 10-15 (30)% cover.
- Understorey layer: 0.1-0.2 (1.5) m tall. (5) 30-35 (80)% cover.

No. of taxa: 80 **No. of taxa per plot:** 8-**13**-24.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus ochrophloia, Eucalyptus largiflorens, Acacia stenophylla, Hakea tephrosperma, Eucalyptus coolibah, Acacia excelsa*.

Shrubs: *Duma florulenta, Sclerolaena birchii, Myoporum montanum, Eremophila bignoniiflora, Teucrium racemosum, Sclerolaena muricata, Atriplex eardleyae, Chenopodium auricomum, Acacia victoriae, Eremophila deserti, Hakea leucoptera, Sclerolaena decurrens, Eremophila glabra, Enchylaena tomentosa, Senna* sp. 'zygophylla', *Sclerolaena muricata, Eremophila sturtii, Atriplex leptocarpa*.

Climbers & trailers: none apparent.

Ground cover: *Sporobolus mitchellii, Paspalidium jubiflorum, Eragrostis lacunaria, Portulaca oleraceus, Marsilea drummondii, Centipeda thespidioides, Eleocharis pusilla, Sporobolus caroli, Cyperus gilesii, Alternanthera nodiflora, Solanum esuriale, Panicum laevinode, Juncus aridicola, Trianthema triquetra, Pterocaulon sphacelatum, Dactyloctenium radulans, Chamaesyce drummondii, Amaranthus macrocarpus, Enteropogon acicularis, Boerhavia repleta, Vittadinia sulcata, Solanum lacunarium, Sida goniocarpa, Sida filiformis, Pluchea tetranthera, Cynodon dactylon, Vittadinia pterochaeta, Streptoglossa adscendens, Pluchea dentex, Marsilea costulifera, Ludwigia peploides, Frankenia uncinata, Eriochloa australiensis, Eleocharis plana, Cyperus bifax, Centipeda minima, Brachyscome ciliaris, Alternanthera denticulata, Abutilon otocarpum, Tephrosia sphaerospora, Sida trichopoda, Sauropus trachyspermus, Phyllanthus virgatus, Leiocarpa semicalva, Hibiscus trionum, Haloragis glauca, Eragrostis australasica, Chamaesyce dallachyana, Brachyscome melanocarpa, Boerhavia coccinea, Aristida holathera.*

Introduced taxa: *Eragrostis cilianensis, Medicago truncatula, Medicago polymorpha, Malvastrum americanum.*

Percent of species introduced: 5%

Taxa of conservation importance: none apparent.

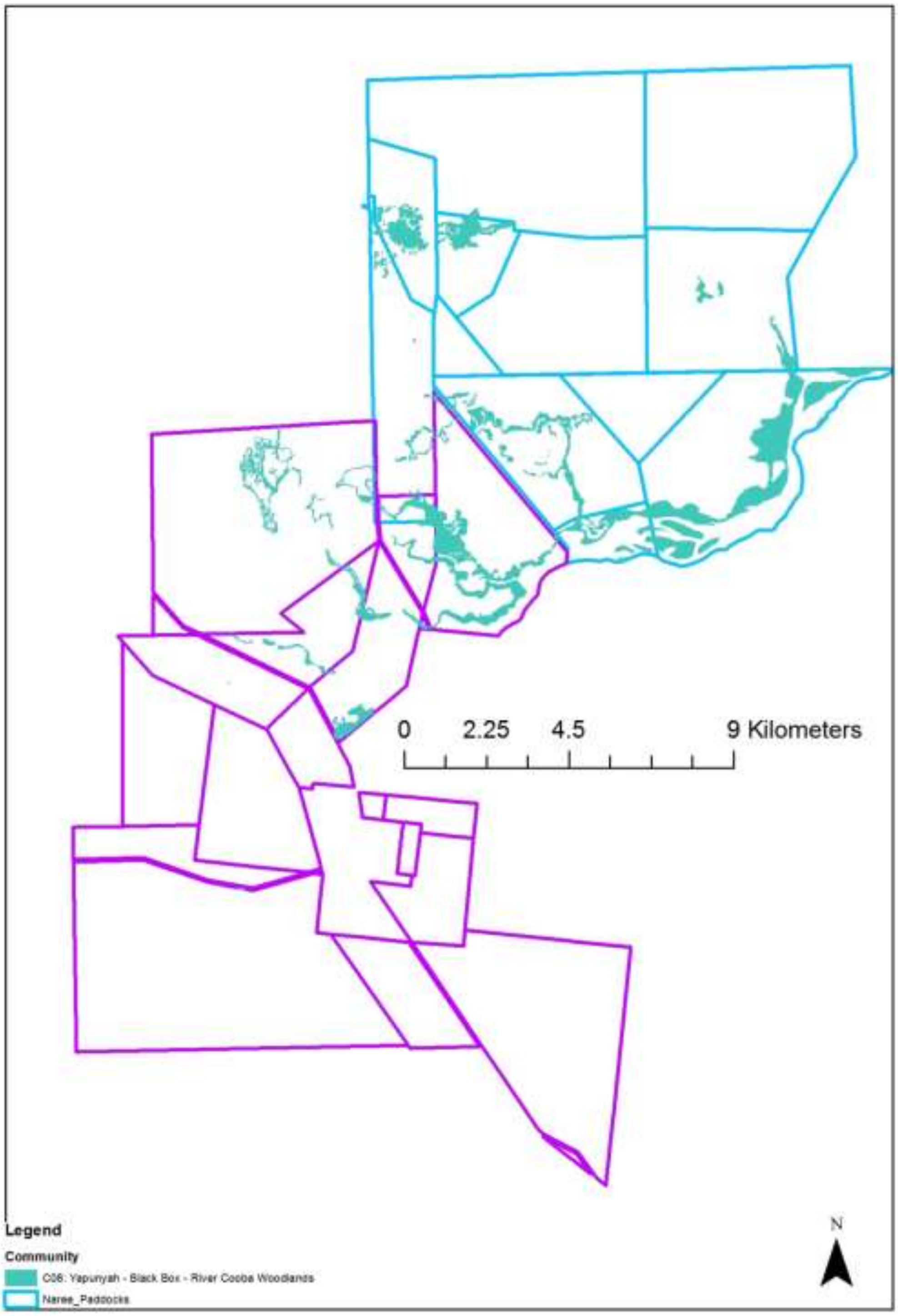

Figure 22: Mapped distribution of Community 8.

Plate 16: Photographs of Community 8. Above NEY044; below NEY051.

Plate 17: Photographs of Community 8. Above NEY058; below NEY079.

Plate 18: Photographs of Community 8. Above NEY103; below NEY106.

3.4.3.1.2 Community 9: Coolibah – River Cooba – Yapunyah Woodland and Forest

Eucalyptus coolabah (Coolibah) – *Acacia stenophylla* (River Cooba) – *Eucalyptus ochrophloia* (Yapunyah) Woodland and Forest

Full floristic sample sites (23): NE09, NEY022, NEY032, NEY033, NEY052, NEY055, NEY090, NEY107, NEY109, NEY110, NEY120, NEY121, NEY122, NEY123, NEY124, NEY126, NEY127, NRE016, NRE021, NRE024, NRE025, NRE028, NRE029.

Rapid survey sites (26): NER006, NER008, NER047, NER050, NER052, NER087, NER102, NER107, NER108, NER115, NER128, NER129, NER131, NER132, NER159, NER161, NER162, NER182, NER184, NER185, NER188, NER190, NER193, NER195, NER196, NERR004.

Number of hectares: 6,248 **Proportion of property:** 19.5%

Environmental relationships: found in frequently inundated locations, particularly along Cuttaburra Creek and within Yantabulla Swamp. In general probably found in areas with more prolonged ponding than Community 8.

Distribution within *Naree* and *Yantabulla*: found throughout flooded clay soils within both properties.

Structure: generally a woodland, layered shrubby woodland, tall layered shrubland or open to closed shrubland.

- Tree or tall shrub-layer: 4-7 (12) m tall. (5) 25-30 (50)% cover.
- Shrub layer: (0.5) 1.5-3 (5) m tall. (5) 25-30 (70)% cover.
- Low shrub layer: 1-2.5 (3) m tall. (25) 40-45 (70)% cover. Rarely present.
- Understorey layer: 0.1-0.7 (2) m tall. (5) 25-35 (70)% cover.

No. of taxa: 92 **No. of taxa per plot:** 7-**13.5**-21.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus coolabah, Acacia stenophylla, Eucalyptus ochrophloia, Atalaya hemiglauca, Eucalyptus largiflorens*.

Shrubs: *Duma florulenta, Sclerolaena muricata, Eremophila bignoniiflora, Sclerolaena birchii, Myoporum montanum, Atriplex eardleyae, Sclerolaena* *decurrens, Atriplex leptocarpa, Teucrium racemosum, Eremophila gilesii, Atriplex elachophylla, Hakea tephrosperma, Atriplex suberecta, Atriplex stipitata, Atriplex limbata, Atriplex angulata, Maireana brevifolia, Eremophila deserti*.

Climbers & trailers: none apparent.

Ground cover: *Sporobolus mitchellii, Paspalidium jubiflorum, Alternanthera nodiflora, Cyperus gilesii, Ammannia multiflora, Eragrostis lacunaria, Chamaesyce drummondii, Portulaca oleracea, Eleocharis pusilla, Centipeda thespidioides, Sporobolus caroli, Marsilea drummondii, Glinus lotoides, Pluchea dentex, Eragrostis australasica, Echinochloa inundata, Centipeda cunninghamii, Trianthema triquetra, Juncus aridicola, Hibiscus trionum, Haloragis glauca, Cyperus squarrosus, Centipeda crateriformis, Streptoglossa adscendens, Sporobolus actinocladus, Solanum esuriale, Pseudognaphalium luteoalbum, Eragrostis dielsii, Enteropogon acicularis, Eleocharis acuta, Einadia nutans, Cyperus iria, Vittadinia pterochaeta, Sida goniocarpa, Senecio magnificus, Pterocaulon sphacelatum, Phyllanthus lacunarius, Persicaria lapathifolia, Panicum laevinode, Epaltes australis, Dactyloctenium radulans, Cyperus difformis, Chenopodium melanocarpum, Centipeda minima, Boerhavia repleta, Amaranthus macrocarpus, Abutilon leucopetalum, Stemodia glabella, Solanum lacunarium, Solanum cleistogamum, Pluchea tetranthera, Ludwigia peploides, Goodenia glauca, Echinochloa turneriana, Cyperus bifax, Cynodon dactylon, Cullen cinereum, Alternanthera denticulata, Abutilon otocarpum.*

Introduced taxa: *Sisymbrium erysimoides, Malvastrum americanum, Heliotropium supinum, Cenchrus ciliaris, Potentilla supina, Medicago polymorpha, Eragrostis cilianensis, Citrullus lanatus.*

Percent of species introduced: 10%

Taxa of conservation importance: none apparent.

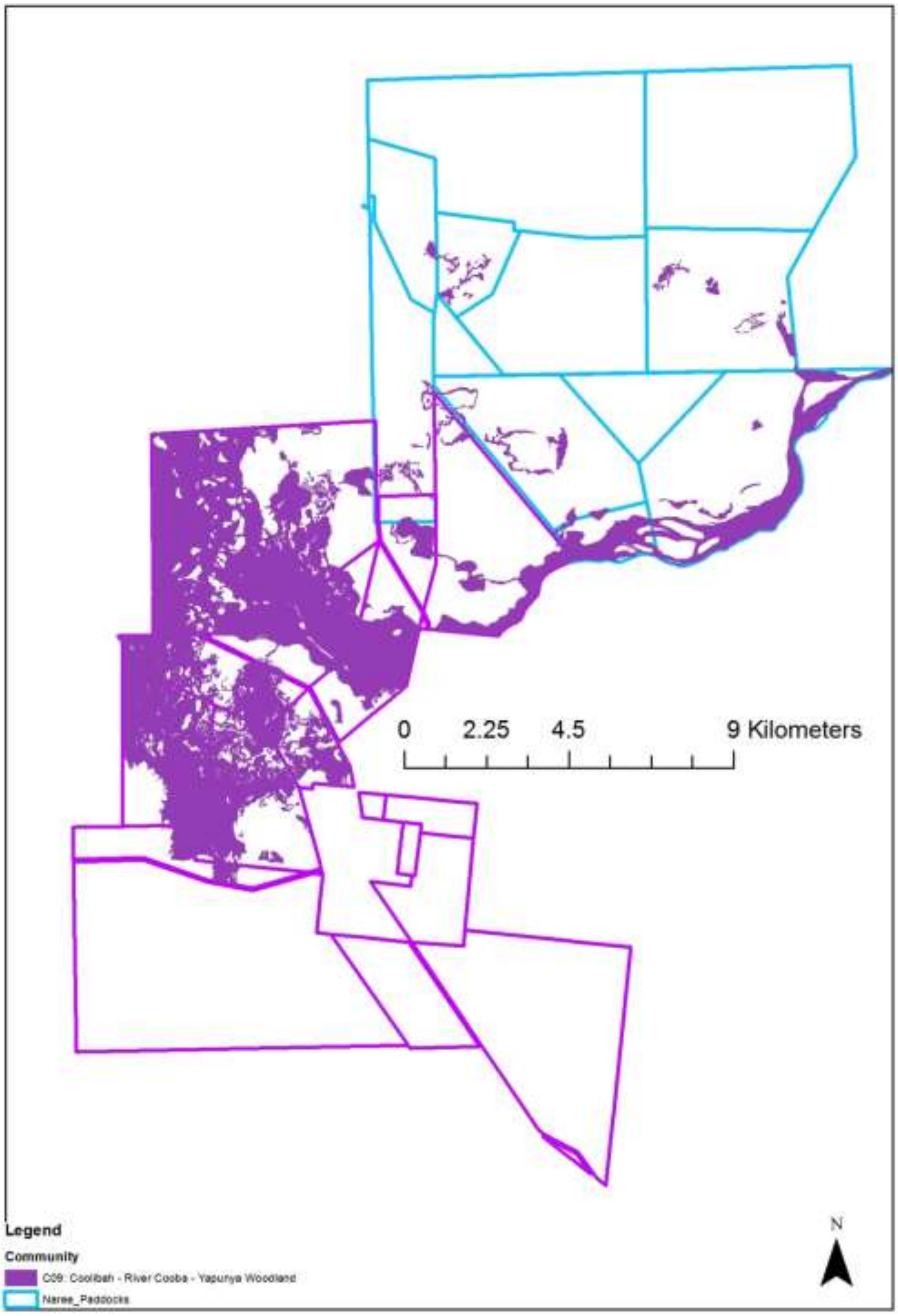

Figure 23: Mapped distribution of Community 9.

Plate 19: Photographs of Community 9. Above NEY022; below NEY033.

Plate 20: Photographs of Community 9. Above NEY090; below NEY107.

Plate 18: Photographs of Community 9. Above NEY120; below NEY126.

3.4.3.2 Sub-element: Rat's tail Couch – Lovegrass Grasslands

Area: 2,091 ha (6.5%)

Common Overstorey: *Eucalyptus coolabah.*
Common Mid-storey: *Sclerolaena birchii, Teucrium racemosum, Acacia victoriae, Myoporum montanum, Duma florulenta.*
Common Understorey: *Sporobolus mitchellii, Eragrostis lacunaria, Portulaca oleracea, Eragrostis dielsii, Trianthema triquetra, Centipeda thespidioides, Alternanthera nodiflora, Dactyloctenium radulans, Atriplex angulata, Eleocharis pusilla, Chenopodium melanocarpum, Pratia darlingensis, Solanum esuriale, Sida goniocarpa, Marsilea drummondii, Atriplex limbata, Sclerolaena decurrens, Glinus lotoides, Chenopodium cristatum, Alternanthera denticulata, Paspalidium jubiflorum*.

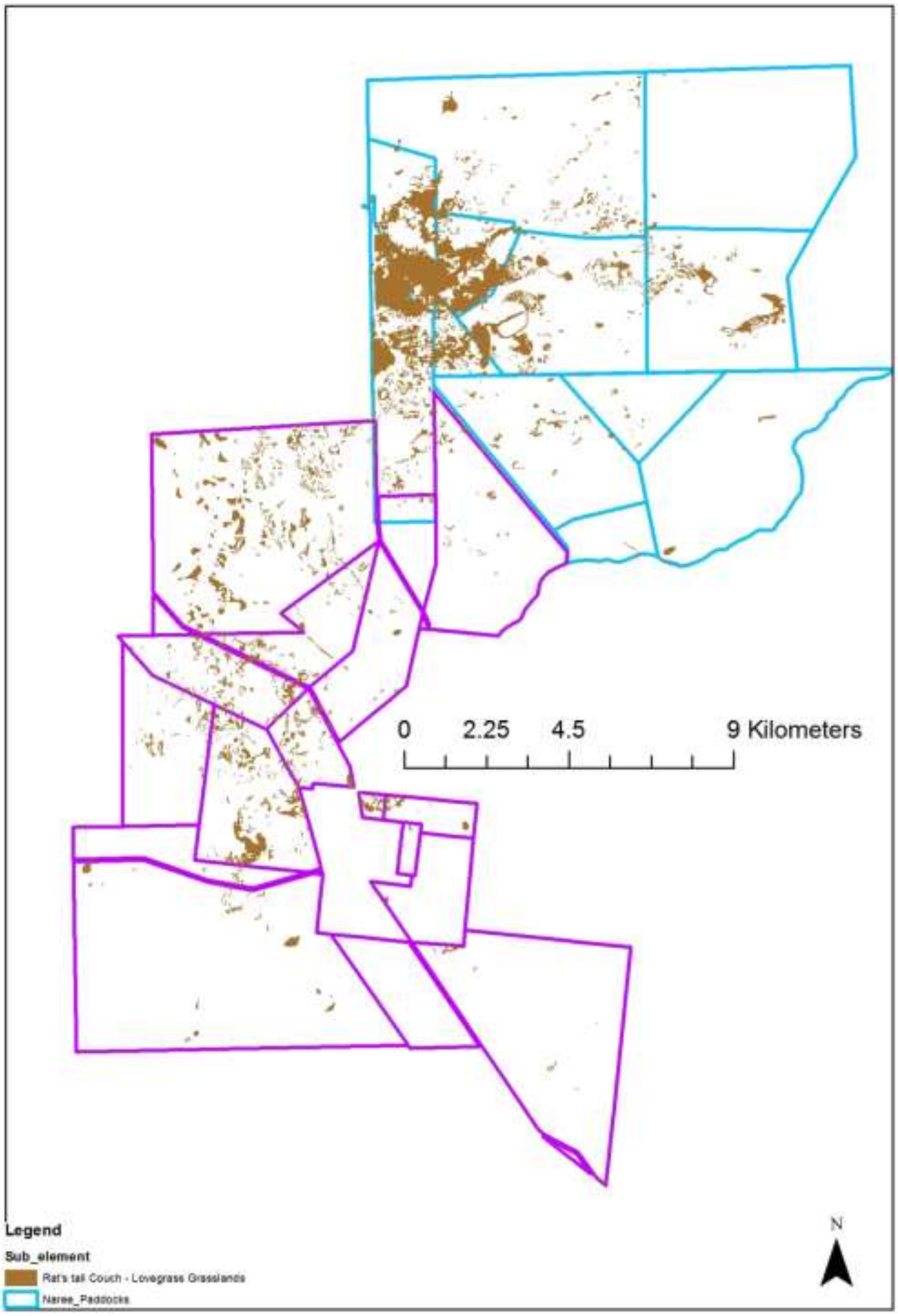

Figure 24: Mapped distribution of the Sub-element Rat's tail Couch – Lovegrass Grasslands within *Naree* and *Yantabulla*.

3.4.3.2.1 Community 10: Rat's-tail Couch – Purple Lovegrass – Fairy Grass Grassland and Herbfield

Sporobolus mitchellii (Rat's-tail Couch) – *Eragrostis lacunaria* (Purple Lovegrass) – *Sporobolus caroli* (Fairy Grass) Grassland and Herbfield

Full floristic sample sites (22): NE15, NE16, NE25, NE26, NE29, NEY024, NEY053, NEY054, NEY056, NEY083, NEY084, NEY094, NEY108, NRE003, NRE004, NRE012, NRE026, NRE027, NRE030, NRE041, NRE042, NRE043.

Rapid flora sites (12): NER017, NER030, NER045, NER058, NER081, NER082, NER097, NER100, NER110, NER119, NER124, NER138.

Number of hectares: 1,995 **Proportion of property:** 6.2%

Environmental relationships: found in areas where water ponding occurs but usually on lighter soil profiles than Community 8 or 9.

Distribution within *Naree* and *Yantabulla*: throughout both properties in areas of water ponding.

Structure: usually an open to closed grassland, low open shrubland or open shrubland.

- Shrub layer: (0.8) 2.5-4.5 (9) m tall. (1) 15-20 (60)% cover. Often absent.
- Low layer: 1-2.5 (3) m tall. 10-15 (20)% cover. Rarely present.
- Understorey layer: 0.1-0.6 (1) m tall. (5) 40-45 (90)% cover.

No. of taxa: 113 **No. of taxa per plot:** 7-**17.7**-34.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus coolabah*.

Shrubs: *Sclerolaena birchii, Teucrium racemosum, Acacia victoriae, Myoporum montanum, Atriplex angulata, Duma florulenta, Atriplex limbata, Sclerolaena decurrens, Atriplex holocarpa, Atriplex eardleyae, Eremophila sturtii, Salsola australis, Atriplex elachophylla, Sclerolaena tricuspis, Enchylaena tomentosa, Sclerolaena diacantha, Sclerolaena bicornis, Olearia pimeloides, Mairena brevifolia, Atriplex stipitata*.

Climbers & trailers: *Convolvulus remotus, Convolvulus clementii*.

Ground cover: *Sporobolus mitchellii, Eragrostis lacunaria, Portulaca oleracea, Sporobolus caroli, Eragrostis dielsii, Trianthema triquetra, Dactyloctenium radulans, Solanum esuriale, Marsilea drummondii, Eleocharis pusilla, Alternanthera nodiflora, Chloris truncata, Chamaesyce drummondii, Paspalidium jubiflorum, Enneapogon avenaceus, Chenopodium cristatum, Brachyscome ciliaris, Tetragonia eremaea, Rhynchosia minima, Pterocaulon sphacelatum, Frankenia uncinata, Fimbristylis dichotoma, Chenopodium melanocarpum, Centipeda thespidioides, Centipeda crateriformis, Pluchea tetranthera, Panicum decompositum, Lotus cruentus, Linum marginale, Glossostigma diandrum, Eriochloa australiensis, Eragrostis parviflora, Calotis hispidula, Brachyscome ciliaris, Wahlenbergia communis, Tragus australianus, Pratia darlingensis, Eragrostis australasica, Einadia nutans, Boerhavia repleta, Walwhalleya subxerophyllum, Stemodia glabella, Sporobolus actinocladus, Sida platycalyx, Sida goniocarpa, Sida filiformis, Pimelea trichostachya, Leiocarpa semicalva, Juncus aridicola, Glinus lotoides, Eragrostis brownii, Centipeda minima, Boerhavia dominii, .*

Introduced taxa: *Eragrostis cilianensis, Malvastrum americanum, Medicago polymorpha, Cucumis myriocarpus, Malva parviflora, Xanthium occidentale, Sonchus oleraceus, Silene gallica, Lepidium bonariense, Cenchrus ciliaris.*

Percent of species introduced: 10%

Taxa of conservation importance: none apparent.

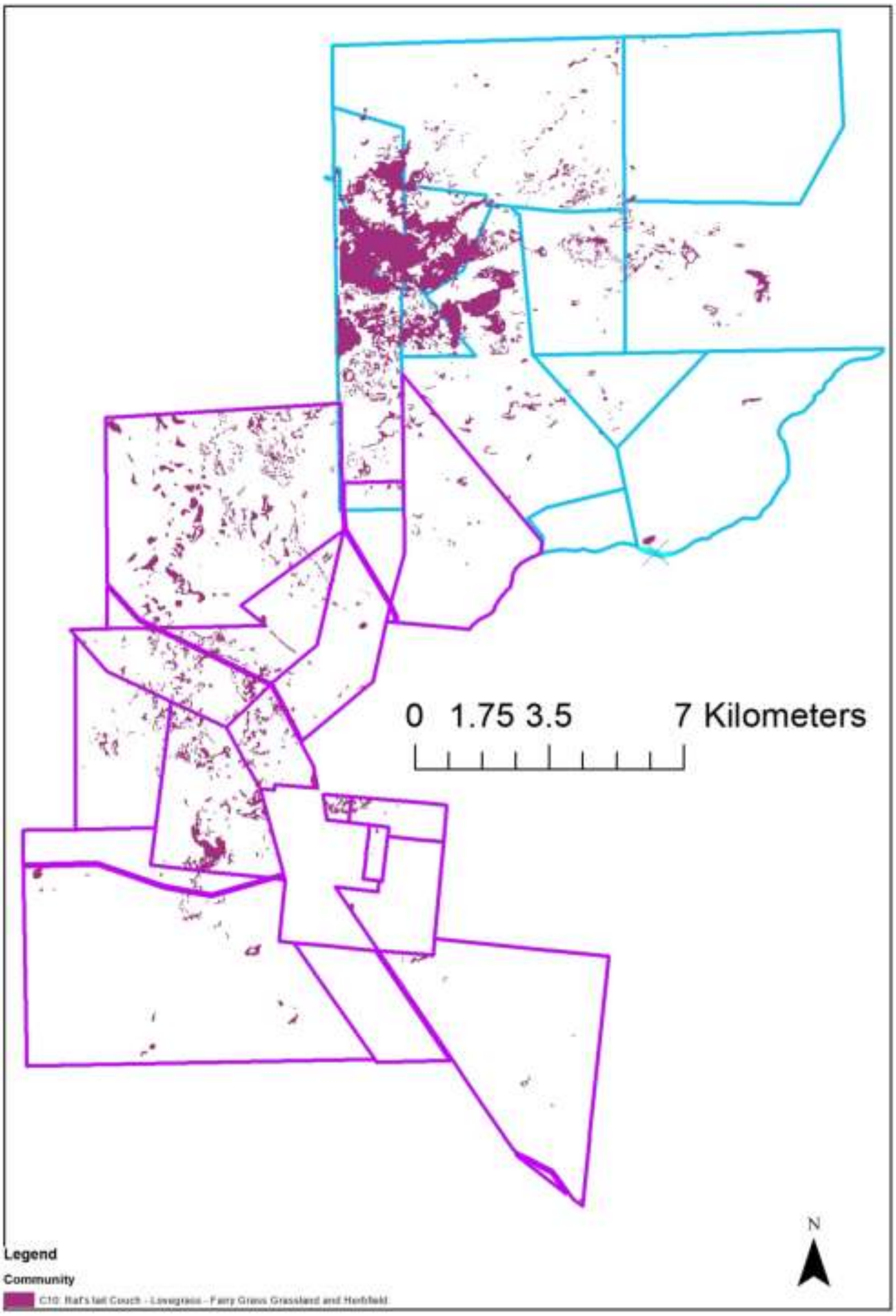

Figure 25: Mapped distribution of Community 10.

