Irongrass Environmental
Rehabilitation Services

Barunga Gap Rail Corridor Biodiversity Management Plan



February 2025

Survey and Report by Andrew Allanson & Janet Kuys

Irongrass Environmental Rehabilitation Services

Acknowledgments

Several people have contributed their time and technical knowledge in the preparation of this Biodiversity Management Plan.

Our many thanks to,

Bruce Michael	Snowtown Community Management Committee Inc; thank you for your invitation to undertake the writing of this plan, as well as your ideas and time in reading the first draft and your astute comments. We hope that this document serves it's intended purpose.
Glen Growden	Public Services Officer at the Wakefield Regional Council; thank you for your time spent in the field and on the phone, and your passion for conserving native vegetation.
Adrian Shackley	Botanist; thank you so much for your efforts in documenting existing native vegetation in the area of this plan. The time taken to discuss various details of this plan is very much appreciated.

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Summary

A survey of the vegetation along the disused rail corridor between Snowtown and the Wakefield Regional Council border was undertaken by Irongrass Environmental Rehabilitation Services, in late September and early October 2024. A list of native and weed species was compiled. The intention of the plan is to provide a range of management actions to be taken, depending on the availability of time and resources.

If no management takes place, there is likely to be further incursions of weeds due to the narrow shape (edge to area) of the corridor. Furthermore, if management actions are inappropriate, there can be a loss of biodiversity wherever that inappropriate action has occurred.

It will be important to try to stop both:

- New species of weeds establishing
- Existing weeds spreading further

Weed control should always aim to increase the *likelihood* of native species establishing wherever weed control work has been undertaken.

There is a variety of vegetation types *(associations)* present along the corridor, ranging from native grasslands, shrublands to woodlands. The majority of the corridor consists of native grasslands which are variable in quality (e.g. native species and level of weed infestation) as well as the variety of grassland associations *(e.g. Themeda australis grasslands etc).*

Ideally it will be better to undertake management actions consistently. *Generally*, management actions are weather dependant and consist of;

- Use of grass specific herbicides in June/July
- Use of broad-leaf herbicides in July/August and early September
- Slashing of grasslands in late August to September, to reduce seed production of annual weed grass species and some broad-leaf weed species.
- Management of feral (e.g. rabbits, hares, deer) species as well as over-abundant native species (Eastern Grey Kangaroos) to prevent over-grazing of palatable native species.

The use of fire as a management tool is discussed, and involvement of local First Nations people to undertake or demonstrate cultural burning, (to increase native grass and herbaceous species cover) could provide more opportunities to consider in managing grasslands and grassy woodlands.

All the above actions need to be undertaken *only* following a careful inspection of the area where proposed action is to take place. Many native plants may be negatively affected if they are slashed (*Lomandra species, Dianella revoluta, Vittadinia species*) and need to be avoided. The need to monitor the site following management actions will help to decrease the likelihood of mistakes being made in the future.

Normally, one management action will trigger the need to use another management action to maximise the benefit from the first action. For example:

- Areas treated using a grass specific herbicide may cause the germination of broad-leaf weeds, requiring follow up work to prevent broad leaf weeds increasing,
- Slashed areas to decrease annual grasses seeding, may in turn provide ideal opportunity for broad leaved species to increase or to become established.

- Burning will require follow-up work to ensure that weed species don't increase in cover abundance, as well as controlling grazing fauna, which will reduce regeneration of native species post-fire.

The months listed above are only a guide, as each year will be different, both in rainfall (as well as time of rainfall) and availability of resources. Slashing will be less useful *should perennial weed grass species* (e.g. Perennial Veldt Grass, Rice Millet grass, Buffel Grass etc) become established. Therefore, the prevention of perennial weed grasses establishing is very important and will ensure that slashing as an effective management tool is retained.

Several species are very low in number. This may be due to several factors e.g., preferred plants of grazing animals or the narrow shape of the corridor. It will be important to monitor and increase the numbers of these species. Well targeted weed control may assist in increasing the numbers of many of those species. Good weed control should be the first priority, whilst monitoring of those species with low numbers used to guide future actions regarding planting.

An opportunity to increase native grassland knowledge to visitors and trail users, is to establish small fenced planted "pods" which would contain a variety of small herbaceous species along with the existing native grasses. Species that could be planted in each "pod" include a range of lilies, herbaceous species found in grasslands, as well as Irongrass *(Lomandra)* species.

The variety of species planted should reflect where they are naturally found along the rail corridor.

Interpretive signs could be erected at the location of planted "pods" to provide more information about the importance of native grasslands and to show that many species other than grasses are found there. Other interpretive information about winter active and summer active grass species could be used when describing the vegetation more broadly.

Introduction

Irongrass Environmental Rehabilitation Services were invited by Bruce Michael, a member of the Snowtown Community Management Committee Inc, to produce a Management Plan for the Snowtown to Barunga Gap disused railroad corridor (and extending to the Local Government boundary with Barunga West Council). Both Bruce Michael and Glen Growden (from Wakefield Regional Council) provided us with further information, during an initial inspection of the disused railroad corridor with them on the 16th of September. They provided an overview of different management issues, as well as to make us aware of potential issues with various stakeholders (adjacent landholders, local government etc).

The Snowtown Community Management Committee (SCMC) is a community group that aims to make improvements for the the Snowtown community. The committee is recognised by the Wakefield Regional Council and is able to raise issues with the Council. This ensures that any issues are effectively communicated.

The SCMC see the Barunga Gap Rail Corridor as an environmental "window" to what this land was like and that's its protection is vital as an

- educational resource,
- a tourist attraction to the area
- a plant reserve for seed and plant propagation
- an area for First Nations education for the wider community.

The SCMC through the Northern and Yorke Landscape Board's Grassroots Grant was able to receive funds for this Biodiversity Management Plan to be written plus supporting funds from the Snowtown Progress Association and private landholders. The Tilt Energy, "Lend-A-Hand" grant will also help towards regeneration work that is highlighted in this report.

The dimensions of the Barunga Gap rail corridor are 12.8 kms long, from Hummocks Station Road to Boundary Road. It is between 50 and 130 meters wide and it covers approximately 97.9 ha.

A significant level of information was provided by Adrian Shackley, a native grassland botanist, who had already completed a botanical survey over several sections of the rail reserve. This list can be found as an addendum to this plan.

A more detailed assessment of the site was undertaken on the 30th of September and 3rd of October. This involved recording native flora species, weed species present and opportunistic sightings of wildlife.

Parts of the disused railroad corridor have been made suitable for a multi-use recreation trail. The trail will extend from Snowtown, to link up with the trail already developed by the Barunga West Council. The intention is to provide a recreation opportunity for people to walk or bike ride from Snowtown to Bute, to provide picturesque surroundings and as well as to provide interpretive information at points along the trail, (e.g. native vegetation, surrounding land use, wind turbines and on Snowtown and nearby townships.

The area surrounding Snowtown as well as the Hummocks Range are anecdotally said to have been the original country of the Kaurna nation bordered by the Narungga, Nukunu and Ngadjuri nations, before European arrival. However, the Barunga Gap Rail Corridor surveyed for this management plan sits within the 'Narungga Nation Native Title Determination Area' as noted by the environment.sa.gov.au/naturemaps website.

Since European settlement, much of South Australia has been heavily cleared of native vegetation. In particular, native grasslands have been significantly reduced since European settlement. The various indigenous nation's people actively managed grasslands and grassy woodlands to ensure that large and small game flourished, as well as the diversity of herbaceous species used as sources of food e.g. lily species etc (Gammage B, 2011). This would most likely to have been the case in the Barunga, and Hummock's Range. Most native grasslands were more easily cleared for European agriculture as fewer trees needed to be removed.

The climate is well suited for agriculture and the Snowtown, Hummocks and Barunga Gap areas are considered to be reliable grain growing areas. The average mean rainfall for the region is 363 mm and the average mean temperate ranges from 8.9C to 24.2C. (http://www.bom.gov.au/climate/averages/tables/cw_021133.shtml)

The Snowtown to Kadina Railroad was opened on the 1st of October 1879. It eventually closed in March 1993 although a small section was retained to enable continued use of the silos. A multi-use trail has been created from Bute eastwards to the boundary with the Regional Council of Wakefield. It is intended to continue this trail toward Snowtown – which is partially complete. Several sections of the railroad in the Wakefield Regional Council area run parallel to the Snowtown to Bute Road. This has proven to be helpful in the retention of native vegetation across a wider area than just the railroad corridor. Members of the local community have expressed an interest in the management of the native vegetation along the railroad corridor.