Plate 22: Photographs of Community 10; Above NEY053; below NEY056.

Plate 23: Photographs of Community 10; Above NEY083; below NEY108.

Plate 24: Photographs of Community 10; Above NRE003; below .

3.4.3.2.2 Community 11: Rat's Tail Couch – Purple Lovegrass Grassland and Herbfield

Sporobolus mitchellii (Rat's-tail Couch) – *Eragrostis lacunaria* (Purple Lovegrass) Grassland and Herbfield

Full floristic sample sites (7): NE21, NEY088, NRE009, NRE010, NRE044, NRE045, NRE046.

Rapid survey sites (1): NER031.

Number of hectares: 57 **Proportion of property:** 0.2%

Environmental relationships: found in areas of waterlogging and water ponding, in general in locations with higher clay content than Community 10.

Distribution within *Naree* and *Yantabulla*: found rarely and in scattered locations across both properties.

Structure: usually an open grassland, grassland or open herbfield, more rarely a low open woodland.

- Tree-layer: 5-10 (15) m tall. 10-15% cover. Usually absent.
- Understorey layer: 0.1-0.3 (0.6) m tall. 15-30 (70)% cover.

No. of taxa: 54 **No. of taxa per plot:** 12-**15.3**-25.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus coolabah, Eucalyptus populnea*.

Shrubs: *Teucrium racemosum, Sclerolaena diacantha, Sclerolaena decurrens*.

Climbers & trailers: *Convolvulus remotus, Convolvulus clementii.*

Ground cover: *Sporobolus mitchellii, Portulaca oleracea, Eragrostis lacunaria, Sida goniocarpa, Stuartina muelleri, Glinus lotoides, Alternanthera denticulata, Abutilon otocarpum, Sida trichopoda, Chenopodium melanocarpum, Centipeda thespidioides, Alternanthera nodiflora, Dactyloctenium radulans, Abutilon oxycarpum, Stemodia glabella, Sporobolus caroli, Marsilea hirsuta, Eragrostis basedowii, Epaltes australis, Monachather paradoxa, Marsilea drummondii, Frankenia uncinata, Eragrostis dielsii, Centipeda minima, Bergia trimera, Wahlenbergia communis, Pluchea dentex.*

Introduced taxa: *Malvastrum americanum.*

Percent of species introduced: 2%

Taxa of conservation importance: *Dentella minutissima*.

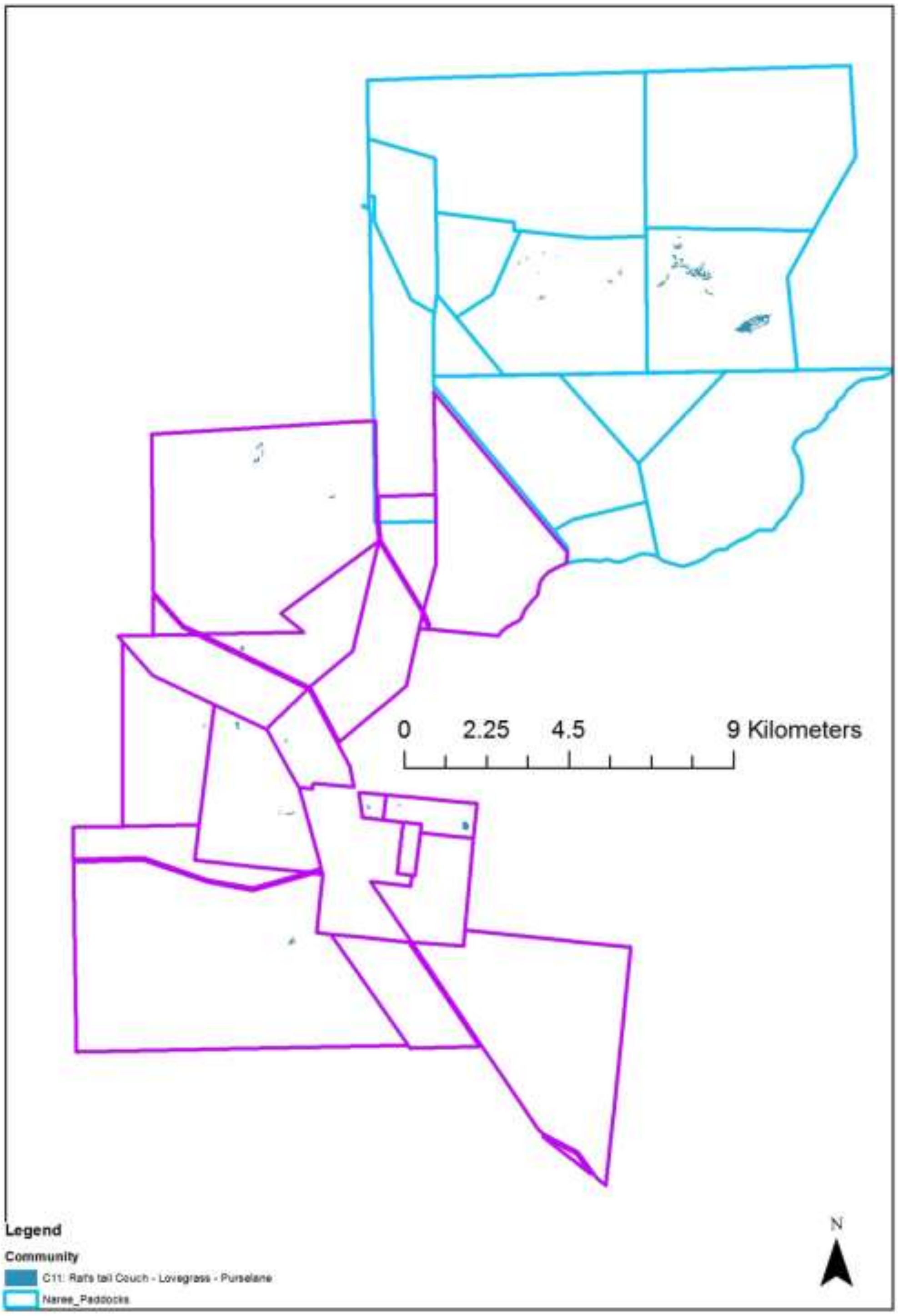

Figure 26: Mapped distribution of Community 11.

Plate 25: Photographs of Community 11. Above NEY088; below NRE009.

Plate 26: Photographs of Community 11. Above NRE010; below NRE045.

3.4.3.2.3 Community 12: Darling Pratia – Rat's tail Couch – Spike Rush Herbfield and Grassland

Pratia darlingensis (Darling Pratia) – *Sporobolus mitchellii* (Rat's-tail Couch) – *Eleocharis pusilla* (Spike Rush) Herbfield and Grassland

Full floristic sample sites (4): NEY015, NEY042, NEY043, NEY116.

Rapid survey sites (1): NER073.

Number of hectares: 27 **Proportion of property:** 0.1%

Environmental relationships: found in locations where water ponding occurs, generally in areas with higher sand content than Community 11.

Distribution within *Naree* and *Yantabulla*: scattered primarily within Naree but also present in small locations with Yantabulla.

Structure: generally an open herbfield or grassland, rarely an open shrubland.

- Tree-layer: 4-7 m tall. 5-25% cover. Very rarely present
- Shrub layer: 1-2 m tall. 5% cover. Very rarely present.
- Understorey layer: 0.1-0.6 m tall. 10-40% cover.

No. of taxa: 38 **No. of taxa per plot:** 9-**14.5**-21.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus populnea*.

Shrubs: *Hakea ivoryi, Teucrium racemosum, Sclerolaena birchii, Senna* sp. 'zygophylla', *Sclerolaena muricata, Sclerolaena convexula, Eremophila longifolia, Dodonaea viscosa, Acacia victoriae, Acacia aneura, .*

Climbers & trailers: none apparent.

Ground cover: *Pratia darlingensis, Sporobolus mitchellii, Eleocharis pusilla, Centipeda thespidioides, Alternanthera nodiflora, Sporobolus caroli, Solanum cleistogamum, Paspalidium jubiflorum, Cyperus squarrosus, Chenopodium melanocarpum, Sporobolus actinocladus, Eragrostis parviflora, Eragrostis lacunaria, Cyperus iria, Alternanthera denticulata, Solanum esuriale, Sida goniocarpa, Panicum laevinode, Marsilea costulifera, Eragrostis dielsii, Eleocharis pallens, Cynodon dactylon, Chamaesyce drummondii, Calotis cuneifolia, Boerhavia repleta.*

Introduced taxa: *Eragrostis cilianensis.*

Percent of species introduced: 2%

Taxa of conservation importance: none apparent.

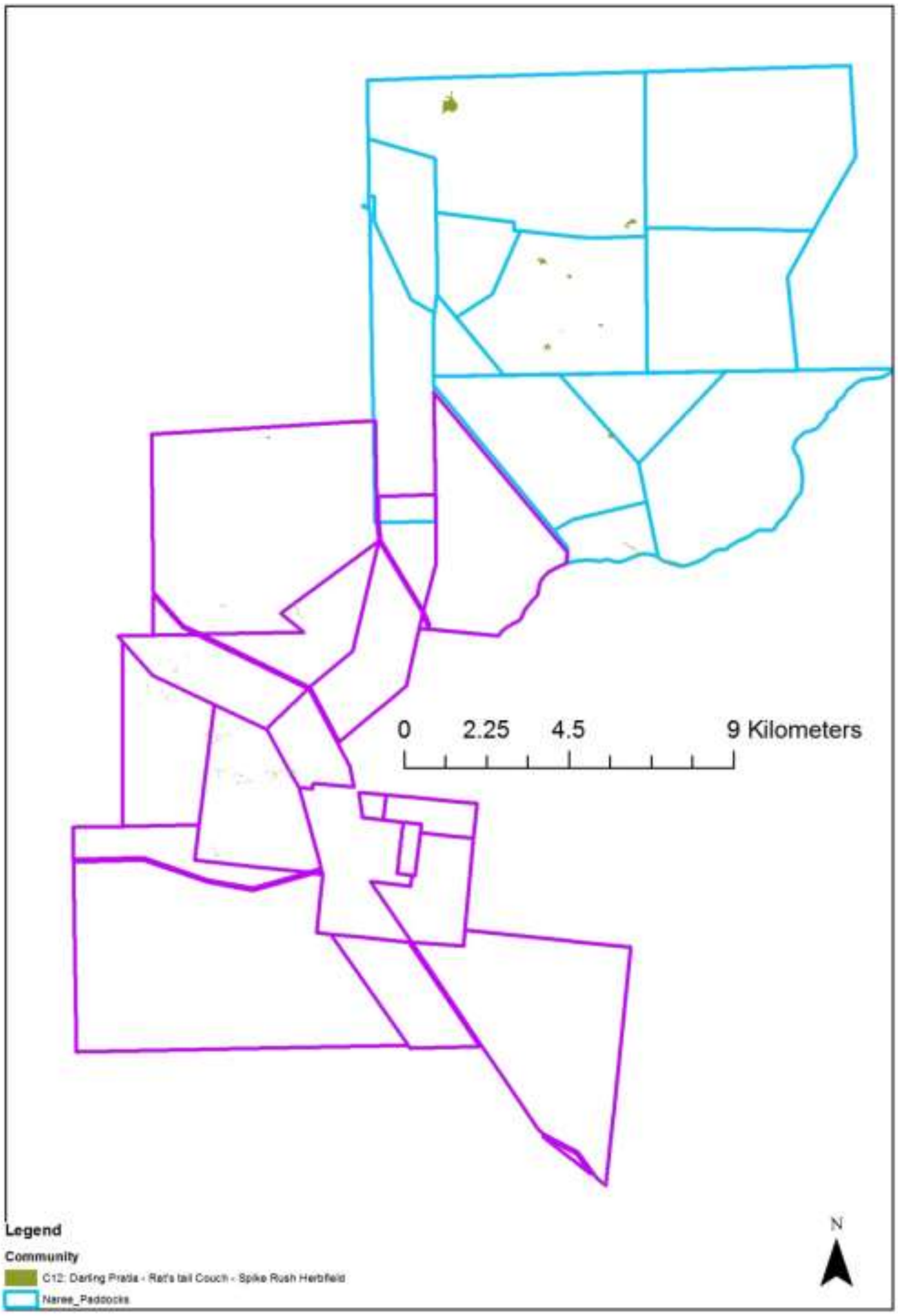

Figure 27: Mapped distribution of Community 12.

Plate 27: Photographs of Community 12. Above NEY015; below NEY042.

Plate 28: Photographs of Community 12. Above NEY043; below NEY116.

3.4.3.3 Sub-element: Canegrass Grassland

3.4.3.3.1 Community 13: Canegrass Grassland

Eragrostis australasica (Canegrass) Grassland

Full floristic sample sites (2): NE27, NE28.

Rapid survey sites (11): NER069, NER070, NER083, NER089, NER094, NER118, NER125, NER126, NER136, NER139, NER140.

Number of hectares: 175 **Proportion of property:** 0.6%

Environmental relationships: restricted to frequently inundated and ponding areas, often with a fine silty clay content.

Distribution within *Naree* and *Yantabulla*: scattered throughout both properties generally in discrete patches.

Structure: a grassland to open grassland.

- Upper layer: 0.8-2.5 m tall. 10-80% cover.
- Understorey layer: 0.1-1 m tall. 5-30 (70)% cover.

No. of taxa: 11 **No. of taxa per plot:** 1-**6**-11.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: none apparent.

Shrubs: *Atriplex eardleyae, Atriplex stipitata, Duma florulenta, Atriplex angulata*.

Climbers & trailers: none apparent.

Ground cover: *Eragrostis australasica, Panicum decompositum, Sporobolus mitchellii, Eleocharis pusilla, Centipeda crateriformis, Portulaca oleracea.*

Introduced taxa: none apparent.

Percent of species introduced: 10%

Taxa of conservation importance: none apparent.

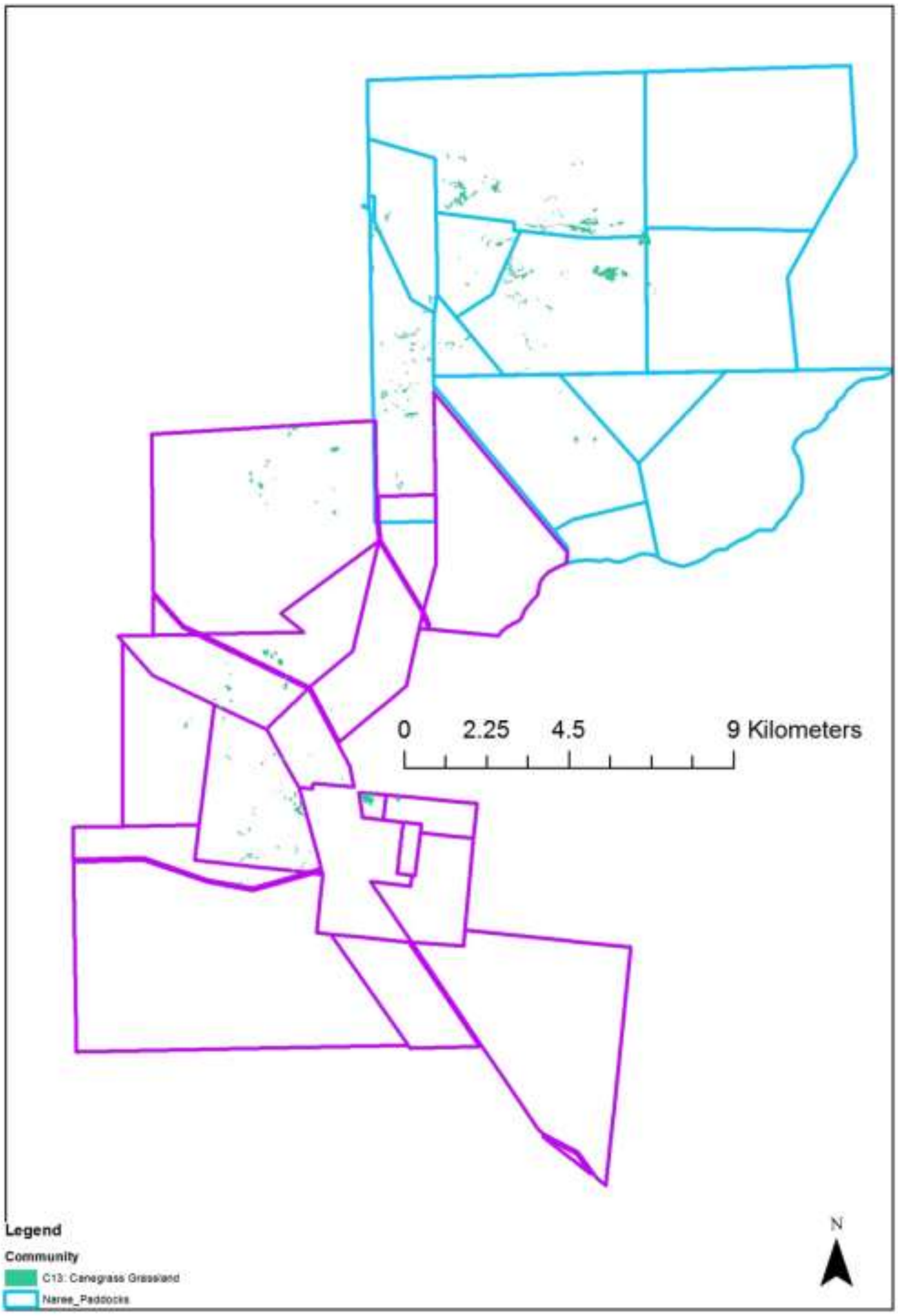

Figure 28: Mapped distribution of Community 13.

Plate 29: Photographs of Community 13. Above NER094; below NER126.

3.4.3.4 Sub-element: Lignum – Glinus Shrubland

3.4.3.4.1 Community 14: Glinus – Groundsel – Lignum Herbfield & Shrubland

Glinus lotoides – Senecio runcinifolius – Duma florulenta

Full floristic sample sites (7): NE33, NEY023, NEY061, NEY062, NEY063, NEY065, NEY085.

Rapid survey sites (3): NER090, NER117, NER127.

Number of hectares: 239 **Proportion of property:** 0.8%

Environmental relationships: restricted to flooded and ponding areas generally on heavier clays.

Distribution within *Naree* and *Yantabulla*: found in scattered locations in low lying areas on both properties.

Structure: an open herbaceous shrubland or open to closed herbfield.

- Upper layer: 1-2.5 m tall. 40-80% cover. Usually absent.
- Understorey layer: 0.1-1.5 m tall. 5-70% cover.

No. of taxa: 32 **No. of taxa per plot:** 4-**8.3**-16.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus coolabah, Acacia stenophylla*.

Shrubs: *Duma florulenta, Myoporum montanum, Sclerolaena birchii, Dodonaea viscosa*.

Climbers & trailers: none apparent.

Ground cover: *Glinus lotoides, Senecio runcinifolius, Centipeda minima, Sporobolus mitchellii, Centipeda cunninghamii, Centipeda crateriformis, Epaltes australis, Alternanthera nodiflora, Pterocaulon sphacelatum, Marsilea costulifera, Cyperus squarrosus, Centipeda thespidioides, Ammannia multiflora, Amaranthus grandiflorus, Alternanthera angustifolia, Stemodia glabella, Sporobolus caroli, Ludwigia peploides, Juncus aridicola, Dactyloctenium radulans, Cynodon dactylon, Chenopodium melanocarpum.*

Introduced taxa: *Heliotropium supinum, Citrullus lanatus, Cucumis myriocarpus, Argemone ochroleuca.*

Percent of species introduced: 10%

Taxa of conservation importance: none apparent.

Plate 30: Photographs of Community 14. Above NEY061; below NEY062.

Plate 31: Photographs of Community 14. Above NEY063; below NEY065.

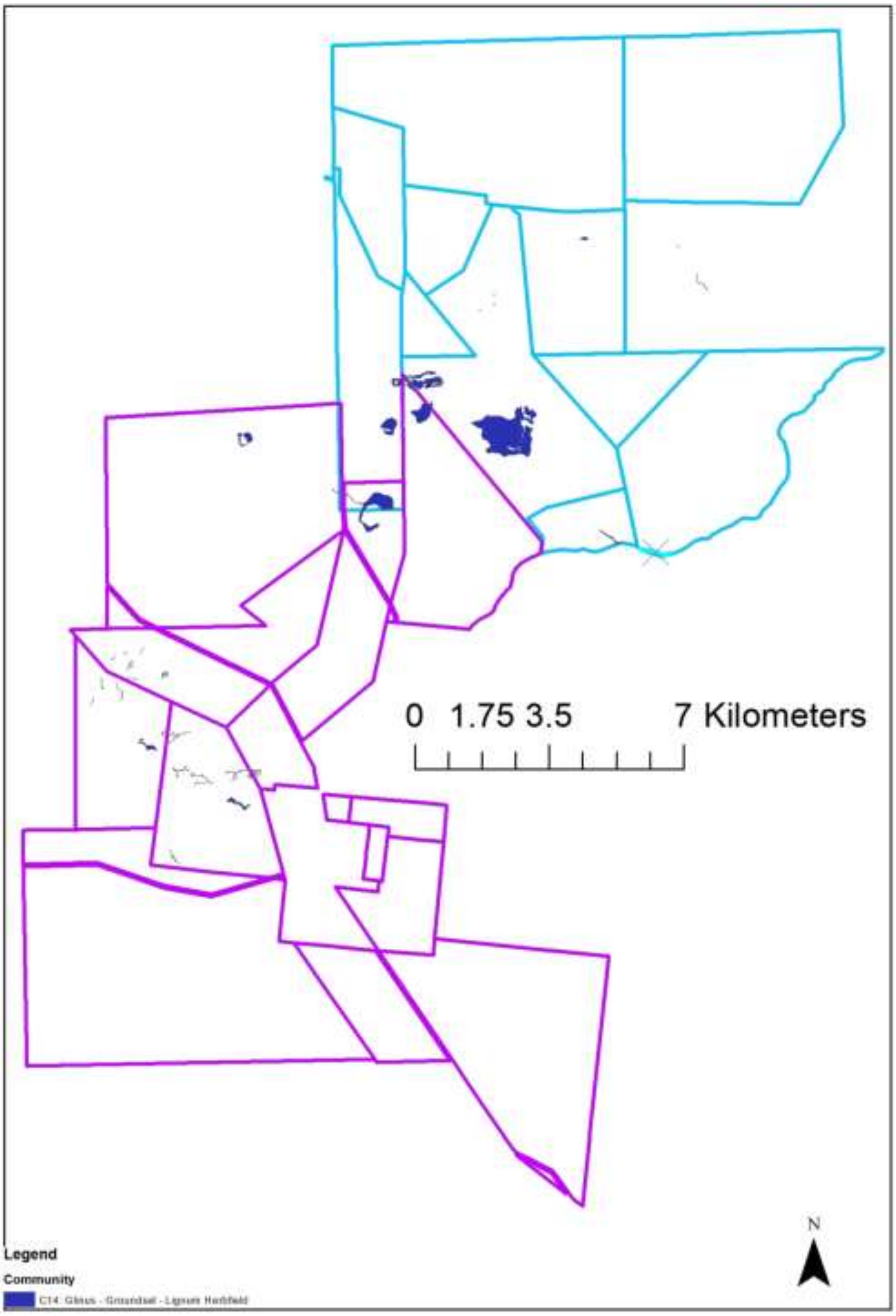

Figure 29: Mapped distribution of Community 14.

3.4.3.5 Sub-element: Poplar Box – Black Box Woodlands

Area: 1,366 ha (4.3%)

Common Overstorey: *Eucalyptus populnea, Eucalyptus largiflorens*.
Common Mid-storey: *Teucrium racemosum, Senna* sp. 'zygophylla', *Eremophila sturtii, Senna* sp. 'filifolia', *Sclerolaena birchii, Eremophila longifolia, Eremophila deserti, Myoporum montanum, Eremophila goodwinii.*
Common Understorey: *Enteropogon acicularis, Eragrostis lacunaria, Solanum esuriale, Sporobolus actinocladus, Paspalidium jubiflorum, Centipeda thespidioides, Sporobolus caroli, Marsilea drummondii, Cyperus iria, Wahlenbergia gracilis, Sida trichopoda, Eriochloa australiensis, Chloris truncata, Chenopodium melanocarpum, Marsilea costulifera, Digitaria brownii*.

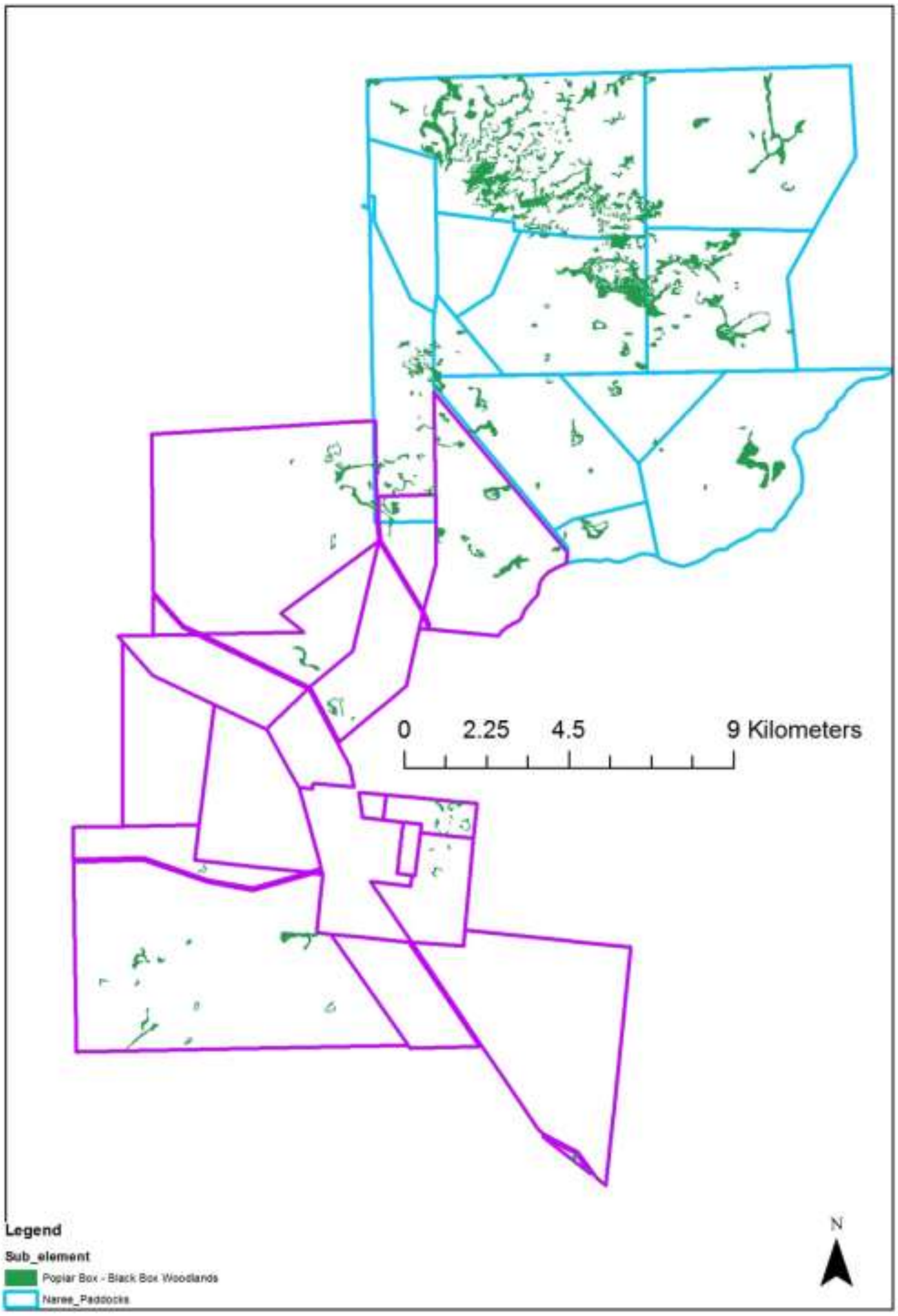

Figure 30: Mapped distribution of the Sub-element Poplar Box – Black Box Woodlands within *Naree* and *Yantabulla*.

3.4.3.5.1 Community 15: Poplar Box Woodlands

Eucalyptus populnea (Poplar Box) Woodlands

Full floristic sample sites (13): NE18, NE19, NE20, NE30, NEY002, NEY017, NEY020, NEY034, NEY036, NEY038, NEY047, NEY048, NEY119.

Rapid survey sites (15): NER001, NER012, NER022, NER034, NER037, NER043, NER056, NER068, NER075, NER078, NER079, NER093, NER121, NER143, NER171

Number of hectares: 1,060 **Proportion of property:** 3.3%

Environmental relationships: often on minor ephemeral drainage lines associated with plateau areas and intermediate locations duplex soils between dunal or red clay soils and grey to black clays of the floodplain.

Distribution within *Naree* and *Yantabulla*: found within both properties, particularly in minor drainage line areas within Mulga landscapes.

Structure: generally a low woodland or shrubby low woodland.

- Tree-layer: (3) 5-10 (16) m tall. (10) 20-25 (50)% cover.
- Shrub layer: 1-2.5 (3) m tall. (5) 15-25 (70)% cover.
- Understorey layer: 0.1-0.7 (1.8) m tall. (10) 30-35 (60)% cover.

No. of taxa: 113 **No. of taxa per plot:** 6-**22.3**-43.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus populnea, Acacia aneura, Eucalyptus coolabah*.

Shrubs: *Senna* sp. 'zygophylla', *Senna* sp. 'filiformis', *Teucrium racemosum, Sclerolaena birchii, Eremophila sturtii, Eremophila longifolia, Eremophila deserti, Myoporum montanum, Eremophila goodwinii, Sclerolaena convexula, Eremophila glabra, Dodonaea viscosa, Eremophila gilesii, Dichanthium sericeum, Amaranthus macrocarpus, Abutilon oxycarpum, Tripogon loliiformis, Trianthema triquetra, Solanum ellipticum, Solanum cinereum, Pluchea tetranthera, Panicum effusum, Panicum decompositum, Evolvulus alsinoides, Eragrostis setifolia, Eragrostis microcarpa, Eragrostis brownii, Enneapogon avenaceus, Elytrophorus spicatus, Centipeda minima, Centipeda crateriformis, Boerhavia repleta, Aristida jerichoensis*.

Climbers & trailers: *Convolvulus clementii.*

Ground cover: *Enteropogon acicularis, Sporobolus actinocladus, Solanum esuriale, Centipeda thespidioides, Paspalidium jubiflorum, Sporobolus caroli, Alternanthera nodiflora, Eragrostis lacunaria, Cyperus iria, Calandrinia eremaea, Wahlenbergia gracilis, Sida trichopoda, Pterocaulon sphacelatum, Eriochloa australiensis, Chenopodium melanocarpum, Abutilon otocarpum, Sporobolus mitchellii, Marsilea drummondii, Marsilea costulifera, Digitaria brownii, Chloris truncata, Stemodia glabella, Phyllanthus virgatus, Eragrostis parviflora, Eleocharis pusilla, Alternanthera denticulata, Aristida holathera.*

Introduced taxa: *Malvastrum americanum, Eragrostis cilianensis, Verbena gaudichaudii, Silene gallica, Cucumis myriocarpus, Citrullus lanatus.*

Percent of species introduced: 5%

Taxa of conservation importance: none apparent.

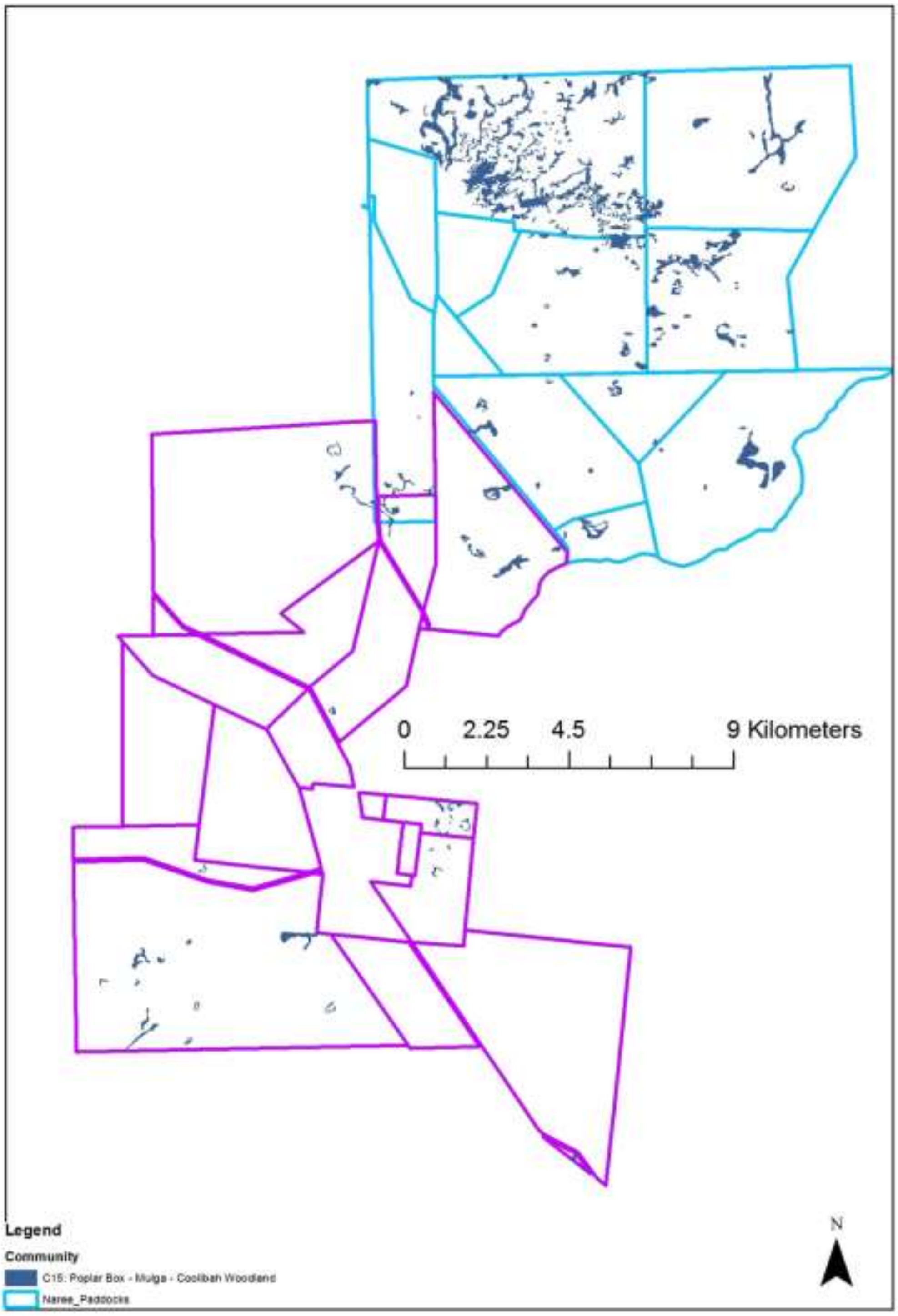

Figure 31: Mapped distribution of Community 15.

Plate 32: Photographs of Community 15. Above NEY020; below NEY038.

Plate 33: Photographs of Community 15. Above NEY048; below NEY119.

3.4.16 Community 16: Black Box Woodlands

Eucalyptus largiflorens (Black Box) Woodlands

Full floristic sample sites (5): NE032, NEY025, NEY027, NRE008, NRE013.

Rapid survey sites (6): NER028, NER035, NER038, NER041, NER086, NER114.

Number of hectares: 307 **Proportion of property:** 1%

Environmental relationships: found on low lying areas that are periodically flooded, usually on the upper margins of lake beds or within islands internal to lakes. Often forming dense stands due to mass germination and establishment.

Distribution within *Naree* and *Yantabulla*: found in scattered locations within both properties.

Structure: generally a low open woodland, low woodland or a dense shrubland (due to young cohort regeneration).

- Tree-layer: (3) 4.5-8 (10) m tall. (20) 40-45 (70)% cover.
- Shrub layer: (0.5) 0.8-2 (3) m tall. 5-10% cover. Rarely present.
- Understorey layer: 0.1-0.4 (1) m tall. (5) 30-35 (80)% cover.

No. of taxa: 113 **No. of taxa per plot:** 4-**10.2**-19.

Most common natives: listed in order of decreasing summed cover scores (fidelity x cover).

Trees: *Eucalyptus largiflorens, Eucalyptus populnea*.

Shrubs: *Teucrium racemosum, Eremophila sturtii, Sclerolaena birchii, Hakea leucoptera, Dodonaea viscosa, Atriplex eardleyae*.

Climbers & trailers: none apparent.

Ground cover: *Eragrostis lacunaria, Enteropogon acicularis, Stemodia glabella, Solanum esuriale, Pterocaulon sphacelatum, Sporobolus mitchellii, Paspalidium jubiflorum, Sporobolus caroli, Portulaca oleracea, Marsilea drummondii, Calandrinia eremaea, Brachyscome ciliaris, Boerhavia coccinea, Vittadinia cuneata, Sida goniocarpa, Sclerolaena birchii, Sauropus trachyspermus, Linum marginale, Leptorhynchos baileyi, Eragrostis dielsii, Einadia nutans, Chloris truncata, Chamaesyce drummondii, Alternanthera nodiflora.*

Introduced taxa: *Malvastrum americanum, Eragrostis cilianensis.*

Percent of species introduced: 10%

Taxa of conservation importance: none apparent.

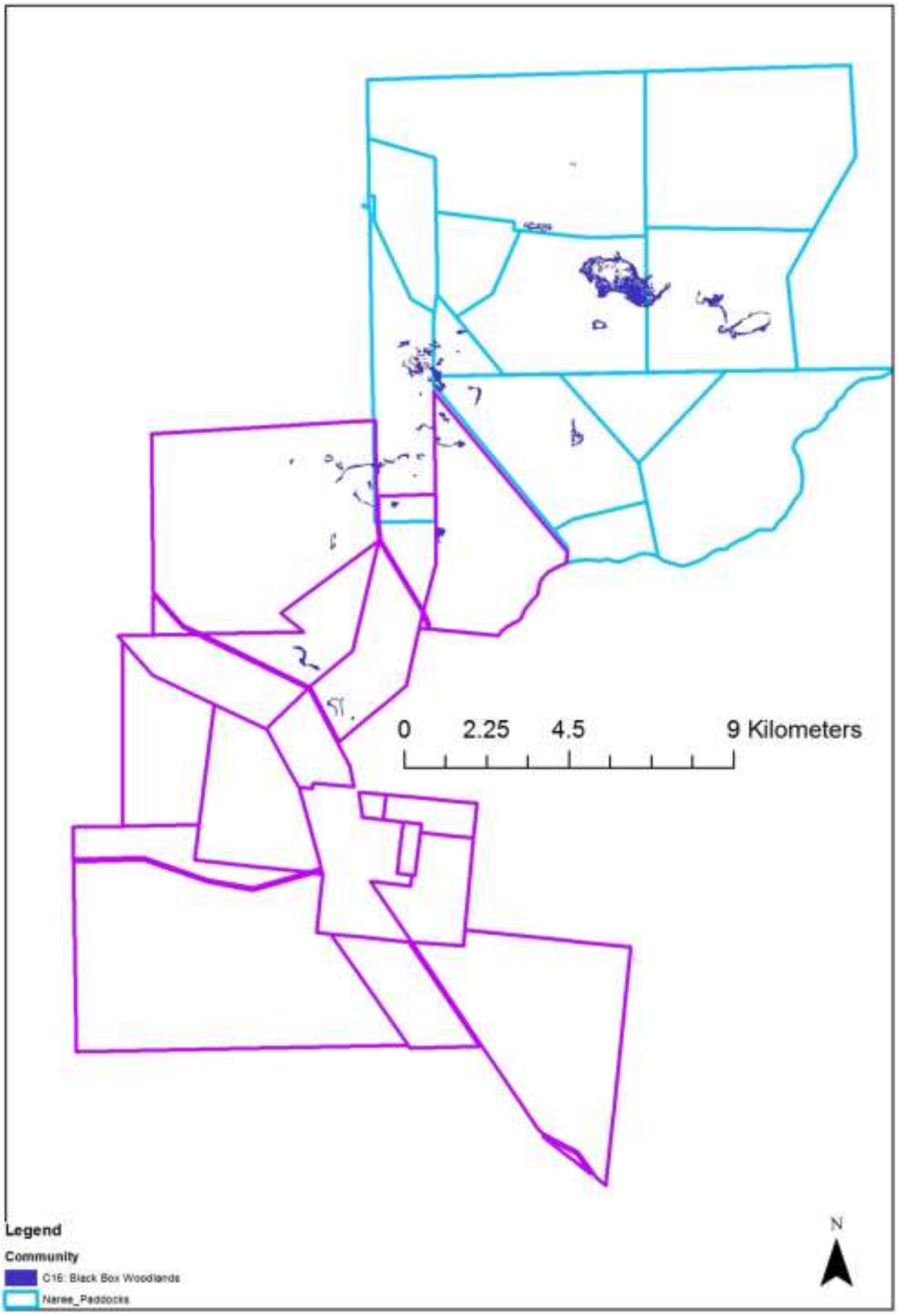

Figure 32: Mapped distribution of Community 16.

Plate 34: Photographs of Community 16. Above NEY025; below NEY027.

Plate 35: Photographs of Community 16. NRE008; below NRE013.

3.5 Taxa and communities of conservation significance

Only one species is currently listed as threatened under the New South Wales *TSC* Act; *Dentella minutissima* which has been previously recorded within Nocoleche Nature Reserve, Toorlae National Park, Toorale State Conservation Area and here at Naree. The species is restricted to mud flats around drying waterholes or sandy silts on the edge of drainage lines. Due to the ephemeral flowering and size of the species there may be additional significant populations across both properties.

No species listed on the *EPBC* Act have yet been found and no currently listed threatened communities have been found. This however is probably more a reflection of the lack of botanical exploration and mapping in western NSW. Furthermore many western species are likely to warrant inclusion under either the State or Federal Acts however submissions are required and the lack of expert botanical knowledge has meant that submissions from these areas are lacking, rather than a true reflection of rarity.

Some other significant taxa may include:
Potentella nanopetala which is only known from two other populations within NSW

Eucalyptus melanophloia which is at its western most limit within Naree and Yantabulla.

Brachychiton populneus which is at its western most limit within Naree and Yantabulla.

Plate 36: Photograph of *Dentella minutissima* from *Naree*.

3.6 Fire

In general bushfire management strategies tend to create a homogeneous fire landscape. Whereas it is a heterogeneous fire landscape (i.e. patchy burns with frequently burnt areas intermixed with long unburnt sites) that helps promote diversity at a landscape scale. Careful consideration must therefore be given to the requirements of native vegetation remnants when looking at the implementation of a non-natural fire regime.

Fire suppression for the protection of life and property has long reaching effects on biodiversity, and some recent research is discussed herewith. The efficacy of prescribed burning in reducing or eliminating the threats from wildfires has been questioned in recent research (King et al. 2008, Whelan 2002), especially in extreme weather conditions (such as high temperatures, high winds and low relative humidity). Research into litter depths is currently showing that frequent, low intensity fires cause trees and shrubs to drop damaged or stressed foliage and stimulate suckering. Thus, promoting fine fuel loads which have a greater flammability that larger woody matter. The passage of fire also disrupts soil/litter biota causing a reduction in the amount of litter that is naturally broken down and returned to the soil. Woody debri when it breaks down provides far better soil integrity (protection from erosion) than grass and the larger the woody debri the greater the soil integrity. Furthermore frequent burning may promote fire insensitive species that often have higher oil content over less flammable fire sensitive species, again increasing the flammability of native vegetation. In combination this indicates that a program of frequent low intensity fires may in fact keep fuel loads at a high level necessarily requiring fires to be more frequent to keep such fuel loads down.

Native vegetation left long unburnt for decades (30 or more years) can have lower fuel loads than areas burnt only three to five years previously (Croft et al., in review). Fuel loads do not increase indefinitely but are constantly broken down by the ground flora and fauna. Fine fuel loads disappear to be replaced by less flammable larger woody debris. Frequent fire can also keep a woodland in a perpetual young state by stimulating germination and removing old trees (eating them out till they fall) thus reducing the number of hollows in the landscape (Croft 2013).

The effects of frequent low intensity burning on native fauna is increasingly found to have negative consequences, causing significant losses by gradual attrition of habitat. What is certain is that ecosystems in Australia have been modified by changes in fire regimes in the last 200 years (Clarke 2008, Tasker et al. 2006, Lunt 2002, Pyne 1991). Changes have occurred in the structure and floristic composition of the vegetation, and microhabitat features such as decreasing litter and logs (Spencer and Baxter 2006, Tasker et al. 2006, Gill and Catling 2002, Hobbs 2002, Russell-Smith and Stanton 2002, Catling 1991, Bell and Koch 1980; Croft et al. 2010). The impact of wildfires and prescribed burning is often a secondary consideration in fire management (Clarke 2008).

A key habitat feature that is consumed by fire is fallen timber which provides shelter for; reptiles, frogs, small mammals and numerous invertebrates (Spencer and Baxter 2006, Bowie and Frampton 2004, Michael et al. 2004, Fischer et al 2003, Lindenmayer et al. 2003). Reptile abundance and richness has been correlated with the percentage cover of logs, their number and length (McElhinny et al. 2006). Logs provide basking sites for reptiles as well as shelter, foraging and nesting locations

(Lindenmayer et al. 2005). Survival of some animal populations during and after fire is dependent on unburnt or partially burnt log refuges withstanding the passage of fire, and a fire free period to allow populations to recover.

Solid logs in fire-affected areas are sometimes burnt or charred but not totally consumed, while incompletely burnt hollow logs can collapse leaving a charred log surface interface with the ground surface. The quality of these charred logs as fauna habitat appears to be reduced, with fauna surveys recording fewer animals (both invertebrates and vertebrates) recorded under this altered habitat attribute (Croft et al. 2010). This potential reduction habitat quality through partial burning is a consequence of hazard reduction burning that should be considered in fire management.

Studies have shown that in burnt forest the litter layer is often completely consumed by wildfire while in the unburnt forest there is 99% ground cover, made up mainly of grass tussocks and litter (to an average depth of 4 cm). Litter is an important habitat attribute for ground dwelling invertebrates, reptiles, frogs and mammals for foraging, shelter and basking (Clarke 2008; Taylor 2008, McElhinny et al. 2006, Majer et al. 2002).

Morrison et al.(1995) and Clarke (2008) note that it is ecologically undesirable to frequently remove ground level fuels using prescribed fire across large areas to satisfy demands for fire control. Especially considering that hazard reduction advantages of large-scale prescribed fire are not proven (Fernandes and Botelho 2003). Tolhurst et al. (1992) found that low-intensity fires reduced litter and elevated fuels and bark, but a single fire did not significantly affect coarse fuels (logs). One way to protect fallen timber habitat is to proceed with hazard reduction burning only when the drought index is low.

Climate change projections predict large increases in drought in Australia, along with more frequent fires associated with the drier and warmer conditions (Cary 2002, Australian Greenhouse Office 2003, Pittock 2005). Plants in fire and drought-prone vegetation communities may respond to these disturbances by evolving recovery mechanisms or survival strategies to persist in these environments after fire (Keith 1996, Bradstock & Kenny 2003) or drought (Davidson & Reid 1989, Morgan 2004).

Resprouting from bud reserves under the bark, from lignotubers, basal stems or rhizomes are recovery responses of many Australian plant genera in communities subject to frequent fire (Keith 1996) and also drought. However, despite an ability to recover from single fires (or other disturbance such as drought), high-frequency fire can cause some species to decline or become locally extinct if resprouters do not have time to recover a reproductive capacity. Repeated disturbances can deplete a plant's reserves and soil seed stores. The regenerative capacity of vegetation may be affected by a combination of fire and drought (Keith 1996, Lawler et al.1998, Marod et al. 2004, van Nieuwstadt & Sheil 2005), especially if inter-fire periods are short and droughts frequent. Croft et al (2007) proposed a model that predicts the decline of several rare and threatened plants subject to the combined disturbances of fire and drought. They concluded from observations of wattle survival after a wildfire followed by drought, that fire history should be adjusted to include severe drought when formulating fire management guidelines for vegetation.

The combined effect of drought and burning on plants' regenerative resources has not been adequately considered in fire regimes recommended for communities and species in NSW. To avoid exacerbating the ecological consequences of frequent fire, caution is required in implementing hazard reduction burning programmes. This is especially important considering the imperative to increase the amount of prescribed burning in NSW (DECC 2009). Too-frequent fire can cause the decline of plant taxa, and fire histories should be adjusted to include the possible effects of severe drought in fire planning.

Even though there have been few studies of invertebrates on tree trunks (Bickel & Tasker 2004), the work that has been done highlights the richness of invertebrate and vertebrate fauna inhabiting different bark types. Majer et al (2002) collected over 1,200 invertebrate species on three bark types: smooth, stringy and rough. Noske (1985) determined the taxonomic composition of arthropods of the same three bark types while investigating bark-foraging by birds. Arthropods are an important resource for feeding birds, with bark also providing nesting material (Pearce 1996, Loyn et al. 2007), nesting and foraging sites for small mammals (Dickman 1991) and shelter for bats (Lumsden et al. 2002, Vesk et al. 2008).