It was decided to undertake a "rambling" assessment of the corridor which was carried out on the 30th September and completed on the 3rd of October. The intention was to document the vegetation by categorising the Vegetation Association and its condition, as well as the species found within it (native and introduced). In turn, the Vegetation Associations are referred to as Management Zones. The plan provides some general management actions that can be taken, to maintain the existing biodiversity assets within each management zone along the railroad corridor. Several issues (e.g. grazing by animals, or the infestations of several weed species) occur across many of the different Management zones.

As each section of the corridor was traversed, a *general* inspection was made to ascertain the boundary of the vegetation associations, as well as to the presence of various weed species. This informs local workers on which weeds require control (using the correct herbicide and application technique). A native plant and weed species list was compiled for each zone with additional notes made regarding the management issues observed. Photos were taken to provide a visual representation of the vegetation. A hand-held GPS was used to aid in mapping the vegetation zones.

We were able to carefully drive along the trail. At intervals, we got out of the vehicle to inspect the vegetation more accurately. This enabled the completion of the site inspection in a timely manner. Using a vehicle however, does increase disturbance to any wildlife ahead of the vehicle which subsequently affected sightings of birds and reptiles.

Management of Native Grasslands

It will be better to undertake initial management actions in sections containing the best biodiversity values. Importantly, returning to a "managed" area each year is vital to ensure that the site has:

- Less weed cover
- Increased native species cover – specifically native grass and native herbaceous species

- Existing biodiversity assets are maintained.

The railroad corridor provides a cross-section of the native vegetation that existed prior to land clearance (although altered by the construction and maintenance of the railway line). The native vegetation changes along the corridor due to:

- Changing elevation
- Adjacent land use
- Soil type
- Aspect of vegetation to the sun
- Past construction, management and use of the railroad corridor.

These sections of the railroad corridor are variable in condition, but many areas contain an excellent diversity of native grass and herbaceous species. Of note is the relatively high cover abundance of summer active (C4) species present (Coolah grass, Curly Windmill grass, Kangaroo grass, Bottlewashers grass and Three-awned grass). If the various weed species present are reduced, it is likely that there will be an improvement in the condition of these grasslands.

In the past, some well-meaning projects by community groups, Local Governments, and schools in Australia have proceeded with the planting of trees and shrubs into native grasslands. It is important to remember that over 99% of South Australia's native grasslands have been cleared or severely compromised. Planting trees and shrubs into them will diminish an essential part of South Australia's natural heritage. Communities often look for sites to plant seedlings to commemorate events, however native grasslands are not the ideal area for revegetating with trees and shrubs, as when they reach maturity the grassland is no more and the species diversity is reduced. In this part of South Australia, there are many other areas (closer to Snowtown) where tree planting is more suitable. This corridor does provide revegetation opportunities in the most degraded sections identified during the survey. These sections are at the western end of the corridor as a result of the vegetation being cleared.

Management to Increase Native Grass Cover (and reduce annual weed grasses)

The management of weed species in native grasslands is a high priority and it is likely that there will be recruitment of native herbaceous species as a result of good weed control work. The need to ensure that there is no off-target damage to native species as a result of weed control work is vital. The right herbicide needs to be used at the correct label rate, along with the correct technique or application.

The potential spread of existing native shrub and tree species needs to also be carefully considered. It can be argued that the bushland is "recovering", when in fact the spread of shrubs etc is a reflection of the changes (generally) made by the current management of Australian landscapes. The increase in grazing animals (e.g. rabbits, hares, deer, and over-abundant native herbivores) can alter the composition of native vegetation, such that only non-palatable species increase over time.

It is important to note that the Priority Weeds listed, should be removed or reduced significantly before considering any plantings. Any plantings need to reflect the existing structure of remaining vegetation, e.g. no planting of shrubs and trees into native grasslands. Planting of appropriate herbaceous species (listed further into this plan), should initially be avoided to provide time for native species to appear. This will be somewhat dependent on the presence of seed of native herbaceous species in the soil seed bank.

The management of grasslands in the longer term, should aim to change the soil seedbank, from containing a high percentage of weed seed, to containing mostly native species seed.

Importantly, there is a growth of knowledge regarding the management of grasslands especially in the Eastern States of Australia. However many interstate trials have taken place in nutrient rich basaltic plains. In South Australia, many grasslands which still survive may only be found on lower nutrient soils.

One must keep in mind the *context* in which the remaining grasslands are still found. For the railroad corridor, the vegetation is more vulnerable to damage (e.g. invasion by weeds) due to the high "edge to area" effect.

The railroad itself is very weedy and many weeds have spread into the adjacent grasslands within the wider corridor (Photo 1). Adjacent land use may also affect the vegetation (e.g. accidental herbicide drift). Importantly, *inappropriate* weed management of the vegetation will contribute significantly in reducing its biodiversity.

Annual grass weeds are problematic and their control needs to be undertaken carefully. Work by Richard Davies found that 72% of weeds invading temperate grasslands and Grassy Woodlands are annual weeds (Davies R.J.P., 1997). His studies have continued to provide guidance in the management of native grasslands nearly 30 years on. His in situ *and* ex situ experiments provide useful information on the use of:

- slashing
- broadleaf herbicide
- grass specific herbicide
- fire

as management tools to decrease weed cover and increase native species cover.

Irongrass Environmental Rehabilitation Services also have considerable experience in managing grassland areas on several properties using a combination of slashing, and appropriate herbicide use. Much of the information from Richard Davies' work and subsequent publication has been used to good effect.

Of utmost importance is to not use *one method over a large area* without undertaking trials first. It is not uncommon for "unintentional" problems to arise following "large" area applications of various herbicides etc. By a considered assessment of the various weeds and their lifecycles (e.g. annual, perennial, bulb exhaustion etc), decisions can be made which will *at least* preserve native species which would then ideally set more seed and increase in cover abundance.

Using Grass Specific Herbicide

Assessing the grass weeds that are present on the site is vital before undertaking any work. We discovered that most weed grass species are *annual* species (with the exception of Rice Millet). That is, they grow in the cooler months and set seed in spring before dying off in summer. The seed then germinates following autumn/winter rains. By contrast, all the native grass species observed along the railroad corridor are perennial. These native perennial grasses can be divided further into warm season grasses (sometimes known as C4 grasses) and cool season grasses (C3). These aspects of the many native grass species present on the railroad corridor, provide opportunities for using the grass specific herbicide "Fusilade" to reduce annual grass weed infestations.

During the cold winter months, Fusilade (at 0.5 litre or 1 litre per hectare) has been shown to reduce annual grasses whilst having little to no effect on native grasses (Davies R.J.P. 1997). The concentration level of Fusilade used in his experiments was 212 g per litre ("neat" or before dilution from the container). It is vital that this be taken into account when using Fusilade, as there is range of Fusilade products available.

Annual weed grass control should begin in June – July, and to "err on the side of caution" by spraying at a rate of 0.5 litres per ha. This amount per hectare, will need to be calculated/calibrated – as best as is possible for spot spraying, so that the correct amount of herbicide is sprayed onto weed grasses. Using a dyemarker will also ensure that an area isn't accidentally double sprayed.

From the experiments undertaken by Richard Davies, all grasses were oversprayed – weed *and* native species. However, for the Barunga Gap railroad corridor, it is best to be cautionary - grass species actively growing in winter (C3 grasses) would be best avoided. These include *Rytidosperma*/*Austrodanthonia* (Wallaby Grass) and *Austrostipa* (Spear Grass) species. The aim is to have *RitidospermaAustrodanthonia* and *Austrostipa* grasses actively growing in winter over a wider area than is currently the situation. Active winter growing grasses will possibly aid in inhibiting annual weed germination. This may seem overly cautious, but experience has shown over the years that mistakes can be made in calibration of equipment *and* the operator (given that the spray unit being used may not spray at constant pressure).

When viewed in springtime, the C4 (summer active) grasses become more obvious as they begin to actively grow and to set seed. But during the winter, they are less active and may appear to be "dead". This helps to ensure that this group of native grass species are even less likely to be affected by Fusilade (at 0.5 litres or 1.0 litres per hectare) when used in June - July.

Vulpia sp (Silvergrass) is resilient to grass-specific herbicides. If present when other grass weeds are sprayed, this weed can proliferate very quickly. If this occurs, Glyphosate needs to be used to control this annual weed.