Michael et al (2004) warned that any management activities that reduce structural heterogeneity and complexity of habitat can also reduce faunal diversity. Fire is a natural agent, as well as management tool, that can simplify structurally complex habitat. During wildfires and hazard reduction burning, bark contributes to the fuel that promotes the spread of fire (Gill 1981, Catchpole 2002, Gould 2003). Assessment of the fuel factors affecting fire behaviour emphasises the importance of bark in determining fuel loads and suppression difficulty (McCarthy 2002). It can take some bark types 15 to 25 years to return to pre-burning conditions (Tolhurst et al. 1992) and therefore a similar period of time to re-establish full structural heterogeneity, and possibly concomitant fauna diversity. Land managers need to consider the potential loss of bark resources when undertaking hazard reduction burning.

Burning bark reduces its structural complexity and habitat value. Burning gum trees removes decorticating bark causing a structural change that generally would be short-lived, as gums usually shed bark annually. Burning bark on standing trees can cause longer term loss of habitat with a flow-on effect on resources, as they can take up to 25 years to attain the same amount of pre-fire bark structure and depth (Tolhurst et al. 1992).

A significant component of forest and woodland biodiversity is comprised of arthropods, which often have narrow habitat requirements (Recher et al. 1996). Arthropods are a major food resource for birds, mammals and reptiles. The various forms of bark architecture take up to 20 years to develop (Vesk et al. 2008) and possibly longer to recover fully from fire (Tolhurst et al. 1992). The importance of bark as a foraging substrate for small mammals led Dickman (1991) to recommend that control burning and post-logging burning be minimised during forestry operations so that tree bark be retained. The deleterious impact of fire on habitat resources; bark, fallen timber and litter needs to be considered in fire management prescriptions.

Frequent burning results in a relative increase in species richness in ground layer vegetation in logged and unlogged dry sclerophyll forests in south-eastern Australia

(Penman et al 2008), but a decline of larger species over 1m in height. Very short or very long inter-fire periods are likely to lead to changes in species abundance (McCarthy et al. 2003, Croft et al. 2006). Whelan et al (2002) demonstrated a reduction of mean species richness per sample plot where there were very short inter-fire intervals.

Some studies have shown a decline in species richness with time since fire (for example Whelan et al 2002). However, a more detailed analysis of the results of this survey questions the extent of the length of time since fire as the primary determinant of the decline in species richness. Other environmental variables, especially slope in this case, along with aspect and soil depth had a greater influence on species richness. Long periods without burning (> 50 years) may deplete some populations locally. But as Bradstock and Kenny (2003) point out such effects may be offset if populations are intact elsewhere in the landscape and long unburnt vegetation has been found to contain species that require a long fire free periods before they become established.

Long unburnt vegetation communities (>50 years) are rare in the landscape. The substantial habitat features of these communities indicate that they are a valuable resource despite an apparent small reduction in species richness per site. The imperative to burn vegetation communities that are beyond the recommended upper fire thresholds, in order to prevent species loss, needs to be questioned in fire management planning. Croft (2013) currently recommends that current upper fire free periods should be at least doubled to cater for fauna habitat in eastern Australia.

Grazing pressure from introduced rabbits, but also from native fauna such as Kangaroos, is accentuated in small burns if dry conditions follow in the post fire environment (Cohn & Bradstock 2000). There is a need to regulate feral animals such as rabbits if good seedling recruitment is to occur in the post fire environment (Cohn & Bradstock 2000).

Although biodiversity is shown to increase after fire one should not be misled by a too great an emphasis on diversity at the cost of considering which species are contributing to the diversity and to richness at the landscape scale (Gill 1977; Noble 1981). Rigid prescriptions for fires will inevitably lead to the development of vegetation communities adapted to an inflexible fire regime with the consequent loss of many plant species (Heislers *et al.* 1981). For example, while fires were shown to increase local richness at Yathong it decreased the richness between sites and while richness declined with greater inter-fire periods differences between sites (beta diversity) increased (Cohn *et al.* 2002). A variety and range of age classes of each vegetation type is the most desirable outcome, with most vegetation being in the older age classes (Heislers *et al.* 1981). Variability and adaptability in fire regimes is the goal suggested by recent research (Bradstock *et al.* 1995; Conroy 1996).

Changes are known to occur in the composition of algal and bryophyte crusts on soils after fire. These crusts help stabilise the soil surface against water erosion (Eldridge & Bradstock 1994). The condition of these crusts can be crucial to soil surface regenerates and nutrient cycling (Cheal 1981; Eldridge & Bradstock 1994; Eldridge & Tozer 1997). Continued frequent burning has been shown to completely destroy cryptogamic crusts (Greene et al. 1990). Eldridge and Bradstock (1994) showed that cryptogamic crusts were best developed about 16 years after fire and that they begin to decrease after this time. The increase in litter from the overstorey species causes this reduction. Increasing fire regularity is currently causing declines in reptile and mammal assembalges in northern Australia and a less prescriptive approach appears to be warrented (Russel-Smith *et al.* 2013; Lawes *et al.* 2015).

In summary:

1. Frequent burning causes increase stress on vegetation, and if droughts occur between fire periods these stresses are exacerbated and may lead to premature death and/or extinction due to the depletion of regenerative resources.
2. Frequent burning has been shown to increase fuel loads in the short term, while long unburnt areas become stabilised and have been shown in some locations to significantly reduce fuel loads.
3. Frequent fire promotes a young and high regenerating woodland or forest.
4. Frequent fire removes essential habitat resources for fauna such as large logs on the ground, large trees with hollows, bark resources and the functional diversity of flora.

5. Long unburnt areas are essential within the landscape and are currently a rare and significant habitat type.
6. Long unburnt vegetation is disproportionately important for fauna habitat.
7. Recently burnt patches are likely to be more heavily grazed (green pick) and may require protection.

It is important that records are kept and mapping of fire occurrences occurs. It is recommended that the following occurs:

- Collation of fire records, verbal reports and evidence from aerial photographs.
- When fires occur, accurate boundary maps of the extent of fires should be made. This needs to include accurate ground truthing.
- Map opportunistic evidence of lightning strikes.
- Site specific research needs to be conducted in each of the communities within the reserve.
- Old age stands (absence of fire) of all community types should be maintained if possible.
- Feral animal control will need to precede and follow or accompany any management burns particularly if weather conditions are dry post fire.

Haslem *et al*. (2011) found the density of fallen timber, bark and hollows to be higher in long unburnt mallee and they considered the fuel of fires, including hazard reduction burns, to equate to the habitat of fauna. The density of fallen timber gradually increased from 50 to 100 years post fire within mallee communities. Smith (2013) found the number of late successional reptile species were most common in mallee habitats that had not been burnt for more than 40 years. This study has highlighted the fact that long-unburnt open forest and woodland is disproportionally important for fauna habitat both in communities within eastern NSW but the same processes and advantages of long unburnt vegetation occurs within semi-arid areas (such as Mallee landscapes). If the gaol of management is to increase the diversity of both vegetation and animal assemblages that a mosaic that includes more frequently burnt vegetation and vegetation that has been unburnt for up to 100 years or more is a necessity.

3.7 Introduced taxa

The number of introduced taxa is relatively low compared to many other locations in western NSW (Table 1). The major threats to conservation values are with two introduced perennial grasses, *Eragrostis cilianensis* which is widespread throughout both properties and is in dense stands particularly around locations of heavy agricultural use such as house yards, stocking yards and dams. This species is also prevalent along tracks and trails and becomes less abundant away from these areas. It however can be found along almost all trails. *Cencrhus ciliaris* is in lower abundance and less well distributed than *Eragrostis cilianensis* however it also follows a similar pattern of distribution. Both species may require similar targeted eradication programs, *Eragrostis cilianensis* in particularly may need a program of removal from the main homestead at *Naree* as it is likely to be spread from here to all sections of the property by vehicles, particularly during wet periods. Vehicles should try to remain on current tracks. *Xanthium occidentale* is also a significant weed generally near dams and other wetter areas along with *Heliotropium* spp., the further closing of watering points will assist in eradication of these taxa. Other species may become troublesome in the future however most other species currently are in low abundance or are ubiquitous environmental weeds.

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Appendix A: Taxon list with recognised authorities and common names. Includes some taxa found from previous survey sites sampled by other botanists.

Preliminary Flora List
for
Naree and *Yantabulla*

(Dr John T. Hunter, based on observations in June 2014 and April 2015 with additional species from previous surveys)

Fern & Fern Allies

Adiantaceae
Cheilanthes sieberi Kunze
subsp. *sieberi*..Narrow Rock Fern

Marsileaceae
Marsilea costulifera D.L.Jones ....Narrow-leaf Nardoo
Marsilea drummondii A.Braun..Common Nardoo
Marsilea hirsuta R.Br...Hairy Nardoo

Gymnosperm

Cupressaceae
Callitris glaucophylla Joy Thomps. & L.A.S.Johnson...................................White Cypress Pine

Monocotyledon

Amaryllidaceae
Calostemma purpurea R.Br...Garland Lily
Crinum flaccidum Herb. ....Darling Lily

Anthericaceae
Tricoryne elatior R.Br. ....Yellow Autumn-lily

Asphodelaceae
Bulbine alata Baijnath...Native Leek

Cyperaceae
Cyperus bifax C.B.Clarke..Downs Nutgrass
Cyperus difformis L. ....Dirty Dora
Cyperus gilesii Benth. ....Sedge
Cyperus iria L. ....Sedge
Eleocharis acuta R.Br. ....Common Spike Rush
Eleocharis pallens S.T.Blake ....Pale Spike Rush
Eleocharis pusilla R.Br. ....Small Spike Rush
Fimbristylis dichotoma (L.) Vahl ....Common Fringe Rush
Isolepis australiensis (Maiden & Betche) K.L.Wilson...................................Club-rush
Schoenoplectus levis (S.T.Blake) J.Raynal...Rush

Juncaceae
Juncus aridicola L.A.S.Johnson...Tussock Rush
Triglochin calcitrapa Hook. ....Spurred Arrowgrass

Phormiaceae
Dianella porracea (R.J.F.Hend.) P.F.Harsfall et. G.W.Carr ....Blue Flax Lily

Poaceae

Amphipogon caricinus F.Muell.
var. *caricinus*....................Long Greybeard Grass
Aristida blakei B.K.Simon ....Kerosene Grass
Aristida calycina
var. *praealta* Domin ....Kerosene Grass
Aristida contorta F.Muell. ....Bunched Kerosene Grass
Aristida holathera Domin
var. *holathera* ....Erect Kerosene Grass
Aristida jerichoensis
subsp. *subspinulifera* Henrard....................Jericho Wiregrass
Aristida leptopoda Benth.....................White Speargrass
Aristida nitidula (Henrard) S.T.Blake ex J.M.Black ....Kerosene Grass
Austrostipa nitida (Summerh. & C.E.Hubb.) S.W.L.Jacobs & J.Everett ....Speargrass
Austrostipa scabra (Lindl.) S.W.L.Jacobs & J.Everett
subsp. *scabra*....................Speargrass
Bromus arenarius Labill.....................Sand Broome
**Cenchrus ciliaris* L.....................Buffel Grass
Chloris pectinata Benth.....................Comb Chloris
Chloris truncata R.Br.....................Windmill Grass
Cymbopogon ambiguus A.Camus ....Lemon Grass
Cymbopogon obtectus S.T.Blake....................Silky-heads
Cynodon dactylon (L.) Pers.....................Couch, Bermuda Grass
Dactyloctenium radulans (R.Br.) P.Beauv. ....Button Grass, Finger Grass
Dichanthium sericeum S.T.Blake
subsp. *humilis* (J.M.Black) B.K.Simon ....Queensland Bluegrass
subsp. *sericeum* ....Queensland Bluegrass
Digitaria ammophila Hughes ....Silky Umbrella Grass
Digitaria brownii (Roem. & Schult.) Hughes ....Cotton Panic Grass
Digitaria coenicola (F.Muell.) Hughes ....Finger Panic Grass
Digitaria divaricatissima (R.Br.) Hughes ....Spreading Umbrella Grass
Digitaria hystrichoides Vickery ....Curley Umbrella Grass
Echinochloa colona (L.) Link ....Awnless Barnyard Grass
Echinochloa inundata P.W.Michael & Vickery ....Marsh Millet
Echinochloa turneriana (Domin) J.M.Black....................Channel Millet
Elytrophorus spicatus (Willd.) A.Camus ....Spike Grass
Enneapogon avenaceus (Lindl.) C.E.Hubb ....Bottle-washers
Enneapogon cylindricus N.T.Burb.....................Jointed Nine-awn
Enneapogon intermedius N.T.Burb.....................Tall Bottle-washers
Enneapogon nigricans (R.Br.) P.Beauv. ....Niggerheads
Enneapogon polyphyllus (Domin) N.T.Burb....................Limestone Bottle-washers
Enteropogon acicularis (Lindl.) Lazarides....................Curly Windmill Grass
Eragrostis australasica (Steud.) C.E.Hubb. ....Canegrass
Eragrostis basedowii Jedwabn. ....Lovegrass
Eragrostis brownii (Kunth) Nees ....Brown's Lovegrass
**Eragrostis cilianensis* (All.) Link ex Vignolo ....Stinkgrass
Eragrostis dielsii Pilger....................Mallee Lovegrass
Eragrostis elongata (Willd.) J.Jacq. ....Clustered Lovegrass
Eragrostis eriopoda Benth. ....Woollybutt
Eragrostis kennedyae F.Turner ....Lovegrass
Eragrostis lacunaria F.Muell. ex Benth.....................Purple Lovegrass
Eragrostis laniflora Benth.....................Woollybutt
Eragrostis leptocarpa Benth. ....Drooping Lovegrass
Eragrostis leptostachya Steud. ....Paddock Lovegrass
Eragrostis microcarpa Vickery....................Lovegrass
Eragrostis parviflora (R.Br.) Trin. ....Weeping Lovegrass
**Eragrostis pilosa* (L.) P.Beauv. ....Soft Lovegrass
Eragrostis setifolia Nees ....Neverfail
Eragrostis sororia Domin ....Lovegrass
Eriachne aristidea F.Muell. ....Threeawn Wanderie Grass
Eriachne helmsii (Domin) Hartley ....Woollybutt Wanderrie Grass

Eriachne mucronata R.Br. ....Mountain Wanderrie Grass
Eriochloa australiensis Stapf ex Thell. ....Spring Grass
Eriochloa pseudoacrotricha (Stapf ex Thell.) J.M.Black...............................Early Spring Grass
Eulalia aurea (Bory) Kunth ....Silky Browntop
Iseilema membranaceum (Lind.) Domin..Small Flinders Grass
Monachather paradoxa Steud. ....Bandicoot Grass
Neurachne munroi (F.Muell.) F.Muell. ....Mulga Grass
Panicum decompositum R.Br. ....Native Millet
Panicum laevinode Lindl..Pepper Grass
Panicum effusum Domin ....Panic
Paspalidium constrictum (Domin) C.E.Hubb..Knottybutt Grass
Paspalidium jubiflorum (Trin.) Hughes ....Warrego Grass
Perotus rara R.Br...Comet Grass
Poa fordeana F.Muell. ....Poa
Sporobolus actinocladus (F.Muell.) F.Muell..Katoora Grass
Sporobolus caroli Mez ....Fairy Grass, Yakka Grass
Sporobolus mitchellii (Trin.) C.E.Hubb. ex S.T.Blake...................................Rats tail Couch
Themeda avenacea (F.Muell.) Maiden & Betche..Native Oatgrass
Themeda triandra Forssk. ....Kangaroo Grass
Thyridolepis mitchelliana (Nees) S.T.Blake ....Mulga Mitchell Grass
Thyridolepis xerophila (Domin) S.T.Blake ....Mitchell Grass
Tragus australianus S.T.Blake..Small Burr-grass
Tripogon loliiformis (F.Muell.) C.E.Hubb. ....Five Minute Grass
Triraphis mollis R.Br..Purple Needle-grass
Walwhalleya subxerophyllum (Domin) Wills & J.J.Bruhl ....Gilgai Grass

Dicotyledon

Aizoaceae

Glinus lotoides Loefl. ....Glinus
Mollugo cerviana (L.) Ser. ....Mollugo
Tetragonia eremaea Ostenf. ....New Zealand Spinach
Trianthema triquetra Willd. ....Small Hogweed
Zaleya galericulata (Melville) H.Eichler ....Hogweed

Amaranthaceae

Alternanthera angustifolia R.Br. ....Joyweed
Alternanthera denticulata R.Br. ....Joyweed
Alternanthera nodiflora R.Br. ....Common Joyweed
Amaranthus grandiflorus (J.M.Black) J.M.Black ....Amaranth
Amaranthus macrocarpus Benth. ....Dwarf Amaranth
Ptilotus gaudichaudii
var. *parviflorus* (Benth.) Benth. ....Ptilotus
Ptilotus leucocoma (Moq.) F.Muell. ....Purple Ptilotus
Ptilotus polystachyus (Gaudich.) F.Muell.
var. *polystachyus*...Long-tails
Ptilotus sessilifolius (Lindl.) Benl
var. *sessilifolius*...Crimson Foxtail

Apiaceae

**Ammi majus* L. ....Bishops Weed
Daucus glochidiatus (Labill.) Fisch., C.A.Mey. & Ave-Lall ....Native Carrot
Trachymene glaucifolia (F.Muell.) Benth. ....Wild Parsnip
Trachymene ochracea L.A.S.Johnson ....Native Parsnip, White Parsnip

Apocynaceae

Alstonia constricta F.Muell. ....Quinine Bush

Asclepiadaceae

Marsdenia viridiflora R.Br..Native Pear

Sarcostemma viminale
subsp. *australe* (R.Br.) P.I.Forst..Caustic Vine

Asteraceae
Actinobole uliginosum (A.Gray) H.Eichler ....Flannel Cudweed
Angianthus brachypappus F.Muell...Spreading Cup-flower
Brachyscome ciliaris
var. *lanuginosa* (Steetz) Benth..Variable Daisy
Brachyscome heterodonta
var. *dentata* Gaudich ....Daisy
Brachyscome melanocarpa Sond. & F.Muell...Black-seeded Daisy
Calocephalus sonderi F.Muell. ....Pale Beauty-heads
Calotis cuneifolia R.Br..Purple Burr-daisy
Calotis erinacea Steetz..Tangled Burr-daisy
Calotis hispidula (F.Muell.) F.Muell..Bogan Flea
Calotis inermis Maiden & Betche ....Fluffy Burr-daisy
Calotis lappulacea Benth. ....Yellow Burr-daisy
Centipeda crateriformis
subsp. *compacta* N.G.Walsh ....Sneezeweed
Centipeda cunninghamii (DC.) A.Braun. & Asch...Common Sneezeweed
Centipeda minima (L.) A.Braun & Asch.
var. *minima*..Spreading Sneezeweed
Centipeda thespidioides F.Muell...Desert Sneezeweed
**Conyza bonariensis* (L.) Cronq. ....Flaxleaf Fleabane
Epaltes australis Less..Spreading Nut-heads
Glossocardia bidens (Redtz.) Veldkamp...Cobbler's Tack
Gnaphalium diamontinense Paul G.Wilson ....Daisy
Gnephosis arachnoidea Turcz..Daisy
Gnephosis foliata (Sond.) Eichler ....Erect Yellow-heads
Gnephosis tenuissima Cass..Yellow-heads
Isoetopsis graminifolia Turcz...Grass Cushions
**Lactuca serriola* L.
forma *integrifolia* ....Prickly Lettuce
Leiocarpa semicalva (F.Muell.) Paul G.Wilson
subsp. *semicalva*..Hill Everlasting
Leptorhynchos baileyi F.Muell..Daisy
Millotia greevesii
subsp. *glandulosa* (Schodde) P.S.Short...Daisy
Minuria integerrima (DC.) Benth. ....Smooth Minuria
Olearia pimeloides (DC.) Benth...Daisy Bush
Pluchea dentex R.Br. ex Benth..Bowl Daisy
Pluchea tetranthema F.Muell...Pink Plains Bush
Podolepis capillaris (Steetz) Diels ....Invisible Plant
Pseudognaphalium luteoalbum (L.) Hilliard & B.L.Burtt..............................Jersey Cudweed
Pterocaulon sphacelatum (Labill.) Benth. & Hook. f. ex F.Muell. ....Applebush
Pycnosorus thompsonianus Everett & Doust ....Billy Buttons
Senecio glossanthus (Sonder) Belcher...Groundsel
Senecio magnificatus F.Muell. ....Groundsel
Senecio runcinifolius J.H.Willis ....Tall Groundsel
Sigesbeckia australiensis D.L.Schultz..Sigesbeckia
**Sonchus oleraceus* L...Common Sowthistle
Streptoglossa adscendens (Benth.) Dunlop ....Desert Daisy
Streptoglossa liatroides (Turcz.) Dunlop ....Wertaloona Daisy
Stuartina muelleri Sond..Spoon Cudweed
**Verbesina encelioides* (Cav.) A.Gray
subsp. *encelioides*..Crownbeard
Vittadinia cuneata DC.
var. *cuneata*...Fuzzweed
Vittadinia pterochaeta (F.Muell. ex Benth.) J.M.Black ....Rough Fuzzweed
Vittadinia sulcata N.T.Burb. ....Fuzzweed

Xanthium occidentale Bertol. ....Noogoora Burr, Cockle Burr

Boraginaceae

Heliotropium amplexicaule Vahl ....Blue Heliotrope
Heliotropium supinum L. ....Prostrate Heliotrope
Omphalolappula concava (F.Muell.) Brand...Burr Stickseed

Brassicaceae

Arabidella eremigena (F.Muell.) E.A.Shaw...Cress
Harmsiodoxa brevipes (F.Muell.) O.Schultz..Harmsiodoxa
Lepidium bonariense L...Peppercress
Lepidium sagittulatum Thell...Fine-leaf Peppercress
Sisymbrium erysimoides Desf...Smooth Mustard

Campanulaceae

Wahlenbergia communis Carolin ....Tufted Bluebell
Wahlenbergia gracilis (Forst.f.) A.DC..Sprawling/Australian Bluebell
Wahlenbergia tumidifructa P.J.Sm...Bluebell

Capparaceae

Apophyllum anomalum F.Muell. ....Warrior Bush
Capparis mitchellii Lindl. ....Wild Orange

Caryophyllaceae

Gypsophylla tubulosa (Jaub. & Spech) Boiss...Annual Chalkwort
Polycarpaea corymbosa (L.) Lam.
var. *minor* Pedley ....Polycarpaea
Silene gallica L.
var. *gallica* ....French Catchfly

Casuarinaceae

Casuarina pauper F.Muell. ex L.A.S.Johnson ....Black Oak, Belah

Chenopodiaceae

Atriplex angulata Benth. ....Fan Saltbush
Atriplex eardleyae Aellen...Small Saltbush
Atriplex elachophylla F.Muell..Saltbush
Atriplex holocarpa F.Muell. ....Pop Saltbush
Atriplex leptocarpa F.Muell. ....Slender-fruited Saltbush
Atriplex limbata Benth. ....Spreading Saltbush
Atriplex nessorhina S.Jacobs...Donald Duck Saltbush
Atriplex pseudocampanulata Aellen...Mealy Saltbush
Atriplex pumilio R.Br. ....Saltbush
Atriplex stipitata Benth..Bitter Saltbush
Atriplex suberecta Verd..Saltbush
Atriplex turbinate (R.Anderson) Allen. ....Saltbush
Chenopodium auricomum Lindl..Queensland Bluebush
Chenopodium cristatum (F.Muell.) F.Muell...Crested Goosefoot
Chenopodium desertorum (J.M.Black) J.M.Black
subsp. *desertorum* ....Saltbush
Chenopodium melanocarpum (J.M.Black) J.M.Black ....Black Crumbweed
Chenopodium nitrariaceum (J.M.Black) J.M.Black.......................................Nitre Goosefoot
Dissocarpus paradoxus (R.Br.) F.Muell. ex Ulbr. ....Cannonball Burr
Dysphania glomulifera (Nees) Paul G. Wilson ....Crumbweed
Dysphania kalpari Paul G.Wilson..Crumbweed
Dysphania littoralis R.Br. ....Crumbweed
Dysphania rhadinostachya
subsp. *inflata* (Aellen) Paul G.Wilson...Crumbweed
Einadia nutans (R.Br.) A.J.Scott
subsp. *nutans*...Climbing Saltbush

Einadia trigonos (Roem. & Schult.) Paul G.Wilson ....Fishweed
Enchylaena tomentosa R.Br. ....Ruby Saltbush
Maireana brevifolia (R.Br.) Paul G.Wilson ....Yanga Bush
Maireana decalvans (Gand.) Paul G. Wilson...Black Cotton Bush
Maireana triptera (Benth.) Paul G.Wilson...Three-wing Bluebush
Maireana villosa (Lindl.) Paul G. Wilson ....Silky Bluebush
Salsola australis R.Br...Salsola
Sclerolaena bicornis Lindl.
var. *bicornis* ....Goathead Burr
Sclerolaena bicornis
var. *horrida* ....Goathead Burr
Sclerolaena birchii (F.Muell.) Domin ....Galvanized Burr
Sclerolaena convexula (R.Anderson) A.J.Scott...Tall Copperburr
Sclerolaena cuneata Paul G.Wilson ....Tangled Copperburr
Sclerolaena decurrens (J.M.Black) A.J.Scott ....Green Copperburr
Sclerolaena diacantha (Nees) Benth. ....Grey Copperburr
Sclerolaena intricate (R.Anderson) A.J.Scott. ....Copperburr
Sclerolaena lanicuspis (F.Muell.) Benth. ....Woolly Copperburr
Sclerolaena muricata
var. *semiglabra* (Ising) A.J.Scott ....Black Roly-poly
Sclerolaena obliquicuspis R.H.Henderson ....Limestone Copperburr
Sclerolaena tricuspis (F.Muell.) Ulbr..Giant Red Burr
Tecticornia indica
subsp. *leiostachya* (Benth.) K.A.Steph. & Paul G.Wilson ....Samphire