Should ***perennial*** weed grasses (e.g. Perennial Veldt Grass, Rice Millet Grass, Buffel Grass etc) establish along the corridor, action should be taken *before they set seed* to dig them out to prevent the infestation becoming large. If too large to dig out and remove, then grass specific herbicide will be required, as slashing alone will not reduce these weeds.

Use of Broad-Leaf Herbicides

Native grasslands normally contain a number of lilies (e. g. *Bulbine bulbosa*, *Dianella revoluta*), ground creepers (e.g. *Sida corrugata, Maireana enchylaenoides*) or small plants such as *Leiocarpa tomentosa*, or *Einadia nutans* etc. Whenever a broad-leaf herbicide is used, operators need to always search for and mark the locations of small herbaceous native plants, so that they are not accidentally sprayed.

If a grass-specific herbicide has been used previously, it is possible that broad-leaf weeds will germinate and fill the void left by the weed grasses. Weed spraying broad-leaf weeds may be needed to add value to the initial grass specific herbicide application. The probability of both actions (grass specific then broad-leaf herbicide) used in the same year may be difficult due to time constraints but is nevertheless important.

Many of the weeds listed along the railroad corridor will succumb to broad-leaf herbicides, however different herbicides may be better to target a certain group of weeds.

For instance:
Lontrel is very effective on *Scabiosa atropurpurea (*Pincushion) which has a deep root system;
Brush-off or Ally is effective on *Asphodelus fistulosus* (Wild Onion), *Asparagus asparagioides* (Bridal Creeper), (Pritchard. G.H. and Turnbull. K. 2002) as well as *Oxalis pes-caprae* (Soursob);
Garlon 600 is very effective on many broad-leaf weeds as well as woody weeds, as is KambaM, but may not be as useful for use on the above weeds.

Importantly, operators need to use a dye-marker to show what has been sprayed. At times a combination of herbicides is helpful. The labels for each herbicide need to be followed at all times. A surfactant needs to be included in the spray mix.

Slashing

This is frequently used by many Local Governments and landholders to maintain a tidy appearance along roadsides and small reserves. This is frequently done in October, November and into December to reduce fire hazards – *just when the majority of native grasses are setting seed*. Two slashes in an area in August and into September will give a reasonable level of success, that is - introduced annual grasses will produce less seed. If this is done over five or so years (twice each year), one should see an increase in native grass cover abundance (Davies R.J.P. 1997).

A walk through the area to be slashed to ascertain the weed species and to note native species (native herbaceous species will need to be avoided), will help operators form a decision about the most effective height to slash grass areas. No one slashing height will achieve a reduction in seed in all weed grass species, however in the first instance, slashing 15 cm above ground is effective for many of the taller annual grass weeds e.g. *Avena barbata* (wild oats). However lower growing weed grasses may not be affected. This is why a combination of actions each year (herbicide use and slashing) will achieve the best results.

In experiments undertaken by Davies R.J.P., (1997) shallow rooted broad leaf weeds such as *Carduus tenuiflorus* (Winged Slender Thistle) and *Echium plantagineum* (Salvation Jane) were slashed, but the effectiveness was increased with follow-up slashes, as these weeds re-grow quickly. This would apply to many of the broad-leaf weeds found on the railroad corridor. The use of broad leaf herbicides along with slashing will achieve better results – as long as *native* broad leaf plants are *avoided*.

Small annual grasses such as *Bromus rubens* (red brome) are best slashed lower. But consideration of the presence of other native species must be kept in mind. Some native species if slashed too low, may not recover and will subsequently die e.g. *Vittadinia sp* (New Holland Daisy), (Davies R.J.P. 1997). In such cases, the use of a brush-cutter or line trimmer may be needed to avoid native herbaceous species.

Use of Fire as a Management Tool

In his book “Managing the World’s Largest Estate” (Gammage, W., 2011), Gammage makes convincing arguments of the role of fire as used by the various First Nations of Australia. His research of archival histories reveals the observations of early European explorers – that they often observed fires being used somewhere in the landscape, to assist in the management of large game (kangaroos etc). This patchwork of burnt and unburnt land provided plentiful food for them. Gammage writes of the complexities of burning, and notes that First Nations peoples had intricate knowledge of what plant species and patches of bushland needed burning and what shouldn’t be burned.

Today the situation that the vegetation of the railroad corridor remains in, is a landscape that has been altered extensively. The corridor broadly represents a cross-section of the vegetation that once would have existed before Europeans arrived. One could ask, "is burning small areas along a corridor that is mostly less than 100 metres in width worthwhile?". Does it provide opportunities for cultural burning – given that it is vulnerable to many pressures already, due to its narrowness?

This question could be explored further by seeking information from First Nations peoples in the area and using their knowledge to decide if it would be worthwhile and of benefit to the native vegetation. Should a decision be made to burn, it would be important for local CFS volunteers to learn from the First Nations people about what to consider before undertaking a burn.

Davies J.P., (1997) considers several issues and points out the studies that other workers have completed, where different conclusions were found as to the effects of fire on several weed species. Fire was found to have different effects on different annual weed grass species. Fire used at the right time to affect *Briza maxima* or large quaking grass (late spring) in a patch of grassland resulted in a decline in numbers the following year (McMahon, 1991 in Davies J.P., 1997)).

However, McDougall (1989) (in Davies J.P.,1997) found that *Avena barbarta* (Wild Oats), *Bromus* hordeaceus (Soft Brome) and Vulpia *bromoides* (Silver Grass) were able to germinate, flower and shed seed only ten weeks after a springtime burn.

One can see that burning to increase native grass cover is fraught with variables such that a burn may have a chance of unintended consequences (increase in grass weeds and/or broad-leaved weeds). However, with good knowledge of the site's biodiversity and threats to it, before burning, along with the conditions (temperature, wind etc) on the day of burning being suitable, positive change might be gained. The importance of knowing what species (and their cover abundance) are present before burning, then monitoring the burn site after, are essential to ascertain the results of burning.

The effect of fire on the many herbaceous native species needs to be considered. Several species "retreat" underground and lie dormant as root tubers, before re-shooting following rains in cooler months. Fire may increase the numbers of such species. Other herbaceous species may not be favoured in the same way.

In summary, some grassland species will be favoured by using fire, whilst others will be disadvantaged. Annual weed species will also respond variably to fire. Burning undertaken by local First Nations people may provide opportunities for better outcomes for native grasslands.

Monitoring before and after taking actions

There are many ways of monitoring the condition (and management) of grasslands and grassy woodlands. However, time constraints often preclude undertaking a useful monitoring program. Yet monitoring the sites where any work has been undertaken, will provide very useful information as well as inform people involved in the railroad corridor management, of any improvements (or not), in the condition of the vegetation. For example, one native species might flourish as a result of weed control measures, but other native species may not benefit. A good monitoring program will assist in future management decisions.

Importantly, due to the many variables in weather each year, one must aim for *trends* in any changes that a monitoring program may provide.

The Nature Conservation Society of South Australia manages a monitoring program, named "Bushland Condition Monitoring". This program allows for (trained people) estimates of varying aspects of the vegetation (e.g. weed cover abundance, bare soil, etc) in a patch of vegetation. A permanent plot of 30 metres by 30 metres is established and the site is re-surveyed periodically. The first survey establishes the site, and data is recorded of plant species (via a Species List), grazing pressure etc. Further surveys in subsequent years (at a similar time of the year) enable workers to establish if improvements are being made.

There are several other monitoring programs that managers of the railroad corridor can explore. Officers in the Northern and Yorke Landscape Board may be able to suggest similar programs.

Responsibilities for Managing Weeds

The Wakefield Regional Council entered into a licence agreement memorandum with the Minister on 24th May 2022 to manage certain parcels of land which make up the Snowtown to Bute rail corridor. The agreement sets out the terms of management of the land including the responsibility for the control of animal and plant pests. Page 9, Section 23 of the agreement states that "The Licensee must, as is reasonably practical, control all animal and plant pests as required by the relevant authorities pursuant to the Native Vegetation Act 1991 (SA) and the Landscape South Australia Act 2019 (SA)."

Regardless, the community will need to be "on-board" with the management of the native vegetation within the corridor.

Whilst there are several legal responsibilities for adjacent landholders, it would seem best that a co-ordinated & combined approach will be needed, to responsibly and methodically control pests & weeds in both the rail & road reserves. A community working together will be far more effective, than placing more responsibilities onto landholders.

This will require; Landscapes SA, Wakefield Regional Council, consultants, adjoining landowners & interested landcare groups working together. It would be helpful to have a small committee to oversee management activities. This could be formed under the Wakefield Regional Council. The committee could then apply for further grant funding (which is often available) to undertake the management actions that this plan provides.

Vegetation Types and Management Zones

Vegetation Types have been categorised as best as possible. This survey of plant species has been done in a dry year and provides a "snapshot" of the vegetation. It is possible in grasslands, that the dominant species changes at particular times of the year. For example, *Austrostipa* (Spear grass) species may have a higher cover abundance during the winter months when it is more actively growing. All the native grasslands surveyed have summer active species which appeared to be the "dominant" species during fieldwork.

The name of the vegetation type or *association* helps to provide a *broad* description of what the dominant species are – that is, the species which appear to be most frequent and (in most cases), refers to the taller species present.

Grassland Management Zones

There are many similarities in the structure and species compositions of the grassland areas along the disused corridor. The management of weeds following our observations will also be similar. The following grassland associations were classified from our observations and include:

- ***Walwhalleya proluta* (Coolah Grass) and *Enteropogon acicularis* (Curly Windmill Grass) grassland – suitable for slashing using larger equipment.**
- ***Lomandra effusa* (Scented Irongrass) +/- *Bothriochloa macra and Themeda triandra* grassland – suitable for slashing with a brushcutter.**
- ***Themeda triandra* Kangaroo Grass grassland – suitable for slashing with a brushcutter.**

Refer to Map 1: Barunga Gap Rail Corridor – Vegetation Zones mapped in October 2024 page 28. Grasslands marked in Green

We observed a subtle change in grasslands along the railroad corridor as elevation increased. There are more individual *Lomandra effusa* (Scented Irongrass), an increase in *Themeda triandra* as well as occasional shrubs, such *Acacia ligulata* (Umbrella Bush) and *Pittosporum angustifolium* (Native Apricot) plants, however it is for the most part a native grassland.

Whilst there are some woody weeds (olives, peppertrees, boxthorns), the importance of managing to *increase* native grass cover and *reducing* introduced annual grasses is a high priority. This will take several years of consistent management to occur. The variation of rainfall each year, as well as the varying *time* of year that rain falls, will greatly influence the results of management (visually). Refer to the section "Management to Increase Native Grass Cover" section on page 9.



Photo 1 – Unflattering photo of the weedy disused rail line within the Grassland Management Zone. Either side of the rail line does contain good examples of native grassland.



Photo 2 - *Lomandra effusa* (Scented Irongrass) Open grassland

Weed Control Recommendations

Introduced Annual Grass Weed Species

Avena barbarta	Wild oats
Bromus rubens	Red Brome
Bromus diandrus	Great Brome
Hordeum marinum	Sea Barley-grass
Brachypodium distachyon	False Brome

The control of the above annual grass weeds *amongst native grasses* is discussed on Page 10 in the section titled "Use of Grass Specific Herbicides"

Highest Priority Weeds (as infestations are "small")

Lycium ferocissimum	African Boxthorn
Pinus halapensis	Aleppo Pine
Rapistrum rugosum	Turnip Weed
Piptatherum miliaceum	Rice Millet
Olea europaea	Olive
Schinus molle	Pepper Tree

High Priority Weeds

Asphodelus fistulosus	Wild Onion
Asteriscus spinosus	Golden Pallenis
Cynara cardunculus	Artichoke Thistle
Murrubium vulgare	Horehound
Scabiosa atropurpurea	Pincushion
Solanum elaeagnifolium	Silver-leaf Nightshade

Lower Priority Weeds

Solanum nigrum	Blackberry Nightshade
Oxalis pes-caprae	Soursob

Planting Grassland Species in Future Years for Educational Purposes

Should resources become available, some careful revegetation to highlight the beauty of native grasslands be considered. To aid in the management of any planting (of the species listed below this paragraph), it is recommended that small areas be fenced (to reduce grazing) and large numbers of the listed species planted. Small areas (5 x 5 metres) will initially require careful management after planting by well-trained operators.

The *aim* is to eradicate all weeds in the 5 x 5 metre area, but retain native grasses and planted species so that an "ideal" example of a diverse native grassland is created. These small areas (or planting "pods") also provide an educational opportunity for trail users. Interpretive signage could be used to showcase the beauty of native grasslands at various times of the year. Only locally collected seed should be used to propagate seedlings and native grasses should be retained when preparation for planting takes place.

Each planting "pod" could include (if seedlings are available) –

Arthropodium strictum	Common Vanilla-lily
Atriplex semibaccata	Berry Saltbush
Bulbine bulbosa	Golden Lily
Calocephalus citreus	Lemon Beauty Heads
Calostemma purpuream	Garland Lily
Chrysocephalum apiculatum	Common Yellow Button
Chrysocephalum semmipapposum	Clustered everlasting
Dampiera rosmarinafolia	Native Rosemary
Dianella revoluta	Black-anther Flax-lily
Einadia nutans	Climbing Saltbush
Goodenia albiflora	White Goodenia
Goodenia pinnatifida	Cut-leaf Goodenia
Leiocarpa tomentosa	Woolly Plover-daisy
Lomandra effusa	Scented Irongrass
Lomandra multiflora ssp. dura	Many-flower Mat-rush
Ptilotus angustifolia	Regal Fox-tails
Ptilotus spathulatus	Pussy-tails
Scaevola humilis	Sandplain Fan-flower
Vittadinia species	New Holland Daisy
Wahlenbergia species	Bluebells



Photo 3 – *Enteropogon acicularis* (Curly Windmill Grass) grassland +/- *Walwhalleya proluta* (Coolah Grass) along with the small patch of *Callitris gracilis* (Southern Cypress Pine) woodland in the distance. Note the annual weed grasses amongst the drier looking (but soon to be active summer active C4 native grasses).

Shrubland and Drooping Sheoak Woodland Management Zones

There are many similarities in the structure and species compositions within the shrubland areas as well as in the Drooping Sheoak woodlands. There is also a large variation in the quality of native vegetation. Some parts are very weedy, whilst other parts have few weeds and a high diversity of herbaceous species.

The following associations were classified (from our observations) and include:

- ***Eremophila longifolia* (Weeping Eumbush) Tall Open Shrubland.**
- ***Senna artemisioides ssp coriacea* (Broad-leaf Desert Senna) and *Eremophila longifolius* (Weeping Emubush) Shrubland**
- ***Acacia pycnantha* (Golden Wattle) Tall Open Shrubland**
- ***Allocasuarina verticillata* (Drooping Sheoak) Woodland**

Refer to Map 1: Barunga Gap Rail Corridor – Vegetation Zones mapped in October 2024 page 28. Shrublands and Woodlands marked in Blue

The vegetation in these management zones contain several taller shrub species, which along with Drooping Sheoak woodlands contain a diverse understorey. Many of the same species that are in the grassland areas are present, but there are also many species *not found in* native grasslands along the corridor. The adjacent roadside also contains good vegetation in a similar condition and could be managed in the same way as for the railroad reserve.



Photo 4 - *Eremophila longifolia* (Weeping Eumbush) Tall Open Shrubland.

Unfortunately, the presence of *Asparagus asparagoides* (Bridal Creeper) is of major concern. This weed species outcompetes nearby native plants due to its dense foliage and tuberous root system. In research undertaken prior to 2002, bridal creeper was recorded as having 87% of its biomass in the underground root system when it is flowering and at full leaf stage (Pritchard. G.H. and Turnbull. K. 2002). Over time, the proliferation of this weed simplifies the native vegetation.

It is difficult to eradicate Bridal Creeper without damaging nearby native species. The use of a low rate of Metsulfuron Methyl (e.g. Brush-off, Ally) at 0.10g per 5 litres of water has proven to be effective in the first year of weed control. The aim is to "calibrate" the rate at 5 grams per hectare. Weedspraying of bridal creeper should occur from late July to late September for maximum effect. A surfactant is needed to ensure success. The infestation will require a number of years to eradicate. Care must be taken to not "double spray", and to avoid native species as much as possible. Using a vegetable dyemarker will assist in achieving this. Using Metsulfuron methyl requires patience as it is slow acting. Its full effects are realised the following year. Metsulfuron methyl is residual for up to 22 months in Australian soils. In the second year of control, it can be more effective to use Glyphosate. Professional Bush Regeneration contractors are frequently contracted to undertake control of this weed species.

A number of *Eucalytptus cladocalyx* (Sugar Gums) were planted along the adjacent roadside and are now spreading into the railroad corridor. These seedlings and saplings should be removed.



Photo 5 – Bridal creeper infestation amongst native vegetation.