Convolvulaceae
Convolvulus clementii Domin ....Bindweed
Convolvulus remotus R.Br..Bindweed
Evolvulus alsinoides
var. *villosicalyx* Ooststr. ....Evolvulus

Crassulaceae
Crassula sieberiana (Schult. & Schult.f.) Druce..Australian Stonecrop

Cucurbitaceae
**Citrullus lanatus* (Thunb.) Matsum. & Nakai ....Wild, Camel or Bitter Melon
**Cucumis myriocarpus* Naudin...Paddy Melon

Elatinaceae
Bergia trimera Fischer & C.Meyer ....Bergia

Euphorbiaceae
Chamaesyce drummondii (Boiss.) D.C.Hassall..Caustic Weed
Chamaesyce sp. B...Caustic Weed
Euphorbia tannensis Spreng...Spurge
Phyllanthus lacunarius F.Muell. ....Lagoon Spurge
Phyllanthus virgatus G.Forst...Wiry Spurge
Sauropus trachyspermus (F.Muell.) Airy Shaw ....Spurge

Fabaceae
Acacia aneura F.Muell. ex Benth...Mulga
Acacia brachystachya Benth. ....Bastard Mulga
Acacia excelsa
subsp. *angusta* Pedley ....Ironwood
Acacia homalophylla A.Cunn. ex Benth. ....Yarran
Acacia ligulata A.Cunn. ex Benth...Umbrella Bush
Acacia murrayana F.Muell. ex Benth. ....Murray’s Wattle
Acacia oswaldii F.Muell...Miljee
Acacia ramulosa W.Fitzg. ....Horse Mulga
Acacia sibirica S.Moore..Bastard Mulga

Acacia stenophylla A.Cunn. ex Benth. ....River Cooba
Acacia tetragonophylla F.Muell. ....Dead Finish
Acacia victoriae Benth. ....Elegant Wattle
Cullen cinereum (Lindl.) J.W.Grimes ....Annual Verbine
Glycine canescens F.J.Herm. ....Silky Glycine
Lotus cruentus Court ....Red-flowered Lotus
**Medicago polymorpha* L. ....Burr Medic
**Medicago truncata* (L.) Bartol. ....Medic
Petalostylis labicheioides R.Br. ....Butterfly Bush
Rhynchosia minima (L.) DC. ....Ryncho
Senna sp. 'artemisioides' ....Senna
Senna sp. 'coriacea' ....Senna
Senna sp. 'filifolia' ....Senna
Senna sp. ‘helmsii’ ....Senna
Senna sp. 'sturtii' ....Dense Senna
Senna sp. 'zygophylla' ....Senna
Swainsona affinis (A.T.Lee) Joy Thomps. ....Darling Pea
Tephrosia sphaerospora F.Muell. ....Tephrosia

Frankeniaceae
Frankenia uncinata Sprague & Summerh. ....Hairy Sea-heath

Geraniaceae
Erodium crinitum Carolin ....Blue Storksbill, Blue Crowfoot

Goodeniaceae
Goodenia cycloptera R.Br. ....Serrated Goodenia
Goodenia glabra R.Br. ....Pale Goodenia
Goodenia glauca F.Muell. ....Pale Goodenia
Goodenia heteromera F.Muell. ....Goodenia
Goodenia lunata J.M.Black ....Hairy Goodenia
Scaevola spinescens R.Br. ....Spiny Fan-flower
Velleia arguta R.Br. ....Spur Velleia

Haloragaceae
Haloragis aspera Lindl. ....Rough Raspwort
Haloragis glauca Lindl.
forma *glauca* ....Grey Raspwort
Myriophyllum verrucosum Lindl. ....Red Water Milfoil

Lamiaceae
Mentha australis R.Br. ....River Mint
Teucrium racemosum R.Br. ....Grey Germander

Linaceae
Linum marginale A.Cunn. ex Planchon ....Native Flax, Wild Flax

Lobeliaceae
Pratia darlingensis F.Wimmer ....Darling Pratia

Loranthaceae
Amyema lucasii (Blakely) Danser ....Mistletoe
Amyema maidenii (Blakely) Barlow
subsp. *maidenii* ....Pale-leaf Mistletoe
Amyema miraculosum
subsp. *boormanii* (Blakely) Barlow ....Mistletoe
Amyema quandong (Lindley) Tieghem
subsp. *quandong* ....Mistletoe
Lysiana exocarpi (Behr. Ex Schlechter) Tieghem ....Harlequin Mistletoe
Lysiana subfalcata (Hook.) Barlow ....Mistletoe

Lythraceae
Ammannia multiflora Roxb. ....Jerry Jerry

Malvaceae
Abutilon leucopetalum (F.Muell.) F.Muell. ex Benth.....................................Velvet Leaf Hibiscus
Abutilon malvifolium (Benth.) J.M.Black...Mallow-leaf Lantern Flower
Abutilon otocarpum F.Muell. ....Desert Chinese Lantern
Abutilon oxycarpum (F.Muell.) F.Muell. ex Benth. ....Straggly Lantern Bush
Hibiscus brachysiphonius F.Muell. ....Hibiscus
Hibiscus sturtii
var. *grandiflora* Hook. ....Hill Hibiscus
Hibiscus trionum L. ....Bladder ketmia
**Malva parviflora* L. ....Small-flowered Mallow
**Malvastrum americanum* (L.) Torr..Spiked Malvastrum
Sida ammophila F.Muell. ex J.H.Willis ....Sida
Sida cunninghamii C.White..Cunningham's Sida
Sida goniocarpa (F.Muell. ex Benth.) Domin ....Sida
Sida fibulifera Lindl. ....Pin Sida
Sida filiformis A.Cunn. ....Fine Sida
Sida intricata F.Muell. ....Sida
Sida petrophila F.Muell...Rock Sida
Sida platycalyx F.Muell. ex Benth. ....Lifesaver Burr
Sida sp. A ....Sida
Sida trichopoda F.Muell..High Sida

Meliaceae
Owenia acidula F.Muell. ....Gruie Apple, Colane

Myrtaceae
Corymbia tumescens K.D.Hill & L.A.S.Johnson ....Bloodwood
Eucalyptus coolabah Blakely & S.W.L.Jacobs ....Coolabah
Eucalyptus largiflorens F.Muell..Black Box
Eucalyptus melanophloia F.Muell..Silver-leaved Ironbark
Eucalyptus ochrophloia F.Muell. ....Yapunyah
Eucalyptus populnea
subsp. *bimbil* L.A.S.Johnson & K.D.Hill ....Bimble Box, Poplar Box
Thryptomene hexandra C.T.White ....Honey Myrtle

Nyctaginaceae
Boerhavia coccinea Miller ....Tarvine
Boerhavia repleta Hewson ....Tarvine

Oleaceae
Jasminum lineare R.Br. ....Desert Jasmine

Oxalidaceae
Oxalis chnoodes Lourteig...Wood Sorrel
Oxalis exilis A.Cunn. ....Wood Sorrel
Oxalis perennans Haw. ....Wood Sorrel

Papaveraceae
**Argemone ochroleuca* Sweet
subsp. *ochroleuca*..Mexican Poppy

Pittosporaceae
Pittosporum angustifolium Lodd. ....Weeping Pittosporum, Berrigan

Plantaginaceae
Plantago turrifera B.G.Briggs, Carolin & Pulley ....Plantain

Polygonaceae
Duma florulenta (Meisn.) T.M.Schust. ....Lignum
Polygonum plebeium R.Br...Small Knotweed

Portulacaceae
Calandrinia eremaea Ewart ....Small Purslane
Persicaria lapathifolium (L.) S.F.Gray ....Pale Knotweed
Portulaca oleracea L...Pigweed, Purslane

Proteaceae
Grevillea striata R.Br. ....Beefwood
Hakea eryeana (S.Moore) D.McGillivray..Straggly Corkbark
Hakea ivoryi F.M.Bailey ....Corkbark Tree
Hakea leucoptera R.Br.
subsp. *leucoptera*...Needlewood
Hakea tephrosperma R.Br. ....Hooked Needlewood

Ranunculaceae
Ranunculus sessiliflorus R.Br. ex DC.
var. *sessiliflorus*...Small-flowered Buttercup

Rhamnaceae
Ventilago viminalis Hook. ....Supple Jack

Rosaceae
Potentella nanopetala A.R.Bean ....Potentella

Rubiaceae
Dentella minutissima C.T.White & W.D.Francis ....Dentella
Psydrax latifolium
var. *nervosa* S.T.Reynolds & R.J.Henderson...................................Native Current

Rutaceae
Flindersia maculosa (Lindl.) Benth. ....Leopardwood, Leopard Tree

Santalaceae
Santalum lanceolatum R.Br..Northern Sandalwood

Sapindaceae
Alectryon oleifolius
subsp. *canescens* S.T.Reynolds...Western Rosewood, Bonaree
Atalaya hemiglauca (F.Muell.) F.Muell. ex Benth. ....Whitewood
Dodonaea boroniifolia G.Don...Boronia Hop Bush
Dodonaea viscosa
subsp. *angustifolia* (L.f.) J.G.West..Hop Bush
Dodonaea viscosa
subsp. *angustissima* (DC.) J.G.West ....Hop Bush

Scrophulariaceae
Elacholoma hornii F.Muell. & Tate ....Elacholoma
Eremophila bignoniiflora (Benth.) F.Muell. ....Eurah, Bignonia Emubush
Eremophila bowmanii
subsp. *latifolia* (L.S.Smith) Chinnock ....Silver Turkeybush
Eremophila deserti (A.Cunn. ex Benth.) Chinnock..Turkeybush
Eremophila gilesii F.Muell. ....Charleville Turkeybush
Eremophila glabra (R.Br.) Ostenf. ....Tar Bush
Eremophila goodwinii F.Muell..Purple Fuschia Bush
Eremophila latrobei F.Muell.
subsp. *latrobei* ....Crimson Turkeybush

Eremophila longifolia (R.Br.) F.Muell. .... Emu Bush, Berrigan
Eremophila maculata (Ker Gawler) F.Muell. .... Spotted Fuschia Bush
Eremophila mitchellii Benth. .... Budda, False Sandalwood
Eremophila sturtii R.Br. .... Turpentine Bush
Glossostigma diandrum (L.) Kuntze .... Mountain Mudwort
Myoporum montanum R.Br. .... Western Boobialla, Water Bush
Peplidium foecundum W.R.Barker .... Peplidium
Stemodia florulenta W.R.Barker .... Bluerod
Stemodia glabella W.R.Barker .... Stemodia

Solanaceae
Lycium ferocissimum Miers .... African Boxthorn
Nicotiana simulans N.T.Burb. .... Native Tobacco
Nicotiana velutina H.Wheeler .... Native Tobacco
Solanum cinereum R.Br. .... Narrawa Burr
Solanum coactiliferum J.M.Black .... Felted Nightshade
Solanum cleistogamum Symon .... Potato Bush
Solanum ellipticum R.Br. .... Velvet Potato Bush
Solanum esuriale Lindl. .... Quena
Solanum ferocissimum Lindl. .... Spiny Potato Bush
Solanum lacunarium F.Muell. .... Lagoon Nightshade
Solanum parvifolium R.Br. .... Nightshade
Solanum sturtianum F.Muell. .... Thargomindah Nightshade

Sterculiaceae
Brachychiton populneus
subsp. *trilobus* Guymer .... Kurrajong

Thymelaeaceae
Pimelea microcephala R.Br.
subsp. *microcephala* .... Shrubby Rice Flower
Pimelea trichostachya Lindl. .... Spiked Rice Flower

Verbenaceae
**Verbena gaudichaudii* (Briquet) P.W.Michael .... Purple Top

Zygophyllaceae
**Tribulus terrestris* L. .... Caltrop, Cat-head
Zygophyllum ammophilum F.Muell. .... Sand Twin-leaf
Zygophyllum iodocarpum F.Muell. .... Violet Twinleaf

Appendix B: Locality and site information.

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NE	1	A	21/06/2014	55	94	313,596.00	6,769,925.00	120		NE01
NE	2	A	21/06/2014	55	94	313,455.00	6,769,966.00	128		NE01
NE	3	A	21/06/2014	55	94	316,267.00	6,770,850.00	130		NE01
NE	4	A	21/06/2014	55	94	316,562.00	6,768,299.00	131		NE01
NE	5	A	22/06/2014	55	94	311,823.00	6,765,131.00	126		NE03
NE	6	A	22/06/2014	55	94	314,873.00	6,765,128.00	126		NE03
NE	7	A	22/06/2014	55	94	312,639.00	6,763,870.00	123		NE03
NE	8	A	22/06/2014	55	94	313,709.00	6,761,975.00	127		NE03
NE	9	A	21/06/2014	55	94	313,914.00	6,761,070.00	128		NE09
NE	10	A	21/06/2014	55	94	315,234.00	6,761,305.00	127		NE08
NE	11	A	21/06/2014	55	94	317,588.00	6,764,205.00	127		NE08
NE	12	A	21/06/2014	55	94	318,269.00	6,764,513.00	128		NE08
NE	15	A	22/06/2014	55	94	309,325.00	6,768,581.00	127		NE10
NE	16	A	22/06/2014	55	94	308,909.00	6,766,935.00	125		NE10
NE	18	A	21/06/2014	55	94	315,388.00	6,768,175.00	128		NE15
NE	19	A	22/06/2014	55	94	312,253.00	6,760,734.00	126		NE15
NE	20	A	22/06/2014	55	94	311,401.00	6,760,283.00	123		NE15
NE	21	A	21/06/2014	55	94	317,173.00	6,766,656.00	128		NE11
NE	22	A	21/06/2014	55	94	317,167.00	6,764,136.00	132		NE01
NE	23	A	21/06/2014	55	94	316,712.00	6,765,257.00	136		NE01
NE	25	A	22/06/2014	55	94	308,006.00	6,766,062.00	128		NE10
NE	26	A	22/06/2014	55	94	307,727.00	6,765,495.00	126		NE10
NE	27	A	21/06/2014	55	94	313,873.00	6,768,767.00	128		NE13
NE	28	A	22/06/2014	55	94	307,145.00	6,766,114.00	127		NE13
NE	29	A	22/06/2014	55	94	307,465.00	6,767,381.00	126		NE10
NE	30	A	21/06/2014	55	94	314,813.00	6,768,120.00	128		NE15
NE	31	A	22/06/2014	55	94	311,194.00	6,767,679.00	125		NE03
NE	32	A	22/06/2014	55	94	309,694.00	6,763,586.00	126		NE16
NE	33	A	22/06/2014	55	94	311,110.00	6,763,670.00	125		NE14
NE	34	A	22/06/2014	55	94	313,209.00	6,762,337.00	126		NE03
NER	1	A	18/04/2015	55	94	311,185.00	6,769,584.00	125	Rapid.	NE15
NER	2	A	19/04/2015	55	94	315,618.00	6,762,505.00	127	Rapid.	NE02
NER	3	A	19/04/2015	55	94	315,554.00	6,762,251.00	124	Rapid.	NE02
NER	4	A	19/04/2015	55	94	315,567.00	6,762,121.00	124	Rapid.	NE07
NER	5	A	19/04/2015	55	94	315,570.00	6,761,882.00	123	Rapid.	NE05
NER	6	A	19/04/2015	55	94	315,418.00	6,761,305.00	123	Rapid.	NE09
NER	7	A	19/04/2015	55	94	315,243.00	6,761,082.00	124	Rapid.	NE08
NER	8	A	19/04/2015	55	94	314,778.00	6,761,471.00	124	Rapid.	NE09
NER	9	A	19/04/2015	55	94	314,432.00	6,761,550.00	122	Rapid.	NE08
NER	10	A	19/04/2015	55	94	315,531.00	6,763,781.00	124	Rapid.	NE01
NER	11	A	19/04/2015	55	94	313,831.00	6,772,072.00	111	Rapid.	NE07
NER	12	A	19/04/2015	55	94	313,832.00	6,773,244.00	115	Rapid.	NE15

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NER	13	A	20/04/2015	55	94	316,212.00	6,773,455.00	126	Rapid.	NE01
NER	14	A	20/04/2015	55	94	317,332.00	6,773,486.00	134	Rapid.	NE01
NER	15	A	20/04/2015	55	94	317,893.00	6,773,497.00	136	Rapid.	NE01
NER	16	A	20/04/2015	55	94	319,508.00	6,772,135.00	143	Rapid.	NE01
NER	17	A	20/04/2015	55	94	314,013.00	6,769,144.00	128	Rapid.	NE10
NER	18	A	20/04/2015	55	94	314,205.00	6,769,530.00	126	Rapid.	NE01
NER	19	A	20/04/2015	55	94	315,034.00	6,770,264.00	128	Rapid.	NE01
NER	20	A	20/04/2015	55	94	316,806.00	6,771,411.00	131	Rapid.	NE01
NER	21	A	20/04/2015	55	94	317,452.00	6,773,064.00	135	Rapid.	NE01
NER	22	A	20/04/2015	55	94	317,599.00	6,771,082.00	133	Rapid.	NE15
NER	23	A	20/04/2015	55	94	317,743.00	6,770,211.00	132	Rapid.	NE04
NER	24	A	20/04/2015	55	94	317,411.00	6,770,027.00	131	Rapid.	NE02
NER	25	A	20/04/2015	55	94	316,624.00	6,769,511.00	128	Rapid.	NE01
NER	26	A	20/04/2015	55	94	316,304.00	6,768,164.00	128	Rapid.	NE01
NER	27	A	20/04/2015	55	94	316,191.00	6,768,182.00	129	Rapid.	NE03
NER	28	A	20/04/2015	55	94	315,708.00	6,767,209.00	124	Rapid.	NE16
NER	29	A	20/04/2015	55	94	315,406.00	6,767,261.00	125	Rapid.	NE08
NER	30	A	20/04/2015	55	94	314,159.00	6,767,341.00	124	Rapid.	NE10
NER	31	A	20/04/2015	55	94	314,298.00	6,767,565.00	124	Rapid.	NE11
NER	32	A	20/04/2015	55	94	314,312.00	6,767,671.00	124	Rapid.	NE08
NER	33	A	20/04/2015	55	94	314,597.00	6,768,040.00	124	Rapid.	NE08
NER	34	A	20/04/2015	55	94	314,643.00	6,767,919.00	124	Rapid.	NE15
NER	35	A	20/04/2015	55	94	313,424.00	6,767,961.00	123	Rapid.	NE16
NER	36	A	21/04/2015	55	94	312,368.00	6,768,892.00	131	Rapid.	NE03
NER	37	A	21/04/2015	55	94	312,671.00	6,768,639.00	133	Rapid.	NE15
NER	38	A	21/04/2015	55	94	312,398.00	6,768,157.00	126	Rapid.	NE16
NER	39	A	21/04/2015	55	94	312,939.00	6,767,412.00	124	Rapid.	NE16
NER	40	A	21/04/2015	55	94	312,943.00	6,767,322.00	127	Rapid.	NE07
NER	41	A	21/04/2015	55	94	313,513.00	6,767,713.00	125	Rapid.	NE16
NER	42	A	21/04/2015	55	94	314,358.00	6,766,894.00	129	Rapid.	NE03
NER	43	A	21/04/2015	55	94	314,724.00	6,766,428.00	128	Rapid.	NE15
NER	44	A	21/04/2015	55	94	315,257.00	6,766,003.00	130	Rapid.	NE01
NER	45	A	21/04/2015	55	94	316,507.00	6,765,876.00	131	Rapid.	NE10
NER	46	A	21/04/2015	55	94	317,349.00	6,765,623.00	131	Rapid.	NE05
NER	47	A	21/04/2015	55	94	317,987.00	6,765,184.00	134	Rapid.	NE09
NER	48	A	21/04/2015	55	94	317,659.00	6,764,913.00	133	Rapid.	NE02
NER	49	A	21/04/2015	55	94	317,666.00	6,764,542.00	131	Rapid.	NE08
NER	50	A	21/04/2015	55	94	318,166.00	6,763,119.00	130	Rapid.	NE09
NER	51	A	21/04/2015	55	94	316,673.00	6,764,590.00	145	Rapid.	NE02
NER	52	A	21/04/2015	55	94	316,862.00	6,763,783.00	134	Rapid.	NE09
NER	53	A	21/04/2015	55	94	316,599.00	6,763,375.00	135	Rapid.	NE05
NER	54	A	21/04/2015	55	94	316,374.00	6,762,466.00	135	Rapid.	NE07
NER	55	A	21/04/2015	55	94	315,785.00	6,762,045.00	135	Rapid.	NE01

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NER	56	A	21/04/2015	55	94	311,593.00	6,769,950.00	128	Rapid.	NE15
NER	57	A	21/04/2015	55	94	311,939.00	6,770,357.00	130	Rapid.	NE03
NER	58	A	21/04/2015	55	94	312,200.00	6,771,225.00	129	Rapid.	NE10
NER	59	A	21/04/2015	55	94	312,150.00	6,771,673.00	130	Rapid.	NE01
NER	60	A	21/04/2015	55	94	312,496.00	6,773,253.00	130	Rapid.	NE02
NER	61	A	21/04/2015	55	94	311,705.00	6,773,311.00	130	Rapid.	NE01
NER	62	A	21/04/2015	55	94	310,902.00	6,773,285.00	129	Rapid.	NE03
NER	63	A	21/04/2015	55	94	310,536.00	6,773,273.00	129	Rapid.	NE01
NER	64	A	21/04/2015	55	94	310,148.00	6,773,259.00	129	Rapid.	NE02
NER	65	A	21/04/2015	55	94	307,730.00	6,771,456.00	127	Rapid.	NE01
NER	66	A	21/04/2015	55	94	307,134.00	6,771,350.00	129	Rapid.	NE04
NER	67	A	21/04/2015	55	94	306,641.00	6,771,439.00	133	Rapid.	NE02
NER	68	A	21/04/2015	55	94	308,255.00	6,770,931.00	126	Rapid.	NE15
NER	69	A	21/04/2015	55	94	308,338.00	6,770,425.00	126	Rapid.	NE13
NER	70	A	21/04/2015	55	94	308,887.00	6,770,204.00	126	Rapid.	NE13
NER	71	A	21/04/2015	55	94	306,729.00	6,769,879.00	125	Rapid.	NE04
NER	72	A	21/04/2015	55	94	307,057.00	6,770,100.00	125	Rapid.	NE04
NER	73	A	21/04/2015	55	94	307,848.00	6,770,143.00	126	Rapid.	NE12
NER	74	A	22/04/2015	55	94	305,487.00	6,749,780.00	134	Rapid.	NE01
NER	75	A	24/04/2015	55	94	310,089.00	6,770,144.00	123	Rapid.	NE15
NER	76	A	24/04/2015	55	94	310,350.00	6,770,406.00	124	Rapid.	NE03
NER	77	A	24/04/2015	55	94	310,065.00	6,771,158.00	125	Rapid.	NE01
NER	78	A	24/04/2015	55	94	309,332.00	6,771,944.00	124	Rapid.	NE15
NER	79	A	24/04/2015	55	94	309,016.00	6,772,197.00	124	Rapid.	NE15
NER	80	A	24/04/2015	55	94	308,780.00	6,772,442.00	122	Rapid.	NE03
NER	81	A	24/04/2015	55	94	309,500.00	6,769,255.00	122	Rapid.	NE10
NER	82	A	24/04/2015	55	94	307,947.00	6,767,830.00	124	Rapid.	NE10
NER	83	A	24/04/2015	55	94	307,938.00	6,767,213.00	126	Rapid.	NE13
NER	84	A	24/04/2015	55	94	307,660.00	6,766,624.00	126	Rapid.	NE04
NER	85	A	24/04/2015	55	94	307,943.00	6,765,697.00	128	Rapid.	NE08
NER	86	A	24/04/2015	55	94	308,035.00	6,765,203.00	127	Rapid.	NE16
NER	87	A	24/04/2015	55	94	307,878.00	6,764,402.00	128	Rapid.	NE09
NER	88	A	24/04/2015	55	94	308,055.00	6,763,926.00	129	Rapid.	NE03
NER	89	A	24/04/2015	55	94	308,059.00	6,763,652.00	129	Rapid.	NE13
NER	90	A	24/04/2015	55	94	307,867.00	6,763,399.00	128	Rapid.	NE14
NER	91	A	24/04/2015	55	94	308,073.00	6,763,115.00	130	Rapid.	NE05
NER	92	A	24/04/2015	55	94	308,077.00	6,762,615.00	130	Rapid.	NE05
NER	93	A	24/04/2015	55	94	307,006.00	6,761,340.00	133	Rapid.	NE15
NER	94	A	24/04/2015	55	94	310,405.00	6,768,983.00	121	Rapid.	NE13
NER	95	A	24/04/2015	55	94	310,170.00	6,768,501.00	124	Rapid.	NE05
NER	96	A	24/04/2015	55	94	309,917.00	6,767,929.00	123	Rapid.	NE06
NER	97	A	24/04/2015	55	94	309,932.00	6,767,732.00	122	Rapid.	NE10
NER	98	A	24/04/2015	55	94	309,922.00	6,766,870.00	126	Rapid.	NE03