Photo 6 – *Ptilotus angustifolius* (Regal Fox-tails) beginning to flower

Introduced Annual Grass Weed Species

Avena barbarta	Wild oats
Brachypodium distachyon	False Brome
Bromus diandrus	Great Brome
Bromus rubens	Red Brome
Hordeum marinum	Sea Barley-grass

The control of the above annual grass weeds *amongst native grasses* is discussed on Page 10 in the section titled "Use of Grass Specific Herbicides"

Highest Priority Weeds (as infestations are "small")

Euphorbia terracena	False Caper
Lycium ferocissimum	African Boxthorn
Olea europaea	Olive
Pinus halapensis	Aleppo Pine
Piptatherum miliaceum	Rice Millet
Schinus molle	Pepper Tree

Other High Priority Weeds

Asparagus asparagoides	Bridal Creeper
Asphodelus fistulosus	Wild Onion
Asteriscus spinosus	Golden Pallenis
Cynara cardunculus	Artichoke Thistle
Murrubium vulgare	Horehound
Scabiosa atropurpurea	Pincushion
Solanum elaeagnifolium	Silver-leaf Nightshade

Lower Priority Weeds

Oxalis pes-caprae	Soursob
Rapistrum rugosum	Turnip Weed
Salvia verbenaca	Wild Sage
Solanum nigrum	Blackberry Nightshade

Planting seedlings in Future Years

Following weed control and other management actions, there may or not be a need for planting of species that are low in numbers. Should the species mentioned below, not increase in numbers of individuals, it will be worthwhile to boost their numbers.

Plantings in this zone should only be undertaken after weed control work has been done for a several years. There is little need for any plantings of existing species in the Shrubland or Woodland Zones. However, some species are very low in number and could be increased. Planting should only take place in degraded patches (weed dominated) of which there are many. There are several additional species (not found in the grassland areas to the east) included in the list below. For example, *Ptilotus angustifolius* (Regal Fox-tails) occurs within the zone, but only 6 or 7 individual plants were observed.

Of note is the presence of *Minuria leptophylla* (Minnie Daisy), (of which only 8 individual plants were observed) as well as two individual plants of *Lomandra collina* (Sand Mat-rush). Building up the number of these species would increase their longer-term presence into the future and could be planted outside of planting "pods" (should that option be undertaken).

Small fenced areas (or planting "pods") could once again be constructed and high numbers of these smaller species used including the species that are low in numbers. Again, only locally

collected seed should be used to propagate seedlings. However, for species where only small numbers continue to survive, obtaining seed from next closest population will be help maintain genetic diversity.

Each 5 metre by 5 metre planting "pod" should include (if possible) -

Arthropodium fimbriatum	Nodding Vanilla-Lily
Arthropodium strictum	Common Vanilla-lily
Bulbine bulbosa	Golden-lily
Dianella revoluta	Black-anther Flax-lily
Goodenia albiflora	White Goodenia
Lomandra collina	Sand Mat-rush
Lomandra densiflora	Soft Tussock Mat-rush
Lomandra multiflora ssp. dura	Many-flower Mat-rush
Minuria leptophylla	Minnie Daisy
Ptilotus angustifolius	Regal Fox-tails
Stackhousia monogyna	Creamy Candles



Photo 7 – *Minuria leptophylla* (Minnie Daisy)



Photo 8 – *Lomandra collina* (Sand Mat-rush)

***Eucalyptus porosa* (Mallee Box) Woodland Zones**

Refer to Map 1: Barunga Gap Rail Corridor – Vegetation Zones mapped in October 2024 page 28. Porosa Woodlands marked in Purple

The Barunga Gap Road intersects with Barunga Top Road, at the Barunga Gap location. The railroad corridor also intersects the road providing a wider area of native vegetation. From this location westwards the vegetation is mainly *Eucalyptus porosa* (Mallee Box) woodland, as well as *Eucalyptus porosa* (Mallee Box) Open woodland along with several areas of Open Grassland vegetation which includes a small patch of *Lomandra effusa* (Scented Mat-Rush) Open Grassland.

The wider area of Mallee Box woodland at Burunga Gap contained many *Pinus halapensis* (Aleppo Pine) which were to be cut down in the following weeks after the fieldwork in preparation for this Management Plan.

This area contained several shrub species including *Acacia pycnantha* (Golden Wattle), *Rhagodia parabolica* (Mealy Saltbush) as well as two individual *Cassinia arcuata* (Drooping Cassinia).

Of interest too is the presence of ***Eucalyptus porosa* (Mallee Box) Woodland** in adjacent privately-owned land as well as Council dedicated Crown-land. These could be managed to complement the work being done along the railroad corridor and could form a larger node of vegetation.

Highest Priority Weeds (as infestations are "small")

Asparagus asparagoides	Bridal Creeper
Lycium ferocissimum	African Boxthorn

Opuntia sp.	Cactus
Pinus halapensis	Aleppo Pine
Schinus molle	Pepper Tree

High Priority Weeds

Asphodelus fistulosus	Wild Onion
Asteriscus spinosus	Golden Pallensis
Solanum elaeagnifolium	Silver-leaf Nightshade

Lower Priority Weeds

Avena barbarta	Wild oats
Oxalis pes-caprae	Soursob
Salvia verbenaca	Wild Sage

Heavily Degraded Zones – Revegetation Areas

Refer to Map 1: Barunga Gap Rail Corridor – Vegetation Zones mapped in October 2024 can be found on page 28. Heavily Degraded and Revegetation Areas marked in Yellow

There are two areas that would be suitable for revegetation, as they are *very* degraded. A small area just before the intersection with Barunga Tops Road, has had many *Pinus halapensis* (Aleppo Pine) cut down and removed (but many more still remain). The second area is much larger and is degraded for many reasons. This area contains a very bad infestation of Silver Leaf Nightshade (*Solanum elaeagnifolium*) as well as Caltrop *(Tribulus terrestris)*. It will take a number of years to control these weeds, which if left alone would have enough cover abundance to prevent the success of any revegetation efforts.

Revegetation is somewhat controversial in the context of nearby grasslands. However, these two areas are so degraded that (given that nearby areas contain woodlands) revegetation is appropriate. One aspect of direct-seeding and tubestock planting that needs to be remembered is that it is a *beginning* of a management program. Often people think that it is a "one-off" management approach. But to achieve maximum value for biodiversity there are several key points to be aware of;

- Use seed from local areas where there are good populations of the target species to be collected
- Use seed collected from as many individual plants as possible
- Weed control needs to occur on an annual basis, using broad-leaf herbicides along with slashing of annual weed grasses (this will assist in native grass re-establishment)
- Be prepared to "cull" seedlings if/when they are growing too close together
- Look at surrounding areas to identify the distances and groupings of different species
- Plant seedlings of the smaller herbaceous species in later years, into weed free areas only

It should be expected in any successfully germinated direct-seeding effort, that there will be a need to cull several times as the site develops.

For both "degraded" areas, the aim should be to create a ***Eucalyptus porosa*** **(Mallee Box) Woodland.** Open areas are a feature of this vegetation type with many herbaceous and grass species making up the bulk of the understorey. If direct-seeding is successful, it will be worthwhile to manage the site to emulate the nearby intact vegetation by **allowing**:

- Mallee Box trees to develop an open crown, allowing lateral branches to develop which if broken off in high wind, will begin to form hollows
- Herbaceous species to germinate or be planted into open areas

- Prevent possible management problems in the future regarding accessibility to the site.

One can gain an idea of how far apart trees naturally are by observing distances between trees in any nearby **mature** *Eucalyptus porosa* (Mallee Box) Woodland. The area covered by the canopy of single old trees can be measured in tens of metres!

Importantly, if trees grow too close together, there will be a delay in the development of hollows in future years. If trees are growing too close together, they are less likely to grow lateral branches (which may break off and provide potential hollow formation). Management of trees in the revegetation, to develop hollows (by culling/reducing plants numbers when too thick etc.) adds great value to any revegetation.



Photo 9 - West of Barunga Gap, showing a degraded area infested in many annual weed grasses and *Solanum elaeagnifolium* (Silver-leaf Nightshade).
Note that the trees on either side are *Eucalyptus porosa* (Mallee Box).

Small areas of Vegetation Types

Callitris gracilis (Southern Cypress Pine) woodland

There is a very small patch of *Callitris gracilis* woodland in amongst a larger patch of native grassland. A slight increase in species diversity was observed. Also, this was the only part of the corridor where *Euphorbia terracena* (False Caper) was found in large numbers. This should be terminated before it sets seed if possible.

This woodland will increasingly provide potential nesting sites for local birds. It may be tempting to increase this area by planting more *Callitris gracilis* however, given that grasslands are poorly conserved in South Australia, this would be a questionable action to take.

Refer to Map 1: Barunga Gap Rail Corridor – Vegetation Zones mapped in October 2024 page 28. Callitris Woodland marked in Red



Photo 10 – *Callitris gracillis* (Southern Cypress Pine)

***Eucalyptus camaldulensis* (River Red Gum) woodland**

Small patches of ***Eucalyptus camaldulensis* woodland** are found growing along small creeklines, which flow from the Hummocks Hills. They would only flow very heavy rain events. They do provide enough water for River Red Gums to flourish.

This species has a potential to decrease the diversity in nearby grassland areas. In a wetter year, many seedlings are able to establish, to an extent that the diversity of native herbaceous species will be reduced. Should seedlings of this tree species begin to increase further from its existing habitat, consideration should be given to culling seedlings (only).

River Red Gum Woodlands are productive areas for birdlife (e.g. more insects etc), thereby providing valuable habitat. Unfortunately, a range of weeds can be found there too – both woody and herbaceous species. The areas of this woodland may be small, but also provide good sites for weeds to become established. For instance, many African Boxthorn were found under River Red Gums.

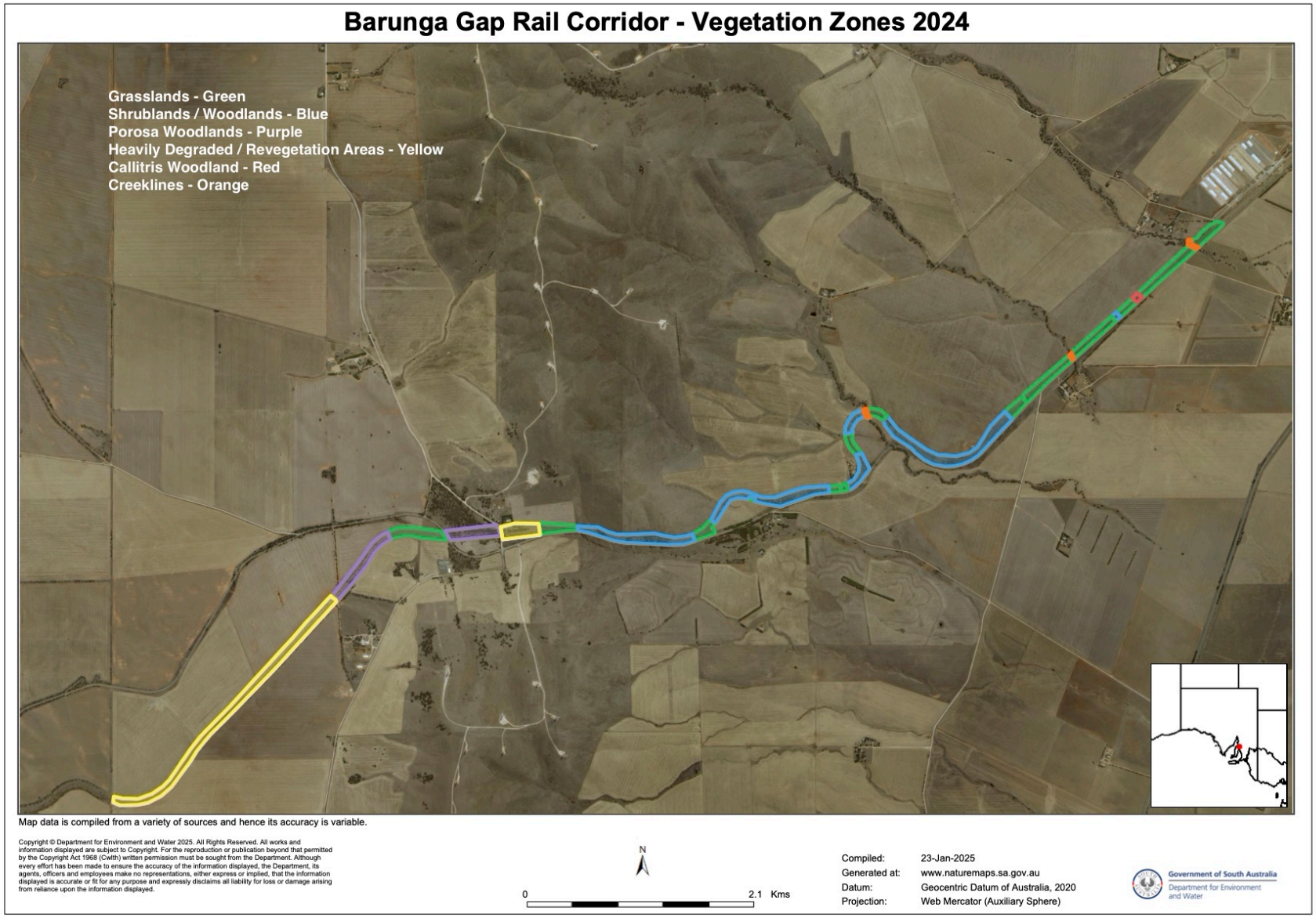
A further survey was undertaken by Adrian Shackley along several creeklines, inside and outside of the railroad corridor in the summer of 2024/25. The species observed by Adrian are shown in Table 1 on page 32 under the columns marked with the names of the creek.

Refer to Map 1: Barunga Gap Rail Corridor – Vegetation Zones mapped in October 2024 page 28. Creeklines marked in Orange