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NER	99	A	24/04/2015	55	94	309,818.00	6,766,493.00	127	Rapid.	NE04
NER	100	A	24/04/2015	55	94	309,720.00	6,766,396.00	125	Rapid.	NE10
NER	101	A	24/04/2015	55	94	310,012.00	6,764,216.00	129	Rapid.	NE05
NER	102	A	24/04/2015	55	94	309,868.00	6,763,469.00	128	Rapid.	NE09
NER	103	A	24/04/2015	55	94	309,736.00	6,763,253.00	130	Rapid.	NE08
NER	104	A	24/04/2015	55	94	309,673.00	6,762,892.00	131	Rapid.	NE06
NER	105	A	24/04/2015	55	94	310,167.00	6,762,227.00	132	Rapid.	NE05
NER	106	A	24/04/2015	55	94	311,058.00	6,761,177.00	132	Rapid.	NE06
NER	107	A	24/04/2015	55	94	311,882.00	6,761,135.00	131	Rapid.	NE09
NER	108	A	24/04/2015	55	94	312,472.00	6,761,277.00	131	Rapid.	NE09
NER	109	A	25/04/2015	55	94	311,915.00	6,765,108.00	129	Rapid.	NE05
NER	110	A	25/04/2015	55	94	313,959.00	6,763,888.00	130	Rapid. Total exclusion.	NE10
NER	111	A	25/04/2015	55	94	313,377.00	6,762,975.00	129	Rapid. Total exclusion.	NE03
NER	112	A	25/04/2015	55	94	311,952.00	6,764,619.00	129	Rapid.	NE06
NER	113	A	25/04/2015	55	94	311,648.00	6,764,480.00	130	Rapid. *Alectryon oleifolius* 40 cm DBH.	NE06
NER	114	A	25/04/2015	55	94	311,836.00	6,763,477.00	114	Rapid.	NE16
NER	115	A	25/04/2015	55	94	311,097.00	6,763,722.00	115	Rapid.	NE09
NER	116	A	25/04/2015	55	94	312,215.00	6,762,687.00	130	Rapid.	NE03
NER	117	A	25/04/2015	55	94	311,675.00	6,763,825.00	125	Rapid.	NE14
NER	118	A	25/04/2015	55	94	310,319.00	6,765,136.00	126	Rapid.	NE13
NER	119	A	25/04/2015	55	94	310,749.00	6,765,494.00	128	Rapid.	NE10
NER	120	A	25/04/2015	55	94	310,855.00	6,767,769.00	126	Rapid.	NE06
NER	121	A	25/04/2015	55	94	310,806.00	6,766,464.00	121	Rapid.	NE15
NER	122	A	25/04/2015	55	94	310,808.00	6,765,860.00	122	Rapid. *Owenia acidula* 46 + 25 cm DBH.	NE05
NER	123	A	25/04/2015	55	94	314,899.00	6,765,163.00	128	Rapid.	NE07
NER	124	A	25/04/2015	55	94	317,528.00	6,766,872.00	127	Rapid.	NE10
NER	125	A	25/04/2015	55	94	312,495.00	6,769,203.00	122	Rapid.	NE13
NER	126	A	25/04/2015	55	94	311,911.00	6,769,132.00	123	Rapid.	NE13
NER	127	A	26/04/2015	55	94	303,050.00	6,762,414.00	125	Rapid.	NE14
NER	128	A	26/04/2015	55	94	302,824.00	6,762,926.00	125	Rapid.	NE09
NER	129	A	26/04/2015	55	94	302,864.00	6,762,928.00	129	Rapid.	NE09
NER	130	A	26/04/2015	55	94	303,421.00	6,761,589.00	128	Rapid.	NE05
NER	131	A	26/04/2015	55	94	304,125.00	6,762,568.00	127	Rapid.	NE09
NER	132	A	26/04/2015	55	94	304,944.00	6,762,160.00	128	Rapid.	NE09
NER	133	A	26/04/2015	55	94	305,059.00	6,762,544.00	133	Rapid. *Alectryon oleifolius* 43 + 17 + 33 + 58 DBH, 2 hollows.	NE05
NER	134	A	26/04/2015	55	94	305,389.00	6,762,678.00	130	Rapid.	NE03
NER	135	A	26/04/2015	55	94	306,007.00	6,762,845.00	130	Rapid.	NE05

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NER	136	A	26/04/2015	55	94	306,393.00	6,764,092.00	127	Rapid.	NE13
NER	137	A	26/04/2015	55	94	306,388.00	6,764,688.00	129	Rapid.	NE04
NER	138	A	26/04/2015	55	94	306,579.00	6,765,479.00	126	Rapid.	NE10
NER	139	A	27/04/2015	55	94	306,114.00	6,753,657.00	119	Rapid.	NE13
NER	140	A	27/04/2015	55	94	307,020.00	6,753,475.00	124	Rapid.	NE13
NER	141	A	27/04/2015	55	94	307,028.00	6,753,601.00	126	Rapid.	NE02
NER	142	A	27/04/2015	55	94	307,542.00	6,753,575.00	128	Rapid.	NE02
NER	143	A	27/04/2015	55	94	308,083.00	6,753,472.00	130	Rapid.	NE15
NER	144	A	27/04/2015	55	94	309,964.00	6,749,775.00	140	Rapid.	NE01
NER	145	A	27/04/2015	55	94	310,426.00	6,749,742.00	141	Rapid.	NE02
NER	146	A	27/04/2015	55	94	312,190.00	6,749,554.00	139	Rapid.	NE02
NER	147	A	27/04/2015	55	94	312,990.00	6,749,026.00	138	Rapid.	NE02
NER	148	A	27/04/2015	55	94	313,302.00	6,748,197.00	145	Rapid.	NE07
NER	149	A	27/04/2015	55	94	313,113.00	6,747,027.00	139	Rapid.	NE02
NER	150	A	27/04/2015	55	94	312,904.00	6,745,656.00	137	Rapid.	NE01
NER	151	A	27/04/2015	55	94	312,507.00	6,745,778.00	138	Rapid.	NE02
NER	152	A	27/04/2015	55	94	310,530.00	6,746,476.00	133	Rapid.	NE02
NER	153	A	27/04/2015	55	94	309,704.00	6,746,748.00	133	Rapid.	NE02
NER	154	A	27/04/2015	55	94	307,137.00	6,750,228.00	134	Rapid.	NE02
NER	155	A	27/04/2015	55	94	308,245.00	6,749,994.00	134	Rapid.	NE02
NER	156	A	27/04/2015	55	94	302,737.00	6,751,449.00	123	Rapid.	NE04
NER	157	A	27/04/2015	55	94	301,920.00	6,751,762.00	127	Rapid.	NE04
NER	158	A	27/04/2015	55	94	300,772.00	6,752,243.00	124	Rapid.	NE04
NER	159	A	27/04/2015	55	94	397,430.00	6,755,327.00	125	Rapid.	NE09
NER	160	A	27/04/2015	55	94	300,541.00	6,753,391.00	124	Rapid.	NE04
NER	161	A	27/04/2015	55	94	300,680.00	6,753,052.00	122	Rapid.	NE09
NER	162	A	27/04/2015	55	94	301,096.00	6,751,862.00	122	Rapid.	NE09
NER	163	A	27/04/2015	55	94	301,451.00	6,751,817.00	124	Rapid.	NE04
NER	164	A	28/04/2015	55	94	305,721.00	6,751,418.00	131	Rapid.	NE01
NER	165	A	28/04/2015	55	94	306,430.00	6,750,179.00	137	Rapid.	NE02
NER	166	A	28/04/2015	55	94	307,659.00	6,748,037.00	144	Rapid.	NE02
NER	167	A	28/04/2016	55	94	308,166.00	6,747,151.00	144	Rapid.	NE02
NER	168	A	28/04/2015	55	94	305,632.00	6,746,728.00	139	Rapid.	NE02
NER	169	A	28/04/2015	55	94	304,219.00	6,746,648.00	140	Rapid.	NE02
NER	170	A	28/04/2015	55	94	303,381.00	6,746,740.00	143	Rapid.	NE02
NER	171	A	28/04/2015	55	94	301,345.00	6,746,877.00	137	Rapid.	NE15
NER	172	A	28/04/2015	55	94	300,295.00	6,747,092.00	143	Rapid.	NE02
NER	173	A	28/04/2015	55	94	299,089.00	6,748,216.00	146	Rapid.	NE02
NER	174	A	28/04/2015	55	94	298,401.00	6,748,751.00	155	Rapid.	NE02
NER	175	A	28/04/2015	55	94	301,173.00	6,749,004.00	136	Rapid.	NE02
NER	176	A	28/04/2015	55	94	302,352.00	6,749,846.00	132	Rapid.	NE02
NER	177	A	28/04/2015	55	94	302,460.00	6,750,472.00	130	Rapid.	NE04
NER	178	A	28/04/2015	55	94	302,508.00	6,750,789.00	131	Rapid.	NE04

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NER	179	A	28/04/2015	55	94	303,336.00	6,751,094.00	131	Rapid.	NE05
NER	180	A	28/04/2015	55	94	303,910.00	6,751,358.00	131	Rapid.	NE05
NER	181	A	28/04/2015	55	94	303,868.00	6,752,241.00	130	Rapid.	NE05
NER	182	A	28/04/2015	55	94	303,253.00	6,754,260.00	130	Rapid.	NE09
NER	183	A	28/04/2015	55	94	400,040.00	6,755,997.00	130	Rapid.	NE05
NER	184	A	28/04/2015	55	94	302,842.00	6,754,946.00	131	Rapid.	NE09
NER	185	A	28/04/2015	55	94	302,577.00	6,755,464.00	131	Rapid.	NE09
NER	186	A	28/04/2015	55	94	302,079.00	6,756,080.00	133	Rapid.	NE05
NER	187	A	28/04/2015	55	94	302,578.00	6,756,738.00	131	Rapid.	NE07
NER	188	A	28/04/2015	55	94	302,449.00	6,758,056.00	131	Rapid.	NE09
NER	189	A	28/04/2015	55	94	302,451.00	6,757,960.00	132	Rapid.	NE03
NER	190	A	28/04/2015	55	94	303,703.00	6,757,565.00	131	Rapid.	NE09
NER	191	A	28/04/2015	55	94	304,125.00	6,757,246.00	133	Rapid.	NE03
NER	192	A	28/04/2015	55	94	304,833.00	6,756,310.00	134	Rapid.	NE05
NER	193	A	28/04/2015	55	94	305,011.00	6,755,900.00	134	Rapid.	NE09
NER	194	A	28/04/2015	55	94	305,376.00	6,755,383.00	134	Rapid.	NE08
NER	195	A	28/04/2015	55	94	305,899.00	6,754,048.00	134	Rapid.	NE09
NER	196	A	28/04/2015	55	94	308,163.00	6,758,242.00	133	Rapid.	NE09
NER	197	A	28/04/2015	55	94	306,674.00	6,760,404.00	139	Rapid.	NE05
NERR	1	A	19/04/2015	55	94	315,507.00	6,761,663.00	123	Rapid.	NE03
NERR	2	A	19/04/2015	55	94	315,484.00	6,761,424.00	125	Rapid.	NE03
NERR	3	A	19/04/2015	55	94	315,258.00	6,761,309.00	125	Rapid.	NE08
NERR	4	A	19/04/2015	55	94	314,778.00	6,761,471.00	124	Rapid.	NE09
NERR	5	A	19/04/2015	55	94	314,414.00	6,761,757.00	124	Rapid.	NE06
NERR	6	A	19/04/2015	55	94	313,893.00	6,761,722.00	123	Rapid.	NE05
NERR	7	A	19/04/2015	55	94	315,473.00	6,763,662.00	125	Rapid.	NE03
NERR	8	A	19/04/2015	55	94	315,463.00	6,763,975.00	124	Rapid.	NE05
NERR	9	A	19/04/2015	55	94	315,219.00	6,763,948.00	124	Rapid.	NE07
NERR	10	A	19/04/2015	55	94	315,080.00	6,764,182.00	124	Rapid.	NE06
NERR	11	A	19/04/2015	55	94	315,308.00	6,764,423.00	125	Rapid.	NE07
NERR	12	A	19/04/2015	55	94	315,414.00	6,764,532.00	125	Rapid.	NE03
NERR	13	A	19/04/2015	55	94	315,702.00	6,764,845.00	126	Rapid.	NE07
NERR	14	A	19/04/2015	55	94	316,035.00	6,765,168.00	125	Rapid.	NE01
NERR	15	A	20/04/2015	55	94	313,831.00	6,771,009.00	42	Rapid.	NE01
NERR	16	A	20/04/2015	55	94	314,337.00	6,771,554.00	97	Rapid.	NE03
NERR	17	A	20/04/2015	55	94	314,554.00	6,771,655.00	102	Rapid.	NE01
NERR	18	A	20/04/2015	55	94	314,547.00	6,773,407.00	116	Rapid.	NE01
NERR	19	A	20/04/2015	55	94	314,902.00	6,773,417.00	119	Rapid.	NE02
NERR	20	A	20/04/2015	55	94	318,515.00	6,773,522.00	136	Rapid.	NE01
NERR	21	A	20/04/2015	55	94	319,456.00	6,772,928.00	144	Rapid.	NE01
NERR	22	A	20/04/2015	55	94	319,391.00	6,770,741.00	147	Rapid.	NE01
NERR	23	A	20/04/2015	55	94	319,078.00	6,770,198.00	142	Rapid.	NE03
NERR	24	A	20/04/2015	55	94	318,915.00	6,769,909.00	141	Rapid.	NE01

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NERR	25	A	20/04/2015	55	94	318,619.00	6,769,393.00	141	Rapid.	NE05
NERR	26	A	20/04/2015	55	94	318,242.00	6,769,039.00	143	Rapid.	NE07
NERR	27	A	20/04/2015	55	94	317,561.00	6,769,047.00	141	Rapid.	NE01
NERR	28	A	20/04/2015	55	94	317,338.00	6,769,052.00	138	Rapid.	NE02
NERR	29	A	20/04/2015	55	94	316,821.00	6,769,053.00	136	Rapid.	NE02
NERR	30	A	20/04/2015	55	94	315,433.00	6,769,086.00	130	Rapid.	NE01
NERR	31	A	20/04/2015	55	94	315,021.00	6,769,093.00	131	Rapid.	NE02
NERR	32	A	20/04/2015	55	94	314,009.00	6,769,178.00	129	Rapid.	NE01
NERR	33	A	20/04/2015	55	94	313,849.00	6,768,621.00	131	Rapid.	NE03
NERR	34	A	20/04/2015	55	94	313,570.00	6,769,020.00	129	Rapid.	NE01
NERR	35	A	20/04/2015	55	94	314,648.00	6,769,930.00	127	Rapid.	NE02
NERR	36	A	24/04/2015	55	94	312,862.00	6,761,373.00	130	Rapid. *Grevillea striata* 80 cm DBH.	NE08
NEY	1	A	19/04/2015	55	94	315,589.00	6,762,767.00	129		NE02
NEY	2	A	19/04/2015	55	94	315,493.00	6,762,033.00	122		NE15
NEY	3	A	19/04/2015	55	94	315,382.00	6,761,110.00	124		NE08
NEY	4	A	19/04/2015	55	94	314,843.00	6,761,355.00	124		NE08
NEY	5	A	19/04/2015	55	94	315,228.00	6,764,015.00	124		NE06
NEY	6	A	20/04/2015	55	94	313,838.00	6,770,097.00	128		NE01
NEY	7	A	20/04/2015	55	94	313,922.00	6,771,400.00	68		NE02
NEY	8	A	20/04/2015	55	94	315,756.00	6,773,442.00	125		NE02
NEY	9	A	20/04/2015	55	94	316,613.00	6,773,393.00	133		NE02
NEY	10	A	20/04/2015	55	94	319,386.00	6,773,504.00	144		NE02
NEY	11	A	20/04/2015	55	94	319,441.00	6,772,658.00	146		NE02
NEY	12	A	20/04/2015	55	94	319,498.00	6,771,807.00	142		NE02
NEY	13	A	20/04/2015	55	94	319,443.00	6,771,236.00	148		NE02
NEY	14	A	20/04/2015	55	94	314,094.00	6,768,990.00	134	*Grevillea striata* 53 + 51 cm DBH, Grevillea striata 63.5 cm DBH.	NE07
NEY	15	A	20/04/2015	55	94	313,456.00	6,769,251.00	128		NE12
NEY	16	A	20/04/2015	55	94	315,838.00	6,770,794.00	129		NE02
NEY	17	A	20/04/2015	55	94	317,551.00	6,771,348.00	132		NE15
NEY	18	A	20/04/2015	55	94	317,645.00	6,770,200.00	133		NE02
NEY	19	A	20/04/2015	55	94	316,571.00	6,768,328.00	129		NE01
NEY	20	A	20/04/2015	55	94	315,853.00	6,768,239.00	127		NE15
NEY	21	A	20/04/2015	55	94	315,540.00	6,768,125.00	125		NE04
NEY	22	A	20/04/2015	55	94	315,598.00	6,767,380.00	125		NE09
NEY	23	A	21/04/2015	55	94	312,818.00	6,768,128.00	127		NE14
NEY	24	A	21/04/2015	55	94	312,598.00	6,768,067.00	127		NE10
NEY	25	A	21/04/2015	55	94	312,074.00	6,767,966.00	126		NE16
NEY	26	A	21/04/2015	55	94	312,015.00	6,768,014.00	126		NE05
NEY	27	A	21/04/2015	55	94	316,217.00	6,765,981.00	129		NE16
NEY	28	A	21/04/2015	55	94	316,741.00	6,766,009.00	131		NE07

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NEY	29	A	21/04/2015	55	94	317,227.00	6,766,269.00	131		NE05
NEY	30	A	21/04/2015	55	94	317,662.00	6,765,576.00	133		NE08
NEY	31	A	21/04/2015	55	94	318,503.00	6,764,469.00	134		NE08
NEY	32	A	21/04/2015	55	94	318,357.00	6,763,713.00	129		NE09
NEY	33	A	21/04/2015	55	94	318,085.00	6,763,305.00	128		NE09
NEY	34	A	21/04/2015	55	94	316,526.00	6,762,874.00	135		NE15
NEY	35	A	21/04/2015	55	94	316,227.00	6,762,136.00	137		NE07
NEY	36	A	21/04/2015	55	94	312,044.00	6,770,941.00	128		NE15
NEY	37	A	21/04/2015	55	94	312,050.00	6,771,439.00	130		NE02
NEY	38	A	21/04/2015	55	94	312,369.00	6,772,663.00	130		NE15
NEY	39	A	21/04/2015	55	94	311,909.00	6,773,304.00	130		NE02
NEY	40	A	21/04/2015	55	94	308,018.00	6,773,213.00	128		NE02
NEY	41	A	21/04/2015	55	94	307,837.00	6,773,186.00	130		NE02
NEY	42	A	21/04/2015	55	94	308,522.00	6,772,587.00	130		NE12
NEY	43	A	21/04/2015	55	94	308,561.00	6,772,323.00	128		NE12
NEY	44	A	21/04/2015	55	94	309,190.00	6,769,607.00	126		NE08
NEY	45	A	21/04/2015	55	94	306,492.00	6,770,008.00	127		NE04
NEY	46	A	21/04/2015	55	94	306,166.00	6,749,699.00	138		NE02
NEY	47	A	24/04/2015	55	94	309,800.00	6,769,657.00	130		NE15
NEY	48	A	24/04/2015	55	94	310,364.00	6,770,931.00	122		NE15
NEY	49	A	24/04/2015	55	94	309,278.00	6,769,050.00	122		NE08
NEY	50	A	24/04/2015	55	94	309,150.00	6,768,820.00	123		NE05
NEY	51	A	24/04/2015	55	94	308,639.00	6,768,595.00	122		NE08
NEY	52	A	24/04/2015	55	94	308,556.00	6,768,120.00	122		NE09
NEY	53	A	24/04/2015	55	94	307,942.00	6,767,582.00	122		NE10
NEY	54	A	24/04/2015	55	94	307,811.00	6,768,126.00	122		NE10
NEY	55	A	24/04/2015	55	94	307,893.00	6,768,430.00	124		NE09
NEY	56	A	24/04/2015	55	94	307,375.00	6,766,831.00	127		NE10
NEY	57	A	24/04/2015	55	94	308,017.00	6,766,149.00	128		NE04
NEY	58	A	24/04/2015	55	94	308,026.00	6,764,539.00	127		NE08
NEY	59	A	24/04/2015	55	94	308,073.00	6,762,845.00	131		NE06
NEY	60	A	24/04/2015	55	94	308,069.00	6,761,262.00	130		NE08
NEY	61	A	24/04/2015	55	94	307,487.00	6,761,463.00	129		NE14
NEY	62	A	24/04/2015	55	94	307,232.00	6,761,384.00	130		NE14
NEY	63	A	24/04/2015	55	94	306,723.00	6,761,391.00	132		NE14
NEY	64	A	24/04/2015	55	94	309,726.00	6,767,186.00	125		NE06
NEY	65	A	24/04/2015	55	94	310,079.00	6,766,261.00	126		NE14
NEY	66	A	24/04/2015	55	94	310,185.00	6,765,224.00	129		NE05
NEY	67	A	24/04/2015	55	94	309,634.00	6,765,041.00	129		NE06
NEY	68	A	24/04/2015	55	94	310,163.00	6,763,593.00	129		NE08
NEY	69	A	24/04/2015	55	94	309,536.00	6,762,471.00	131		NE05
NEY	70	A	25/04/2015	55	94	312,690.00	6,765,130.00	127		NE06
NEY	71	A	25/04/2015	55	94	313,982.00	6,764,805.00	129	Total exclusion.	NE07

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NEY	72	A	25/04/2015	55	94	314,044.00	6,764,470.00	129	Total exclusion.	NE07
NEY	73	A	25/04/2015	55	94	313,988.00	6,763,932.00	131	Total exclusion.	NE05
NEY	74	A	25/04/2015	55	94	313,832.00	6,763,295.00	130	Total exclusion.	NE07
NEY	75	A	25/04/2015	55	94	312,935.00	6,763,493.00	128	Total exclusion.	NE08
NEY	76	A	25/04/2015	55	94	312,142.00	6,764,346.00	129		NE06
NEY	77	A	25/04/2015	55	94	311,220.00	6,763,662.00	128		NE08
NEY	78	A	25/04/2015	55	94	313,278.00	6,762,213.00	130		NE06
NEY	79	A	25/04/2015	55	94	312,042.00	6,761,680.00	126		NE08
NEY	80	A	25/04/2015	55	94	310,917.00	6,763,961.00	127		NE08
NEY	81	A	25/04/2015	55	94	310,434.00	6,764,521.00	129		NE05
NEY	82	A	25/04/2015	55	94	310,716.00	6,765,331.00	130		NE05
NEY	83	A	25/04/2015	55	94	310,537.00	6,768,269.00	135		NE10
NEY	84	A	25/04/2015	55	94	310,815.00	6,766,951.00	125		NE10
NEY	85	A	25/04/2015	55	94	310,456.00	6,766,425.00	124		NE14
NEY	86	A	25/04/2015	55	94	310,511.00	6,766,318.00	129		NE05
NEY	87	A	25/04/2015	55	94	316,867.00	6,765,165.00	138		NE02
NEY	88	A	25/04/2015	55	94	316,983.00	6,766,555.00	124		NE11
NEY	89	A	25/04/2015	55	94	317,692.00	6,766,920.00	128		NE01
NEY	90	A	26/04/2015	55	94	303,347.00	6,763,391.00	125		NE09
NEY	91	A	26/04/2015	55	94	303,139.00	6,762,850.00	127		NE05
NEY	92	A	26/04/2015	55	94	302,860.00	6,762,777.00	126	Might be wrong place.	NE08
NEY	93	A	26/04/2015	55	94	303,838.00	6,762,256.00	127		NE08
NEY	94	A	26/04/2015	55	94	304,623.00	6,762,526.00	128		NE10
NEY	95	A	27/04/2015	55	94	306,548.00	6,753,658.00	132		NE05
NEY	96	A	27/04/2015	55	94	307,050.00	6,753,271.00	124		NE05
NEY	97	A	27/04/2015	55	94	309,181.00	6,753,356.00	130		NE02
NEY	98	A	27/04/2015	55	94	309,067.00	6,752,227.00	134		NE02
NEY	99	A	27/04/2015	55	94	308,970.00	6,751,157.00	134		NE01
NEY	100	A	27/04/2015	55	94	308,905.00	6,750,327.00	141		NE02
NEY	101	A	27/04/2015	55	94	309,537.00	6,749,761.00	140		NE02
NEY	102	A	27/04/2015	55	94	311,844.00	6,749,564.00	139	Fire kills *Eragrostis eriopoda* and promotes *Aristida holathera*.	NE02
NEY	103	A	27/04/2015	55	94	312,812.00	6,749,481.00	139		NE02
NEY	104	A	27/04/2015	55	94	313,086.00	6,749,143.00	141		NE07
NEY	105	A	27/04/2015	55	94	313,255.00	6,747,979.00	146		NE07
NEY	106	A	27/04/2015	55	94	302,584.00	6,751,208.00	121		NE08
NEY	107	A	27/04/2015	55	94	302,385.00	6,751,667.00	124		NE09
NEY	108	A	27/04/2015	55	94	303,045.00	6,751,705.00	128		NE10
NEY	109	A	27/04/2015	55	94	300,866.00	6,752,064.00	127		NE09
NEY	110	A	27/04/2015	55	94	300,801.00	6,753,999.00	125		NE09