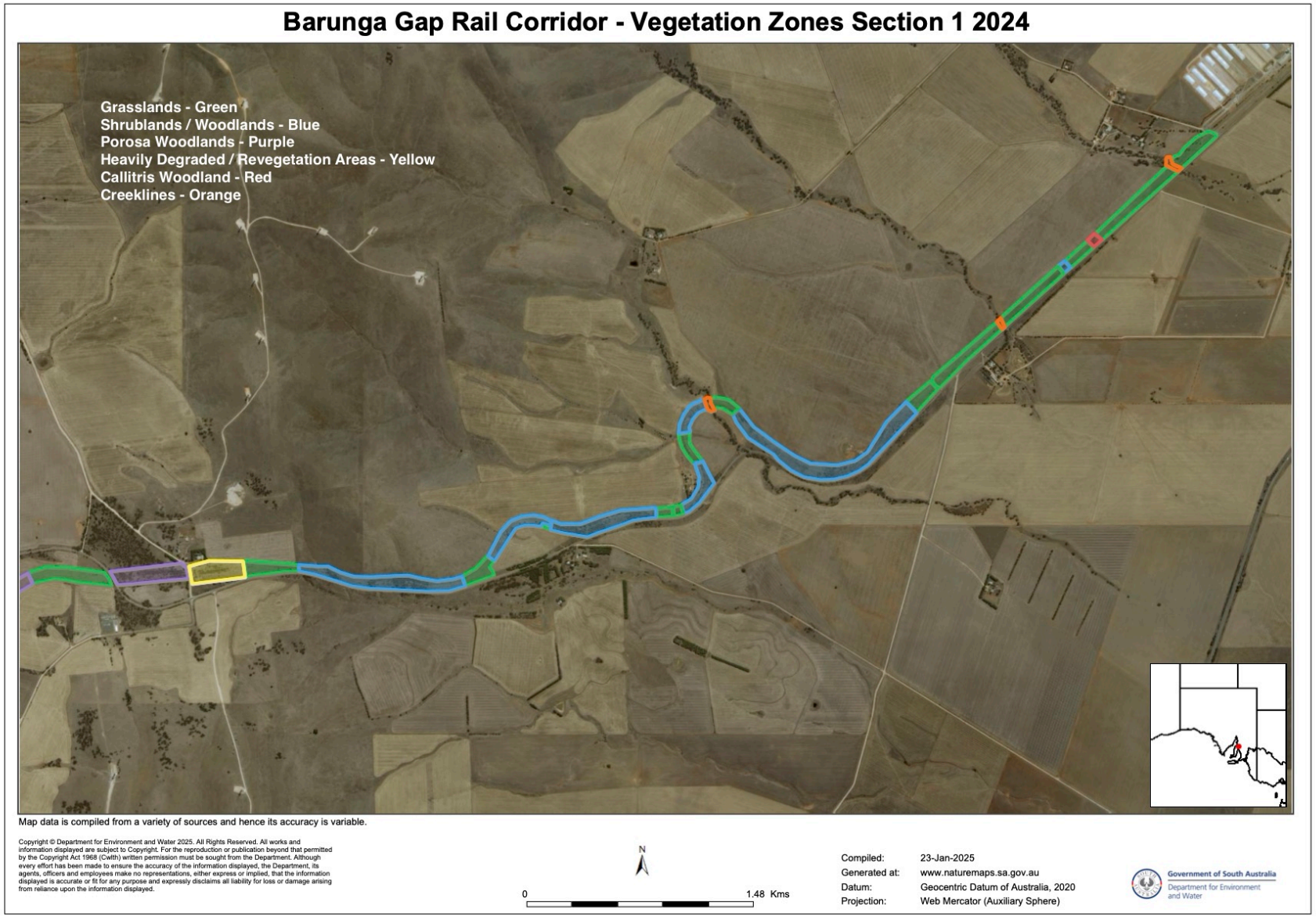


Photo 11 – *Eucalyptus camaldulensis* (River Red Gum) with boxthorn understorey

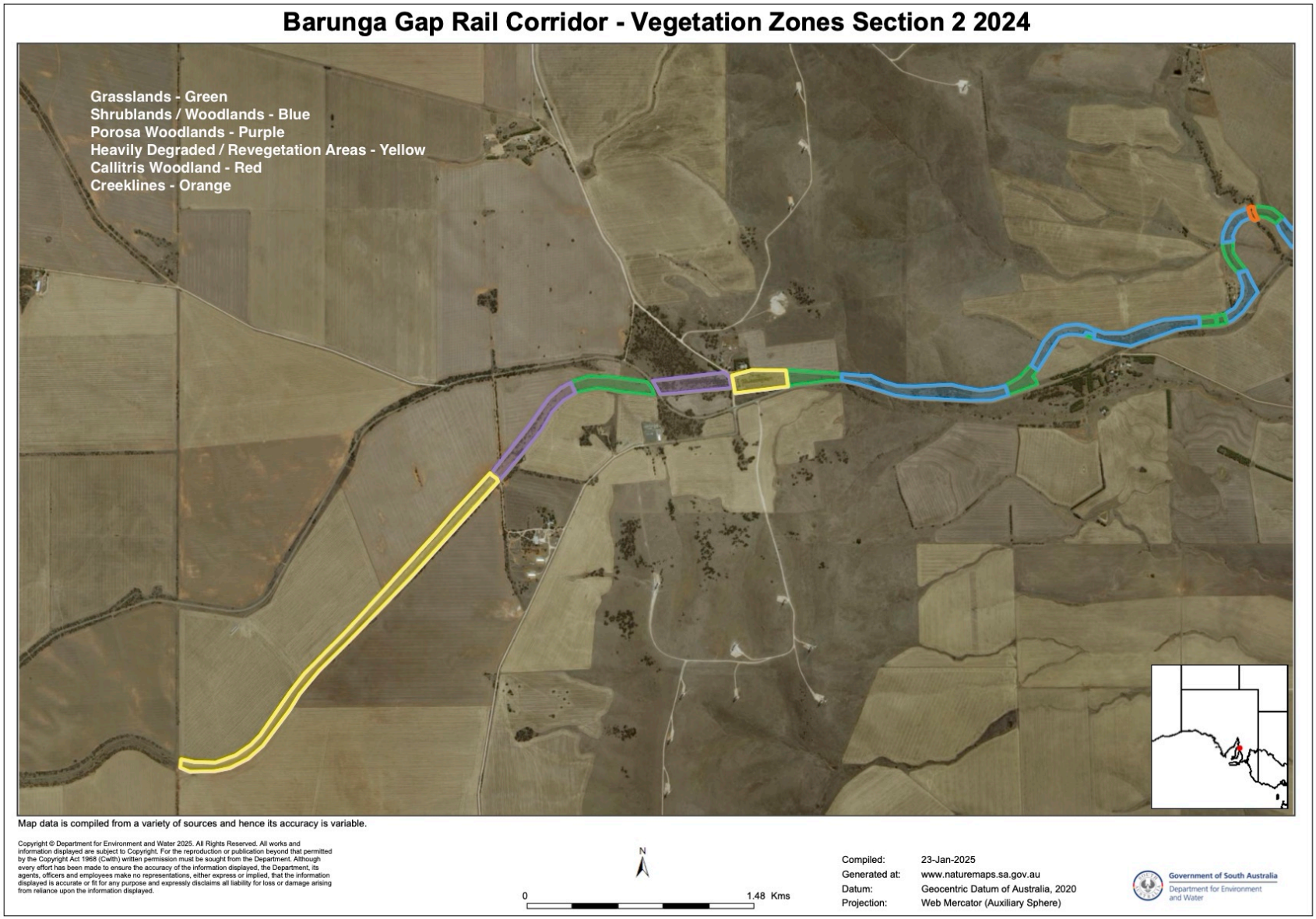
Map 1: Barunga Gap Rail Corridor – Vegetation Zones mapped in October 2024



Map 2: Barunga Gap Rail Corridor – Vegetation Zones Section 1 mapped in October 2024 (Larger Scale than Map 1)



Map 3: Barunga Gap Rail Corridor – Vegetation Zones Section 2 mapped in October 2024 (Larger Scale than Map 1)



Map 4: Locations of Uncommon Plant Species

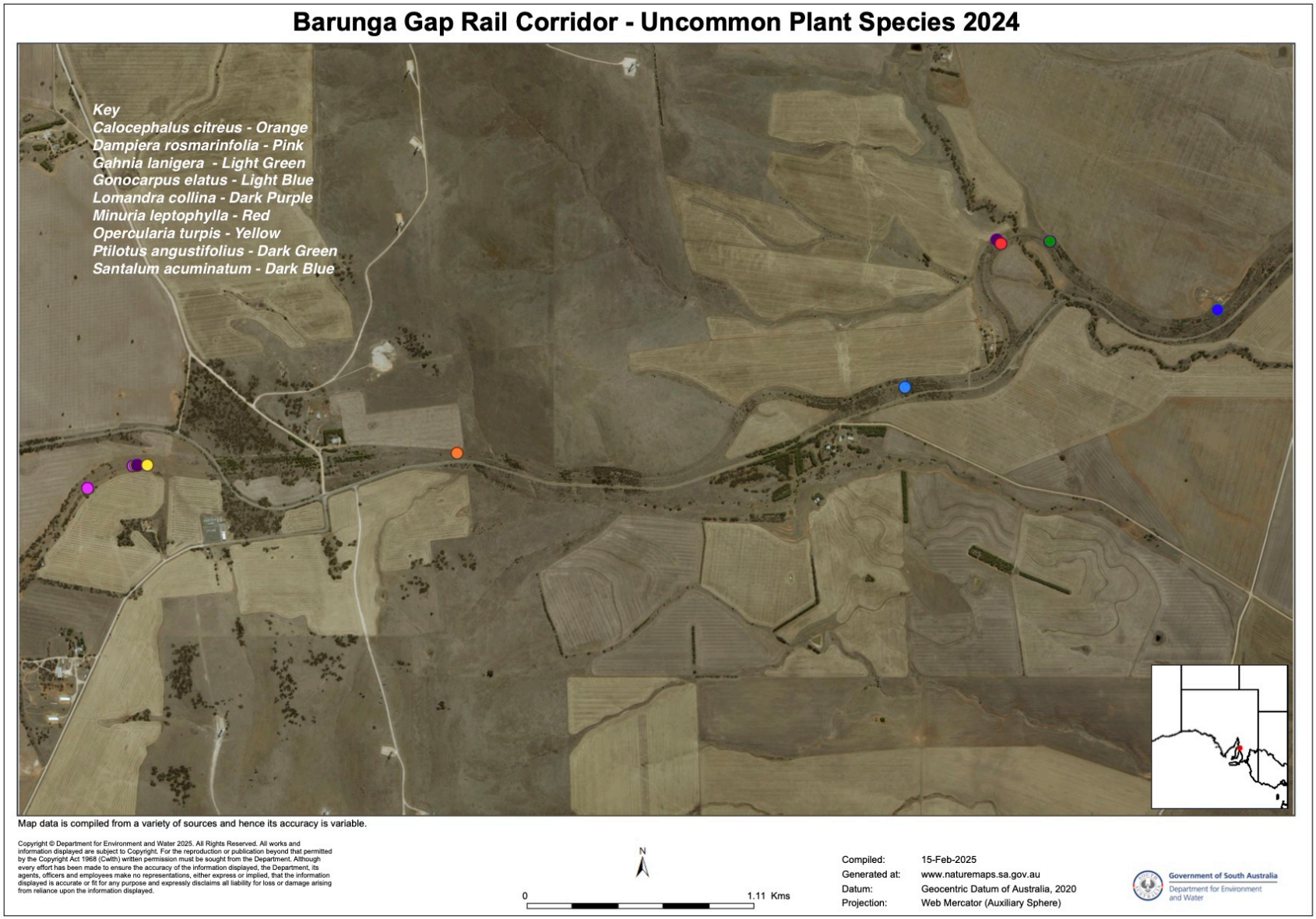


Table 1: Combined Species List by Andrew Allanson and Adrian Shackley.