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NEY	111	A	28/04/2015	55	94	306,147.00	6,750,652.00	136		NE02
NEY	112	A	28/04/2015	55	94	307,130.00	6,748,932.00	142		NE02
NEY	113	A	28/04/2015	55	94	308,265.00	6,746,864.00	145		NE07
NEY	114	A	28/04/2015	55	94	207,614.00	6,746,897.00	145		NE02
NEY	115	A	28/04/2015	55	94	302,682.00	6,746,785.00	142		NE02
NEY	116	A	28/04/2015	55	94	398,572.00	6,748,288.00	140		NE12
NEY	117	A	28/04/2015	55	94	300,632.00	6,747,941.00	140		NE02
NEY	118	A	28/04/2015	55	94	301,438.00	6,748,622.00	135		NE02
NEY	119	A	28/04/2015	55	94	300,646.00	6,749,064.00	137		NE15
NEY	120	A	28/04/2015	55	94	302,508.00	6,752,624.00	131		NE09
NEY	121	A	28/04/2015	55	94	302,781.00	6,753,299.00	131		NE09
NEY	122	A	28/04/2015	55	94	303,264.00	6,753,578.00	130	Owenia *acidula* 60 cm DBH.	NE09
NEY	123	A	28/04/2015	55	94	300,692.00	6,756,721.00	130		NE09
NEY	124	A	28/04/2015	55	94	301,267.00	6,756,479.00	131		NE09
NEY	125	A	28/04/2015	55	94	302,418.00	6,756,352.00	133	*Ventilago viminalis* 70 cm DBH.	NE05
NEY	126	A	28/04/2015	55	94	302,445.00	6,758,004.00	131		NE09
NEY	127	A	28/04/2014	55	94	307,591.00	6,757,982.00	133		NE09
NRE	1	A	16/04/2015	55	94	310,419.00	6,769,548.00		Dana monitoring plot.	NE05
NRE	2	A	16/04/2015	55	94	311,347.00	6,769,804.00		Dana monitoring plot.	NE05
NRE	3	A	16/04/2015	55	94	309,650.00	6,768,175.00		Dana monitoring plot.	NE10
NRE	4	A	16/04/2015	55	94	310,327.00	6,767,222.00		Dana monitoring plot.	NE10
NRE	5	A	16/04/2015	55	94	314,801.00	6,769,792.00		Dana monitoring plot.	NE02
NRE	6	A	16/04/2015	55	94	317,862.00	6,773,029.00		Dana monitoring plot.	NE02
NRE	7	A	17/04/2015	55	94	318,545.00	6,772,027.00		Dana monitoring plot.	NE02
NRE	8	A	17/04/2015	55	94	312,339.00	6,767,779.00		Dana monitoring plot.	NE16
NRE	9	A	17/04/2015	55	94	315,152.00	6,767,805.00		Dana monitoring plot.	NE11
NRE	10	A	17/04/2015	55	94	316,685.00	6,766,614.00		Dana monitoring plot.	NE11
NRE	11	A	18/04/2015	55	94	307,596.00	6,772,356.00		Dana monitoring plot.	NE02
NRE	12	A	18/04/2015	55	94	306,573.00	6,765,149.00		Dana monitoring plot.	NE10
NRE	13	A	18/04/2015	55	94	307,712.00	6,763,637.00		Dana monitoring plot.	NE16
NRE	14	A	19/04/2015	55	94	311,946.00	6,763,986.00		Dana monitoring plot.	NE08
NRE	15	A	19/04/2015	55	94	312,351.00	6,761,560.00		Dana monitoring plot.	NE05

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
NRE	16	A	19/04/2015	55	94	314,282.00	6,760,070.00		Dana monitoring plot.	NE09
NRE	17	A	19/04/2015	55	94	315,842.00	6,763,128.00		Dana monitoring plot.	NE02
NRE	18	A	22/04/2015	55	94	305,384.00	6,750,713.00	133	Dana monitoring plot.	NE01
NRE	19	A	22/04/2015	55	94	307,661.00	6,747,111.00	146	Dana monitoring plot.	NE07
NRE	20	A	22/04/2015	55	94	299,057.00	6,747,775.00	13	Dana monitoring plot.	NE02
NRE	21	A	22/04/2015	55	94	301,795.00	6,752,049.00	16	Dana monitoring plot.	NE09
NRE	22	A	22/04/2015	55	94	310,490.00	6,747,588.00		Dana monitoring plot.	NE07
NRE	23	A	22/04/2015	55	94	311,188.00	6,746,211.00	138	Dana monitoring plot.	NE02
NRE	24	A	23/04/2015	55	94	303,346.00	6,758,071.00	128	Dana monitoring plot.	NE09
NRE	25	A	23/04/2015	55	94	301,834.00	6,758,342.00	127	Dana monitoring plot.	NE09
NRE	26	A	23/04/2015	55	94	302,376.00	6,761,023.00	132	Dana monitoring plot.	NE10
NRE	27	A	23/04/2015	55	94	302,172.00	6,759,390.00	130	Dana monitoring plot.	NE10
NRE	28	A	23/04/2015	55	94	302,567.00	6,755,048.00	130	Dana monitoring plot.	NE09
NRE	29	A	23/04/2015	55	94	303,372.00	6,753,974.00	128	Dana monitoring plot.	NE09
NRE	30	A	23/04/2015	55	94	303,294.00	6,752,287.00	124	Dana monitoring plot.	NE10
NRE	31	A	26/04/2015	55	94	305,076.00	6,762,084.00	125	Dana monitoring plot.	NE05
NRE	32	A	26/04/2015	55	94	303,668.00	6,762,006.00	123	Water point closure monitoring point. Dry Paddock.	NE08
NRE	33	A	26/04/2015	55	94	306,559.00	6,770,036.00	124	Water point closure monitoring point. Kenmere Bore.	NE04
NRE	34	A	26/04/2015	55	94	306,581.00	6,770,070.00	123	Water point closure monitoring point. Kenmere Bore.	NE04
NRE	35	A	26/04/2015	55	94	306,618.00	6,769,963.00	121	Water point closure monitoring point. Kenmere Bore.	NE04
NRE	36	A	26/04/2015	55	94	316,223.00	6,769,203.00	125	Water point closure monitoring point. Holly's Tank.	NE02
NRE	37	A	26/04/2015	55	94	316,320.00	6,769,326.00	125	Water point closure	NE01

Survey	Site	Subsite	Date	Zone	Datum	Easting	Northing	Altitude	Notes	Community
									monitoring point. Holly's Tank.	
NRE	38	A	26/04/2015	55	94	316,360.00	6,769,150.00	126	Water point closure monitoring point. Holly's Tank.	NE01
NRE	39	A	27/04/2015	55	94	311,132.00	6,746,069.00	143	Water point closure monitoring point. Dry Paddock.	NE02
NRE	40	A	27/04/2015	55	94	311,122.00	6,746,124.00	141	Water point closure monitoring point. Dry Paddock.	NE02
NRE	41	A	29/04/2015	55	94	302,711.00	6,752,714.00	127	Water point closure monitoring point. School House Bore.	NE10
NRE	42	A	29/04/2015	55	94	302,662.00	6,752,739.00	126	Water point closure monitoring point. School House Bore.	NE10
NRE	43	A	29/04/2015	55	94	302,672.00	6,752,777.00	128	Water point closure monitoring point. School House Bore.	NE10
NRE	44	A	29/04/2015	55	94	317,193.00	6,766,591.00	133	Water point closure monitoring point. Coolabah Tank.	NE11
NRE	45	A	29/04/2015	55	94	317,108.00	6,766,654.00	133	Water point closure monitoring point. Coolabah Tank.	NE11
NRE	46	A	29/04/2015	55	94	317,064.00	6,766,604.00	133	Water point closure monitoring point. Coolabah Tank.	NE11
NRE	47	A	29/04/2015	55	94	314,174.00	6,771,697.00	133	Water point closure monitoring point. Phillip's Dam.	NE02
NRE	48	A	29/04/2015	55	94	314,200.00	6,771,654.00	134	Water point closure monitoring point. Phillip's Dam.	NE02
NRE	49	A	29/04/2015	55	94	314,191.00	6,771,584.00	133	Water point closure monitoring point. Phillip's Dam.	NE01

Appendix C: Known uses of plants.

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Abutilon leucopetalum				Fodder.			Lazarides & Hince (1993).
Abutilon malvifolium			Poison?	Fodder.			Lazarides & Hince (1993).
Abutilon otocarpum				Fodder.			Lazarides & Hince (1993).
Acacia aneura	Used for food, timber and medicinal purposes. Boomerangs, spears, clubs, digging sticks.	Cribb & Cribb (1982), Lazarides and Hince (1993).		Fodder, Gums, Timber, Fuel, Honey. Fencing timber.			Cribb & Cribb (1982), Lazarides & Hince (1993).
Acacia brachystachya	Aboriginal food.	Lazarides & Hince (1993).		Fodder, Timber, Fuel.			Lazarides & Hince (1993).
Acacia ligulata	Traditional food and medicine. Barked soaked in water/boiled infusion used for coughs. Diaphoretic for nervous conditions/dizziness/nerves/fits.	Lazarides & Hince (1993), Lassack & McCarthy (2011).		Fodder, usually only emergency fodder.		Ornamental.	Lazarides & Hince (1993).
Acacia oswaldii	Food, timber. Seeds ground to a flower. Pods are poisonous	Lazarides & Hince (1993), Harris et al. (2000).	Poison?	Fodder, Pulp.			Lazarides & Hince (1993).
Acacia ramulosa				Fodder. Browsed by stock, but not a preferred species.			Lazarides & Hince (1993). Cunningham et al. (1981).
Acacia stenophylla	Food.	Lazarides & Hince (1993).		Fodder, Timber, Fuel.			Lazarides & Hince (1993).
Acacia tetragonophylla	Timber.	Lazarides & Hince (1993).		Fodder, Honey, Timber.			Lazarides & Hince (1993).
Acacia victoriae	Timber	Lazarides & Hince (1993).		Fodder.			Lazarides & Hince (1993).
Alectryon oleifolius	Fruit can be eaten. Seed can be ground	Harris et al. (2000).					

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
	to make flour. The husk is poisonous.						
Alstonia constricta			Poison.	Fodder.		Medicinal.	Lazarides & Hince (1993).
Alternanthera angustifolia				Fodder.		Weed.	Lazarides & Hince (1993).
Alternanthera denticulata				Fodder.		Weed.	Lazarides & Hince (1993), Cunningham et al. (1981).
Alternanthera nodiflora				Fodder.		Weed.	Lazarides & Hince (1993).
Amaranthus macrocarpus			Poison - nitrate toxic.	Moderately palatable fodder.		Weed.	Cunningham et al. (1981), Lazarides & Hince (1993).
Ammannia multiflora				Fodder, lightly grazed.			Lazarides & Hince (1993).
Ammi majus			Poison.			Weed, ornamental.	Lazarides & Hince (1993).
Amphipogon caricinus				Fodder. Sheep may nibble fresh shoots when available.			Lazarides & Hince (1993), Cunningham et al. (1981).
Amyema cambagei	Fruits eaten.	Cunningham et al. (1981).		Readily grazed if lopped.		Weed.	Cunningham et al. (1981), Lazarides & Hince (1993).
Amyema lucasii	Fruits eaten.	Cunningham et al. (1981).		Readily grazed if lopped.		Weed.	Cunningham et al. (1981), Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Amyema maidenii	Fruits eaten.	Cunningham et al. (1981).		Readily grazed if lopped.		Weed.	Cunningham et al. (1981), Lazarides & Hince (1993).
Angianthus brachypappus				Fodder, limited palatability.			Lazarides & Hince (1993).
Apophyllum anomalum				Young branches and shoots eaten readily by sheep, cattle and goats.		Host for caper white butterfly.	Cunningham et al. (1981), Lazarides & Hince (1993).
Argemone ochroleuca			Poison.			Suspected of poisoning humans and fowls. Honey (pollen), weed.	Cunningham et al. (1981), Lazarides & Hince (1993).
Aristida contorta				Fodder, seeds very harmful to stock. Useful soil binder.		Shelter.	Lazarides & Hince (1993).
Aristida holathera				Fodder.		Shelter, sand dune stabiliser.	Lazarides & Hince (1993).
Aristida latifolia				Fodder.		Invades pastures on clayey soils.	Lazarides & Hince (1993).
Aristida leptopoda				Fodder.			Lazarides & Hince (1993).
Atalaya hemiglauca	Timber.	Lazarides & Hince (1993).	Poison.	Fodder.		Gum, honey (pollen).	Lazarides & Hince (1993).
Atriplex angulata				Some fodder use may be made of this species during times of shortage.			Cunningham et al. (1981), Lazarides & Hince (1993).
Atriplex eardleyae				Readily eaten by			Cunningahm et

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				stock and considered a useful component of pasture.			al. (1981), Lazarides & Hince (1993).
Atriplex holocarpa				Eaten only in the absence of more preferred forage.			Cunningham et al. (1981).
Atriplex leptocarpa				Heavily utilised by stock in dry times.		Coloniser of scalded areas. Shelter.	Cunningham et al. (1981), Lazarides & Hince (1993).
Atriplex limbata				Moderately palatable and a useful forage species.			Cunningham et al. (1981), Lazarides & Hince (1993).
Atriplex nessorhina							
Atriplex pseudocampanulata				Fodder.		Shelter. Colonises scalds and degraded communities.	Lazarides & Hince (1993).
Atriplex stipitata				Utilised by stock only when other forage is very scarce.		Shelter.	Cunningham et al. (1981), Lazarides & Hince (1993).
Atriplex suberecta			Poison?	Relatively acceptable to stock.			Cunningham et al. (1981), Lazarides & Hince (1993).
Boerhavia coccinea	Fleshy roots eaten.	Lazarides & Hince (1993).		Palatable summer forage.		Weed.	Lazarides & Hince (1993).
Boerhavia dominii	Outer flesh of the roots edible. Expectorant for asthma. Root used as	Lazarides & Hince (1993). Lassack &				Weed.	Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
	diuretic & emetic. Dried used as a diuretic.	McCarthy (2011).					
Boerhavia repleta	Roots edible.						
Brachychiton populneus	Young roots can be boiled & taste like turnips. Seeds are edible & can make a beverage. Leaves also edible. Bark used for fishing line.	Harris (2000)					
Brachychiton populneus	Young roots can be boiled & taste like turnips. Seeds are edible & can make a beverage. Leaves also edible. Inner bark pulled off in strips used for dilly bags, nets etc.	Cribb & Cribb (1982).					
Brachyscome ciliaris				Fodder. Major component in diet of grazing stock.			Lazarides & Hince (1993).
Brachyscome melanocarpa				Fodder.			Lazarides & Hince (1993).
Bulbine alata				Palatable to stock.			Cunningham et al. (1981).
Calandrinia eremaea	Eaten as greens. Seeds are also edible.			Palatable to stock, contributes to water requirements of animals.			Cunningham et al. (1981), Lazarides & Hince (1993).
Callitris glaucophylla	Used as splints, molded when wet and then dries in place holding limb in place. Because so flammable was used by Aboriginals for torches by which to spear fish at night.	Cribb & Cribb (1992), Harris et al. (2000).		Used for building construction, fencing posts & telegraph poles.		Resistant to termite attack. Volatile oils in leves and twigs posses antimicrobila activity.	Cribb & Cribb (1982), Lassack & McCarthy (2011).
Calocephalus sonderi			Poison?	Fodder.		Weed. Suspected poison of poultry.	Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Calostemma purpureum				Not particularly palatable, but grazed at times.		Ornamental.	Cunningham et al. (1981), Lazarides & Hince (1993).
Calotis cuneifolia				Useful forage. Barbed seeds prolific and troublesome to sheep and fleece.		Honey, weed.	Lazarides & Hince (1993).
Calotis erinacea				Fodder. Burrs harmful to animals and fleeces.		Weed, shelter.	Lazarides & Hince (1993).
Calotis hispidula				Grazed before seeds mature. Burrs extremely troublesome to stock, causing skin irritation, infection and matting of wool.		Burrs difficult to remove from wool and clothing.	Lazarides & Hince (1993).
Calotis inermis				Fodder.			Lazarides & Hince (1993).
Capparis mitchellii	Pulp of fruit eaten by aborigines.	Cunningham et al. (1981).		Excellent fodder tree, in situ and when lopped.		Wood used for carving, engraving, smokers' pipes. Gums, shelter.	Cunningham et al. (1981), Lazarides & Hince (1993).
Casuarina pauper	Good cooking wood and leaves used in fire pits. Bark may be used for tanning & dying.	Cribb & Cribb (1982), Harris et al. (2000).					
Cenchrus ciliaris			Poison.	Young growth quite palatable to		Shelter.	Cunningham et al. (1981),

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				stock. Susceptible to overgrazing.			Lazarides & Hince (1993).
Centaurea calcitrapa						Honey, weed. Proclaimed noxious in Vic, Tas, SA, part NT.	Lazarides & Hince (1993).
Centipeda cunninghamii	Used to relieve arthritis. Treat purulent ophthalmia/sandy blight. Internally for ill health, tuberculosis. Lotion for skin infections. Around head for colds.	Lazarides & Hince (1993), Harris et al. (2000), Lassack & McCarthy (2011).		Fodder.		Medicinal.	Lazarides & Hince (1993).
Centipeda minima							
Centipeda minima	Decoction for purulent ophthalmia/sandy blight. Crushed herb inhaled & rubbed on nose for colds. Reputed anthelmintic.	Lassack & McCarthy (2011).		Fodder.		Medicinal.	Lazarides & Hince (1993).
Centipeda thespidioides	Drank decoction for colds, sore throat, sore eyes. Poultice applied externally to sprained & jarred limbs.	Lassack & McCarthy (2011).	Poison?	Fodder.			Lazarides & Hince (1993).
Chamaesyce dallachyana							
Chamaesyce drummondii	Infusion as cure for chronic diarrhoea/dysentery/low fever. Drunk for rheumatism. Decoction in boiling water for skin itches/sores/scabies. Rubbed on skin for chest pain.	Lassack & McCarthy (2011).				Also used against snakebite. Milky sap used for VD/sores on genitals.	Lassack & McCarthy (2011).
Cheilanthes sieberi			Poison?				Lazarides & Hince (1993).
Chenopodium auricomum				Useful drought-resistant fodder. Withstands partial inundation.		Ornamental.	Cunningham et al. (1981), Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Chenopodium cristatum	Poultice used for septic inflammation & breast abscesses.	Lazarides & Hince (1993), Lassack & McCarthy (2011).	Poison?	May be poisonous to livestock. Fodder.			Cunningham et al. (1981), Lazarides & Hince (1993).
Chenopodium desertorum				Fodder.			Lazarides & Hince (1993).
Chenopodium desertorum				Useful forage plant.			Cunningham et al. (1981).
Chenopodium melanocarpum	Infusion of leaves boiled in water as a wash to alleviate symptoms of colds.	Lassack & McCarthy (2011).	Poison?	Fodder.			Lazarides & Hince (1993).
Chenopodium nitrariaceum				Not a preferred browse plant, but heavily utilised during stress periods.		Highly drought tolerant, withstands complete inundation for long periods.	Cunningham et al. (1981), Lazarides & Hince (1993).
Chloris pectinata				Moderately palatable.			Cunningham et al. (1981), Lazarides & Hince (1993).
Chloris truncata			Poison?	Widespread, valuable, warm-season grass.		Shelter. Useful for grassing waterways. Seed eaten by Stubble Quail. Resilient in mowed areas.	Cunningham et al. (1981), Lazarides & Hince (1993), Benson & McDougall (2005).
Citrullus lanatus						Food, honey.	Lazarides & Hince (1993).
Crassula sieberiana				Fodder, palatable to stock but limited in value due to its small size or			Cunningham et al. (1981), Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				inaccessible habitats.			
Cucumis myriocarpus			Poison.	Honey			Lazarides & Hince (1993).
Cullen cinereum				Palatable and nutritious fodder.			Lazarides & Hince (1993).
Cymbopogon ambiguus	Hot water infusion of leaves for muscle cramps, scabies, skin sores, headache. Applied over body for fever, respiratory track infections. Teaspoonful taken internally.	Lassack & McCarthy (2011).		Moderate fodder, strongly lemon-scented.			Lazarides & Hince (1993).
Cynodon dactylon			Poison.	Grazed without ill effect. Some forms contain HCN.	C3. Wind tolerant.	Secondary sand coloniser. Tertiary sand coloniser, by transplants. Pollen known to cause asthma in humans. Food plant of Australian Shelduck, Plumed Whistling Duck, Freckled Duck & butterfly larvae.	Clarke (1989), Cunningham et al. (1981), Lazarides & Hince (1993), Benson & McDougall (2005).
Cyperus bifax	Rhizomes used in a decoction for treatment of gonorrhoea.	Webb (1948), Cunningham et al. (1981), Lazarides & Hince (1993), Lassack & McCarthy (2011).			C4	Weed.	Lazarides & Hince (1993).
Cyperus difformis			Poison?	Has been suspected of causing the deaths of sheep.	C3	Weed.	Cunningham et al. (1981), Lazarides & Hince (1993).
Cyperus gilesii				Fodder.	C4		Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Cyperus iria					C4	Weed.	Lazarides & Hince (1993).
Cyperus squarrosus					C4		
Dactyloctenium radulans			Poison	Nutritious fodder while young and green, still readily eaten when mature, especially by sheep.			Cunningham et al. (1981), Lazarides & Hince (1993).
Dianella porracea	Fruits & roots edible. Stems can be pounded to make a fibre.						
Dichanthium sericeum				Fodder, moderately palatable.			Lazarides & Hince (1993).
Dichanthium sericeum				Highly palatable and productive fodder.		Sheep sometimes reported to rarely graze this species. Tolerates moderate grazing.	Lazarides & Hince (1993), Benson & McDougall (2005).
Digitaria ammophila				Fodder, drought resistant.			Lazarides & Hince (1993).
Digitaria brownii				Readily eaten by stock, valuable fodder.			Cunningham et al. (1981), Lazarides & Hince (1993).
Digitaria coenicola				Highly palatable plant, drought resistant.			Cunningham et al. (1981), Lazarides & Hince (1993).
Digitaria divaricatissima				Useful and palatable forage, drought resistant.			Cunningham et al. (1981), Lazarides & Hince

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
							(1993).
Digitaria hystrichoides				Fodder.			Lazarides & Hince (1993).
Dissocarpus paradoxus				Fodder.			Lazarides & Hince (1993).
Dodonaea viscosa	Aqueous infusion of leaveds for sponging forehead & body to releave fever. New-borns exposed to smoke from burning green leaves to promote health.	Lassack & McCarthy (2011).					
Dysphania glomulifera			Poison?	Fodder.		Weed.	Lazarides & Hince (1993).
Dysphania littoralis			Poison?	Potentially dangerous to stock in certain conditions.			Cunningham et al. (1981), Lazarides & Hince (1993).
Dysphania rhadinostachya				Fodder.			Lazarides & Hince (1993).
Echinochloa colona				Fodder.		Food for Freckled Duck.	Lazarides & Hince (1993).
Echinochloa inundata	Source of grain for aborigines.	Cunningham et al. (1981), Lazarides & Hince (1993).		Produces large quantities of forage, readily eaten by stock.			Cunningham et al. (1981), Lazarides & Hince (1993).
Echinochloa turneriana				Palatable and useful feed for cattle.			Cunningham et al. (1981), Lazarides & Hince (1993).
Einadia hastata	Edible fruit.						
Einadia nutans	Edible fruit.						
Einadia trigonos			Poison?				Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Eleocharis acuta				Only eaten by stock in the absence of more palatable species.		Weed.	Cunningham et al. (1981), Lazarides & Hince (1993).
Eleocharis pallens				Grazed by stock, usually when more palatable species are unavailable.			Cunningham et al. (1981), Lazarides & Hince (1993).
Elytrophorus spicatus				Fodder.			Lazarides & Hince (1993).
Enchylaena tomentosa			Poison?	Fodder. Contains toxic levels of soluble oxalate. Sheep have been observed to eat large quantities of the shrub without ill effect		Succulent berries are quite edible.	Cunningham et al. (1981), Lazarides & Hince (1993).
Enneapogon avenaceus				Readily grazed at all stages. Highly regarded as fodder. Regenerates rapidly.			Cunningham et al. (1981), Lazarides & Hince (1993).
Enneapogon cylindricus				Readily grazed by stock either green or dry.			Cunningham et al. (1981), Lazarides & Hince (1993).
Enneapogon intermedius				Useful forage species where it occurs in			Cunningham et al. (1981), Lazarides & Hince

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				quantity.			(1993).
Enneapogon nigricans				Fodder. Susceptible to overgrazing.			Cunningham et al. (1981), Lazarides & Hince (1993).
Enneapogon polyphyllus				Produces forage capable of fattening stock.			Cunningham et al. (1981), Lazarides & Hince (1993).
Enteropogon acicularis				Young growth moderately palatable. Susceptible to heavy grazing.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis australasica				Fodder.		Settler cut, cured and used this species for thatching of sheds, outbuildings and meat houses. Timber, fibre.	Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis basedowii				Palatable and nutritious forage that grows in all seasons after rain.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis brownii				Fodder.		Seed eaten by Finches.	Lazarides & Hince (1993), Benson & McDougall (2005).
Eragrostis cilianensis				Eaten when young.			Cunningham et al. (1981), Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Eragrostis dielsii				Produces an abundance of forage.		Saline tolerant.	Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis eriopoda				Moderately palatable to stock.		Withstands drought and grazing.	Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis lacunaria				Reasonable feed for sheep.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis laniflora				Moderately palatable when young.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis leptocarpa				Palatable to stock.			Cunningham et al. (1981).
Eragrostis leptostachya				Fodder.			Lazarides & Hince (1993).
Eragrostis parviflora				Moderately palatable when young.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis pilosa				Produces reasonable amount of forage. Highly palatable.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eragrostis setifolia				Heavily grazed by stock and kangaroos.		Shelter. Withstands drought.	Cunningham et al. (1981), Lazarides & Hince

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
							(1993).
Eremophila bignoniiflora	Aqueous decoction of young leaves on body/wrapped around head to relieve colds/flu/headaches/sinusitis/nasal congestion. Fruit decoction used as laxative.	Lazarides & Hince (1993), Lassack & McCarthy (2011).	Poison?	Fodder.		Honey.	Lazarides & Hince (1993).
Eremophila bowmanii						Honey.	Lazarides & Hince (1993).
Eremophila deserti			Poison.	Fodder.		Honey.	Lazarides & Hince (1993).
Eremophila gilesii	Medicinal.	Lazarides & Hince (1993).				Honey, weed.	Lazarides & Hince (1993).
Eremophila glabra				Fodder.		Honey, ornamental.	Lazarides & Hince (1993).
Eremophila latrobei	Infusion of crushed leaves as body wash for cold/flu. Crushed leaves rubbed on body. Weaker infusion drunk for sore throat & colds.	Lassack & McCarthy (2011).	Poison?	Fodder.		Honey, ornamental.	Lazarides & Hince (1993).
Eremophila longifolia	Fibre. Nectar sucked from flowers. Treatment of measles & skin problems. Crushed leaves & water for stomach ulcers/colds/scabies. Leaves/oil rubbed into swollen joints.	Lazarides & Hince (1993), Harris (2000), Cribb & Cribb (1982), Lassack & McCarthy (2011).		Fodder. Used for tanning Kangaroo skins.	Lassack & McCarthy (2011)	Honey.	Lazarides & Hince (1993).
Eremophila mitchellii	Wood used as a substitute for sandalwood.	Cribb & Cribb (1982).		Used for fencing posts.		Gums, timber, fuel, honey, weed. Termite resistant.	Cribb & Cribb (1982), Lazarides & Hince (1993).
Eremophila sturtii	Leaf decoction used as hand wash for minor cuts/open sores. Hot bath of leaves for colds/flu. Sore eyes exposed to steam. Not to be taken internally.	Lassack & McCarthy (2011).	Poison?			Honey, weed, fibre, ornamental.	Lazarides & Hince (1993).
Eriachne aristidea				Readily grazed when green. Very			Cunningham et al. (1981),

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				useful forage.			Lazarides & Hince (1993).
Eriachne helmsii				Grazed fairly readily when young. Seedheads readily grazed.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eriachne mucronata				Fodder.			Lazarides & Hince (1993).
Eriochloa australiensis				Useful fodder species, often preferentially grazed.			Cunningham et al. (1981), Lazarides & Hince (1993).
Eriochloa pseudoacrotricha				Valuable forage plant, palatable and nutritious to stock.		Seed eaten by Stubble Quail.	Cunningham et al. (1981), Lazarides & Hince (1993), Benson & McDougall (2005).
Erodium crinitum	Fleshy taproot can be cooked & eaten.	Lazarides & Hince (1993).		Palatable green or dry. Seeds injurious to stock.			Lazarides & Hince (1993).
Eucalyptus coolabah	Used as a fish poison.	Cribb & Cribb (1982).		Gum, Fuel.		Ornamental.	Lazarides & Hince (1993).
Eucalyptus largiflorens				Fodder, Gum, Timber, Honey.			Lazarides & Hince (1993).
Eucalyptus melanophloia				Gum, Timber, Honey.			Lazarides & Hince (1993).
Eucalyptus ochrophloia				Fodder, Timber, Honey.			Lazarides & Hince (1993).
Eucalyptus populnea				Gum, Timber, Fuel. Honey.			Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Euphorbia tannensis	Heated softened plant over coals rubbed on skin affected sores/scabies. Decoction of whole plant or squeezed out latex used to wash scabies/skin leasons.	Lassack & McCarthy (2011).	Poison?				Lazarides & Hince (1993).
Fimbristylis dichotoma				Must be utilised while green for forage.			Cunningham et al. (1981), Lazarides & Hince (1993).
Flindersia maculosa	Gum is edible. Used to make boomerangs. Sap dissolved in water makes a quality adhesive. Exudate used against diarrhoea. Pleasant tasting gum.	Cribb & Cribb (1982), Harris (2000), Lassack & McCarthy (2011).		Fodder, Gum.			Lazarides & Hince (1993).
Glinus lotoides			Poison.	Not acceptable to stock at any time.			Cunningham et al. (1981), Lazarides & Hince (1993).
Glycine canescens				Fodder.			Lazarides & Hince (1993).
Gnephosis arachnoidea						Common in scalded and salt-affected areas.	Lazarides & Hince (1993).
Gnephosis eriocarpa				Provides moderate to good fodder.		Temporarily binds loose soils.	Lazarides & Hince (1993).
Goodenia glabra				Fodder.			Lazarides & Hince (1993).
Goodenia glauca				Fodder.			Lazarides & Hince (1993).
Grevillea striata	Sap ground applied to weeping sores/burns. Food, gums, timber. Nectar from flowers sucked. Wood for Boomerangs. Root resin makes adhesive. Charcoal used to stop bleeding	Cunningham et al. (1981), Cribb & Cribb (1982), Lazarides & Hince (1993), Harris et al. (2000).		Foliage is eaten if accessible. Leaves readily eaten by sheep.		Timber has been used for fence posts and shingles. Sap has been used as a cement.	Cunningham et al. (1981), Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Gypsophyla tubulosa						Weed of disturbed often sandy soils.	Lazarides & Hince (1993).
Hakea eryeana	Medicinal. Powered charcoal of bark applied to burns. Charcoal powder miexed with animal fat applied to burns. Sharp lobes of leaves inserted base of warts.	Lazarides & Hince (1993), Lassack & McCarthy (2011).					
Hakea ivoryi				Possibly sparingly browsed by stock.		Timber.	Cunningham et al. (1981), Lazarides & Hince (1993).
Hakea tephrosperma	Roots were a source of water for aborigines - one end placed in a slow fire. Smoking pipes made from roots.	Cunningham et al. (1981).				Timber used for turnery.	Cunningham et al. (1981).
Haloragis glauca				Fodder.			Lazarides & Hince (1993).
Heliotropium amplexicaule			Poison.	Fodder. Contains toxic alkaloids - suspected cause of toxaemic jaundice in sheep. Low in palatability. Honey deteriorates.			Cribb & Cribb (1982), Lazarides & Hince (1993).
Heliotropium supinum			Poison?	Fodder. Suspected poison of cattle and horses.		Weed, ornamental.	Lazarides & Hince (1993).
Hibiscus brachysiphonius				Fodder, readily eaten by stock.			Lazarides & Hince (1993).
Hibiscus sturtii				Moderately			Lazarides & Hince

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				palatable fodder.			(1993).
Hibiscus trionum			Poison?	Fodder.		Weed, medicinal, ornamental. Used medicinally by southern African indigenous people.	Lazarides & Hince (1993).
Iseilema membranaceum				Excellent pasture species, readily eaten green or dry.			Cunningham et al. (1981), Lazarides & Hince (1993).
Jasminum lineare				Fodder, readily browsed by sheep and goats.		Ornamental.	Lazarides & Hince (1993).
Lactuca serriola			Poison?	Fodder.			Lazarides & Hince (1993).
Lepidium bonariense				Taints butter of dairy cows, and pig meat.			Cunningham et al. (1981), Lazarides & Hince (1993).
Linum marginale	Seeds eaten, and possess all the properties of linseed. Used for fibre also.	Lazarides & Hince (1993).	Poison?				Lazarides & Hince (1993).
Lotus cruentus			Poison.	Fodder. HCN toxic to sheep, especially young leaves and pods.			Lazarides & Hince (1993).
Ludwigia peploides			Poison?	Fodder. Lightly grazed; suspected of causing stomach disorders in horses, cattle and goats.			Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Lycium ferocissimum			Poison?	Honey.		Ornamental.	Lazarides & Hince (1993).
Lysiana exocarpi	Fruits were probably utilised by aborigines.	Cunningham et al. (1981).		Readily grazed if lopped.			Cunningham et al. (1981), Lazarides & Hince (1993).
Lysiana subfalcata	Fruits were probably utilised by aborigines.	Cunningham et al. (1981).		Readily grazed if lopped. Food.			Cunningham et al. (1981), Lazarides & Hince (1993).
Maireana brevifolia			Poison?	Withstands browsing moderately well. Suspected of poisoning sheep.		Shelter. Early coloniser of disturbed land.	Cunningham et al. (1981), Lazarides & Hince (1993).
Maireana decalvans				Heavily utilised when the only green plant present.		An early invader of cleared land.	Cunningham et al. (1981), Lazarides & Hince (1993).
Maireana triptera				Possibly grazed by stock in times of feed shortage.			Cunningham et al. (1981), Lazarides & Hince (1993).
Maireana villosa				Very useful drought forage.			Cunningham et al. (1981), Lazarides & Hince (1993).
Malva parviflora	Medicinal.	Lazarides & Hince (1993).	Poison?	Fodder. Readily eaten by stock. Contains malvic acid. Suspected cause of staggers			Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				in sheep, cattle and horses.			
Malvastrum americanum			Poison?				Lazarides & Hince (1993).
Marsilea drummondii	Sporocarps collected by Kooris and ground to flour, mixed with water for dough. Bruised & boiled.	Cunningham et al. (1981), Lazarides & Hince (1993).	Poison.	Low-grade fodder.			Cunningham et al. (1981), Lazarides & Hince (1993), Harris et al. (2000).
Marsilea hirsuta	Sporocarps collected by Kooris and ground to flour, mixed with water for dough.	Cunningham et al. (1981).	Poison?	Fodder.			Lazarides & Hince (1993).
Medicago polymorpha			Poison?	Fodder, Honey.			Lazarides & Hince (1993).
Medicago truncatula				Fodder.			Lazarides & Hince (1993).
Mentha australis	Medicinal.	Lazarides & Hince (1993).	Poison?	Oil.			Lazarides & Hince (1993).
Minuria integerrima				Fodder.			Lazarides & Hince (1993).
Monachather paradoxa				Highly palatable to stock. Susceptible to preferential grazing. Drought resistant.			Cunningham et al. (1981), Lazarides & Hince (1993).
Myoporum montanum	Fruits are edible.	Lazarides & Hince (1993).	Poison.	Honey.		Ornamental.	Lazarides & Hince (1993).
Myriophyllum verrucosum			Poison.	Readily eaten by stock. HCN poisonous.			Lazarides & Hince (1993).
Neurachne munroi				Very palatable			Cunningham et

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				forage. Susceptible to overgrazing.			al. (1981), Lazarides & Hince (1993).
Nicotiana velutina	Medicinal.	Lazarides & Hince (1993).	Poison.	Fodder.			Lazarides & Hince (1993).
Olearia pimeloides				Honey.		Ornamental.	Lazarides & Hince (1993).
Omphalolappula concava				Moderate fodder. Prickly fruit burrs contribute to vegetable fault in wool.			Lazarides & Hince (1993).
Owenia acidula	Food. Used wood decoction to bath sore eyes. Used in a treatement for malaria.	Lazarides & Hince (1993), Lassach & McCarthy (2011).		Gums			Lazarides & Hince (1993).
Oxalis exilis						Ornamental.	Lazarides & Hince (1993).
Oxalis perennans						Ornamental.	Lazarides & Hince (1993).
Panicum decompositum	Seeds ground and made into cakes.	Cunningham et al. (1981), Lazarides & Hince (1993).		Withstands heavy grazing by stock. Produces forage in bulk.		Seed eaten by Stubble Quail.	Cunningham et al. (1981), Lazarides & Hince (1993), Benson & McDougall (2005).
Panicum effusum	Seeds utilised to make bread.		Poison?	Palatable when young. Overconsumption can cause photo-sensitisation and 'yellow bighead' in sheep.		Seed eaten by Stubble Quail.	Cunningham et al. (1981), Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				Susceptible to close grazing.			
Panicum laevinode			Poison?	Fodder. Suspected cause of photo-sensitisation in sheep.			Lazarides & Hince (1993).
Panicum simile				Fodder.			Lazarides & Hince (1993).
Paspalidium constrictum				Very palatable to stock. Susceptible to preferential grazing.	Drought resistant.		Cunningham et al. (1981), Lazarides & Hince (1993).
Paspalidium jubiflorum				Quite palatable. Often well utilised by cattle. Provides nutritious fodder.		Stabilises wet areas. Responds to flooding. Food plant for freckled duck.	Cunningham et al. (1981), Lazarides & Hince (1993), Benson & McDougall (2005).
Perotus rara				Valuable and nutritious forage plant when young. Seeds injurious to horses.			Cunningham et al. (1981), Lazarides & Hince (1993).
Phyllanthus lacunarius			Poison.	Fodder. Toxic to sheep, cattle and goats. Tested HCN positive.			Lazarides & Hince (1993).
Phyllanthus virgatus	Used for gonorrhoea. Fresh bruised plant mixed with buttermilk and used as a wash for itch in children.	Lassack & McCarthy (2011).					

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Pimelea microcephala	Ripe berries are edible.		Poison.	Fodder, rarely grazed.	Drought resistant.	Shelter.	Lazarides & Hince (1993).
Pimelea trichostachya			Poison.	Fodder. Generally unpalatable. Major component of post-drought pastures. Poisonous to sheep and cattle.			Lazarides & Hince (1993).
Pittosporum angustifolium	Infusion of leaves/seeds/wood for relief of internal pains/cramps/eczema/pruritus. Colds as a lactogogue. Seed flour for food/aphrodisiac/ointment for aching muscles/skin	Anderson (1968), Maiden (1889), Cunningham et al. (1981), Harris et al. (2000), Lassack & McCarthy.		Foliage eaten by stock. Timber.			Cunningham et al. (1981), Lazarides & Hince (1993).
Pluchea tetranthera			Poison?	Fodder. Suspected cause of death in cattle.			Lazarides & Hince (1993).
Poa fordeana				Highly palatable. Probably only grazed when other forage is scarce.			Cunningham et al. (1981), Lazarides & Hince (1993).
Polygonum plebeium				May be utilised by stock in absence of more preferred forage plants.			Cunningham et al. (1981), Lazarides & Hince (1993).
Portulaca oleracea	Eaten as raw or cooked vegetable. Seeds ground to meal, made into cakes or bread. Cooling diuretic, antiscorbutic	Cribb & Cribb (1974), Cunningham et al. (1981) Lazarides &	Poison.	Very palatable to stock, readily eaten. Nitrates			Cunningham et al. (1981), Lazarides & Hince

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
	properties. Blood cleanser.	Hince (1993), Lassack & McCarthy (2011).		and oxalates toxic. Poisonous to sheep and cattle.			(1993).
Pratia darlingensis				Fodder, of little forage value.			Lazarides & Hince (1993).
Pseudognaphalium luteoalbum	Used for making a medicinal drink for general illness.	Lazarides & Hince (1993), Lassack & McCarthy (2011).		Fodder, lightly grazed.			Lazarides & Hince (1993).
Psydrax latifolium	Food.	Lazarides & Hince (1993).		Fodder.		Ornamental.	Lazarides & Hince (1993).
Pterocaulon sphacelatum	Leaf decoction wash for sores, open wounds, ease colds, inflamed eyes. Applied to chest for bronchitis/pleurisy. Placed on nose for congestion. Steam inhaled.	Lassack & McCarthy (2011).		Rarely grazed fodder.			Lazarides & Hince (1993).
Ptilotus leucocoma				Grazed sparingly by stock.			Cunningham et al. (1981), Lazarides & Hince (1993).
Ptilotus polystachyus				Palatable to stock. May provide useful forage, particularly when young.			Cunningham et al. (1981), Lazarides & Hince (1993).
Rhynchosia minima				Heavily grazed fodder. Reported to be injurious to grazing cattle.			Lazarides & Hince (1993).
Salsola australis				Fodder.		Weed, shelter.	Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Santalum acuminatum	Food and timber. Fruit edible, though flesh is tart. Kernel full of oil & can be used as a candle. Ground seed as liniment for pains/swelling/bruising/sprain/backache.	Cunningham et al. (1981), Lazarides & Hince (1993). Cribb & Cribb (1982), Lassack & McCarthy (2011).		Fodder.		Settlers stewed fruits in pies, jellies, jams. Kernels used as marbles, also edible and nutritious. Gums, oils. Pounded leaves applied to boils/sores/gonorrhoea.	Cunningham et al. (1981), Lazarides & Hince (1993), Harris et al. (2000), Lassack & McCarthy (2011).
Santalum lanceolatum	Leaves burnt repel mosquitoes. Berries narcotic properties. Leaf decoction body wash/aches/pains. Inner bark pain/colds/sore throat/VD. Leaf decoction boils/sores.	Cribb & Cribb (1982), Lazarides & Hince (1993), Lassack & McCarthy (2011).		Foliage palatable and useful fodder. Timber. Also mashed roots in liqued applied for rheumatism, itching.		Fruits edible and sweet. Gums.	Cunningham et al. (1981), Lazarides & Hince (1993).
Sauropus trachyspermus			Poison?				Lazarides & Hince (1993).
Scaevola spinescens	Drink root decoction stomach ache/urinary troubles. Roots in water for pains alimentary tract. Broken stem decoction cure boils/sores/rashes when drunk.	Lassack & McCarthy (2011).		Fodder, lightly grazed.		Ornamental. Burnt fumes inhaled for colds. Sores treated by burning leaves/twigs and steaming.	Lazarides & Hince (1993), Lassack & McCarthy (2011).
Sclerolaena bicornis				Nibbled readily by sheep.			Cunningham et al. (1981).
Sclerolaena birchii				Leaves may be nibbled by sheep at times.		Weed, shelter.	Cunningham et al. (1981), Lazarides & Hince (1993).
Sclerolaena convexula				Young plants may be grazed before the burrs			Cunningham et al. (1981), Lazarides & Hince

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				develop.			(1993).
Sclerolaena decurrens				May be utilised as fodder in early drought times.		Shelter.	Cunningham et al. (1981), Lazarides & Hince (1993).
Sclerolaena diacantha				Heavily utilised by stock in dry conditions.		Shelter.	Cunningham et al. (1981), Lazarides & Hince (1993).
Sclerolaena divaricata						Shelter.	Lazarides & Hince (1993).
Sclerolaena lanicuspis				Palatable, good forage.		Shelter.	Cunningham et al. (1981), Lazarides & Hince (1993).
Sclerolaena tricuspis						Shelter.	Lazarides & Hince (1993).
Senecio magnificus			Poison.	Fodder.		Ornamental.	Lazarides & Hince (1993).
Senecio runcinifolius				Fodder.			Lazarides & Hince (1993).
Senna sp. 'artemisioides'	Mixed its ash with native tobacco before chewing it.	Lassack & McCarthy (2011).					
Senna sp. 'filifolia'	New babies held in smoke from leafy branches.	Lassack & McCarthy (2011).					
Senna sp. 'sturtii'	Infusion of leafy branches used to wash sores/cuts. Not to take internally.	Lassack & McCarthy (2011).					
Sida ammophila				Fodder.			Lazarides & Hince (1993).
Sida corrugata			Poison?	Valuable forage plant. Suspected			Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				cause of paralysis in sheep.			
Sida cunninghamii				Fodder, readily grazed.			Lazarides & Hince (1993).
Sida fibulifera				Fodder.			Lazarides & Hince (1993).
Sida filiformis				Palatable green forage plant.	Highly drought tolerant.		Lazarides & Hince (1993).
Sida goniocarpa				Fodder.			Lazarides & Hince (1993).
Sida intricata				Fodder.			Lazarides & Hince (1993).
Sida platycalyx				Fodder. Spiny burrs troublesome in wool.			Lazarides & Hince (1993).
Sida trichopoda				Valuable pasture plant.	Extremely drought tolerant.		Lazarides & Hince (1993).
Sisymbrium erysimoides				Eaten only when there is little alternative forage.			Cunningham et al. (1981), Lazarides & Hince (1993).
Solanum cinereum			Poison?	Fodder. Berries suspected poisonous to sheep and horses.			Lazarides & Hince (1993).
Solanum coactiliferum	Treated berries eaten by Aborigines.	Lazarides & Hince (1993).		Fodder.			Lazarides & Hince (1993).
Solanum ellipticum	Berries eaten by Aborigines.	Lazarides & Hince	Poison?				Lazarides & Hince

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
		(1993).					(1993).
Solanum esuriale	Fruit eaten by Aborigines.	Lazarides & Hince (1993), Harris et al. (2000).	Poison.	Fodder. Poisonous to sheep.			Lazarides & Hince (1993).
Solanum sturtianum			Poison.	Plant toxic to stressed cattle and sheep.			Lazarides & Hince (1993).
Sonchus oleraceus	Food. Eaten as a vegetable.	Lazarides & Hince (1993).	Poison?	Fodder. Suspected cause of photo-sensitisation in cattle. Readily grazed by stock.	C3. Wind intolerant , drought intolerant, intolerant of waterlogging and salinity.	Cosmopolitan species, on the back dune. Juice used medicinally. Weed.	Clarke (1989), Lazarides & Hince (1993).
Sporobolus actinocladus				Provides very palatable forage, especially before flowering.			Cunningham et al. (1981), Lazarides & Hince (1993).
Sporobolus caroli				Very palatable, high quality feed.			Cunningham et al. (1981), Lazarides & Hince (1993).
Sporobolus mitchellii				Has some grazing value; often not utilised by stock when more paltable plants are available.			Cunningham et al. (1981), Lazarides & Hince (1993).
Streptoglossa adscendens			Poison?	Fodder.			Lazarides & Hince (1993).
Streptoglossa liatroides				Low forage value fodder.			Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Tetragonia eremaea				Eaten readily by stock, providing useful moisture			Cunningham et al. (1981), Lazarides & Hince (1993).
Teucrium racemosum				Fodder.			Lazarides & Hince (1993)
Themeda avenacea	Decoction of aerial parts as a wash for whole body to reduce colds/chest complaints/reduce fever. Dried parts ground to powder/water into liniment for rubby on body.	Lassack & McCarthy (2011).		Utilised by stock during droughts.			Cunningham et al. (1981), Lazarides & Hince (1993).
Themeda triandra				Very palatable, heavily grazed in eastern NSW. Sparingly grazed in Western NSW. Young growth utilised		Food plant of butterfly larvae. Will not tolerate continuous grazing. Very palatable when young but only moderate nutritive value. Provides much roughage to offset effects of highly improved grasslands.	Cunningham et al. (1981), Lazarides & Hince (1993), Benson & McDougall (2005).
Thryptomene hexandra				Honey.			Lazarides & Hince (1993).
Thyridolepis mitchelliana				Very palatable, useful forage for all types of livestock. Withstands grazing moderately well.			Cunningham et al. (1981), Lazarides & Hince (1993).
Thyridolepis xerophila				Fodder.			Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Trachymene glaucifolia			?Poisonous.				Lazarides & Hince (1993).
Trachymene ochracea	Edible tap root eaten raw or roasted.		?Poisonous.				Lazarides & Hince (1993).
Tragus australianus				Useful plant when young and green, summer forage, mature burrs troublesome.			Cunningham et al. (1981), Lazarides & Hince (1993).
Trianthema triquetra			Poisonous.	Eaten by stock at times, in the absence of more palatable species. Suspected of poisoning horses, calves and sheep.			Cunningham et al. (1981), Lazarides & Hince (1993).
Tribulus terrestris			Poisonous.	Causes nitrate poisoning and phot-sensitization in sheep; burrs troublesome to stock and reduce fleece value. Honey. Pollen.			Cribb & Cribb (1982), Lazarides & Hince (1993).
Tricoryne elatior				Eaten by stock but lacks bulk.			Cunningham et al. (1981), Lazarides & Hince (1993).
Tripogon loliiformis				Should be utilised quickly. Quite			Cunningham et al. (1981),

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
				palatable.			Lazarides & Hince (1993).
Triraphis mollis			Contains HCN.	Low forage value. Contains HCN.			Cunningham et al. (1981), Lazarides & Hince (1993).
Velleia arguta							
Velleia paradoxa			Poisonous?	Honey.			Lazarides & Hince (1993).
Ventilago viminalis	Aboriginal food, timber and gum. Mashed roots & bark in water and used for toothache, rheumatism, swellings, cuts, sores. Hair restorative.	Lazarides & Hince (1993), Lassack & McCarthy (2011).	Poisonous.	Poisonous when fed to sheep as sole food.			Lazarides & Hince (1993).
Verbesina encelioides				Honey.			Lazarides & Hince (1993).
Vittadinia cuneata				Fodder.			Lazarides & Hince (1993).
Vittadinia pterochaeta				Fodder.			Lazarides & Hince (1993).
Wahlenbergia communis				Fodder, palatable to stock.			Lazarides & Hince (1993).
Wahlenbergia gracilis				Palatable forage in cooler months.	C3. Wind intolerant, drought intolerant, intolerant of waterlogging and salinity.	Tertiary sand coloniser. Garden plant, floral display. Cosmopolitan species, on the back dune.	Clarke (1989), Lazarides & Hince (1993).
Zaleya galericulata			Suspected of poisoning stock.	Suspected poison of sheep, cattle and poultry. Fodder.		Useful coloniser of dunes.	Cunningham et al. (1981), Lazarides & Hince (1993).

Taxon	Use	Use Refs	Toxicity	General Use	Physiology	Notes	General Refs
Zygophyllum iodocarpum				Readily grazed. Fodder.		Salt tolerant.	Lazarides & Hince (1993).

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