Green highlight are species identified by Adrian Shackley, columns 3 - 6 denotes Botanical Zones and conservation ratings, columns 7 – 13 are Vegetation Associations.

SPECIES	COMMON NAME	AUS	SA	NY region rating	St Vincent sub-region	Walwhalleya	Lomandra effusa	Themeda	Senna & Eremophila	Allocasuarina woodland	Acacia pycnantha	Eucalyptus porosa
Acacia ligulata	Dune Wattle			LC	LC		✓		✓			
Acacia pycnantha	Golden Wattle			LC	LC		✓	✓	✓	✓	✓	✓
Acacia salacina	Willow Wattle			LC	NT				✓			
Acacia victoriae ssp. victoriae	Elegant Wattle			LC	LC	✓			✓			
Allocasuarina verticillata	Drooping Sheoak			LC	LC	✓	✓	✓	✓	✓		
Aristida behriana	Brush Wire-grass			LC	LC	✓	✓	✓	✓			✓
Aristida contorta	Keroseene Grass			LC	LC		✓		✓			✓
Arthropodium fimbriatum	Nodding Vanilla-lily			NT	LC							
Arthropodium strictum	Common Vanilla-lily			NT	LC	✓	✓	✓	✓	✓	✓	
Asperula conferta	Common Woodruff			NT	RA	✓						
Atriplex semibaccata	Berry Saltbush			LC	LC	✓	✓			✓		
Atriplex stipitata	Bitter Saltbush			LC	LC							✓
Austrostipa blackii	Crested Spear-grass			NT	LC							
Austrostipa drummondii	Cottony Speargrass			LC	LC	✓	✓	✓		✓		
Austrostipa elegantissimma	Feather Speargrass			LC	LC					✓		
Austrostipa eremophila	Rusty Spear-grass			LC	LC							
Austrostipa nodosa	Tall Spear-grass			LC	LC							
Austrostipa spp	Spear Grass					✓	✓	✓	✓	✓		✓
Boerhavia dominii	Tar-vine			RA	RA							
Bothriochloa macra	Red-leg Grass			no record	no record	✓	✓	✓				
Bulbine bulbosa	Bulbine-lily			RA	EN	✓		✓	✓		✓	

SPECIES	COMMON NAME	AUS	SA	NY region rating	St Vincent sub-region	Walwhalleya	Lomandra effusa	Themeda	Senna & Eremophila	Allocasuarina woodland	Acacia pycnantha	Eucalyptus porosa
Bursaria spinosa	Sweet Bursaria			LC	LC		✓		✓			
Calocephalus citreus	Lemon Beauty-heads			NT	DD			✓				
Calostemma purpureum	Pink Garland-lily			NT	LC	✓		✓				
Callitris gracilis	Southern Cypress Pine			NT	NT				✓			✓
Cassinia arcuata	Droopiing Cassinia			NT	NT							✓
Cheilanthes austrotenuifolia	Rock Fern			LC	LC			✓				
Chrysocephalum apiculatum	Common Everlasting			LC	LC			✓		✓		
Chrysocephalum semipapposum	Clustered Everlasting			LC	LC				✓			
Convululus sp	Convolvulus			LC	LC	✓	✓	✓	✓	✓		
Cullen australascicum	Tall Scurf-pea			RA	VU	✓	✓	✓				
Cyperus gymnocaulus	Spiny Flat-sedge			NT	LC	✓						
Dampiera rosmarinfolia	Rosemary Dampiera (WP 1409)(WP 1745)			RA	NT		✓					
Dianella revoluta	Black Anther Flax-Lily			LC	LC	✓	✓	✓	✓	✓	✓	✓
Dodonaea spatulata ssp spatulata	Sticky Hop-bush			LC	LC					✓		
Einnadia nutans	Climbing Saltbush			LC	LC	✓	✓					
Enchylaena tomentosa var.	Ruby Saltbush			LC	LC	✓		✓	✓	✓		✓
Enchylaena tomentosa prostrate	Ruby Saltbush			LC	LC							
Enneapogon nigricans	Black-head Grass			LC	LC	✓	✓	✓	✓		✓	✓
Enteropogon acicularis	Umbrella Grass			LC	LC	✓	✓	✓				✓
Eremophila longifolia	Weeping Emubush			LC	LC	✓	✓	✓	✓			✓
Erodium crinitum	Blue Heron's-bill			LC	LC	✓	✓	✓				
Eucalyptus camaldulensis	River Red Gum			RA	LC	✓						
Eucalyptus porosa	Mallee Box			LC	LC		✓					✓
Gahnia lanigera	Black Grass Sword Sedge (WP 1741)			NT	LC		✓					
Euphorbia drummondii	Caustic euphorbia			LC	LC							

SPECIES	COMMON NAME	AUS	SA	NY region rating	St Vincent sub-region	Walwhalleya	Lomandra effusa	Themeda	Senna & Eremophila	Allocasuarina woodland	Acacia pycnantha	Eucalyptus porosa
Geranium sp	Geranium							✓				
Gonocarpus elatus	Hill Raspwort			NT	LC			✓		✓		
Goodenia albiflora	White Goodenia			RA	VU	✓		✓	✓	✓		
Haloragis aspera	Rough Raspwart			NT	RA	✓		✓	✓	✓		
Leiocarpa tomentosa	Woolly Ixiolaena			NT	RA	✓	✓		✓			
Lepidosperma viscidum	Sword Sedge			LC	LC	✓		✓	✓		✓	
Lomandra collina	Sand Mat-rush			LC	LC		✓			✓		
Lomandra densiflora	Soft Tussock Mat-rush			NT	RA		✓	✓	✓	✓	✓	
Lomandra effusa	Scented Mat-rush			LC	LC	✓	✓	✓	✓	✓		✓
Lomandra multiflora ssp. dura	Hard Mat-rush			LC	LC	✓	✓	✓	✓	✓	✓	✓
Lysiana exocarpi	Harlequin Mistletoe			LC	LC				✓			
Maireana aphylla	Cotton-bush			LC	LC	✓	✓	✓	✓			
Maireana brevifolia	Short-leaf Bluebush			LC	LC	✓			✓			✓
Maireana enchylaenoides	Wingless Fissure-plant			LC	LC	✓	✓	✓				
Maireana rohrlachii	Rohrlach's Bluebush		R	VU	VU	✓		✓	✓	✓		
Melalueca lanceolata	Dryland Ti-tree			NT	NT							✓
Minuria leptophylla	Minnie Daisy			LC	LC					✓		
Muehlenbeckia florulenta	Lignum			RA	VU	✓		✓				
Olearia lepidophylla	Club-moss Daisy-bush			no rating					✓			
Opercularia turpis	Twiggy Stinkweed (Way Pt 1740)			NT	LC		✓					
Oxalis perennans	Native sorrel			LC	LC	✓		✓	✓		✓	
Pimelea micrantha	Silky Riceflower			NT	RA	✓	✓	✓	✓	✓		
Pittosporum angustifolium	Native Apricot			LC	LC	✓		✓	✓	✓		✓
Plantago sp (gaudichaudii)	Narrow-leaf Plantain			NT	VU			✓				
Pomaderis paniculosus	Inland Pomaderris			LC	LC				✓	✓		

SPECIES	COMMON NAME	AUS	SA	NY region rating	St Vincent sub-region	Walwhalleya	Lomandra effusa	Themeda	Senna & Eremophila	Allocasuarina woodland	Acacia pycnantha	Eucalyptus porosa
Ptilotus angustifolius	Yellow-tails		E	EN?	EN?	✓	✓		✓			
Rhagodia parabolica	Mealy Saltbush			LC	LC	✓						✓
Rytidosperma sp	Common Wallaby-grass					✓	✓	✓	✓	✓		✓
Rytidosperma caespitosum	Common Wallaby-grass			LC	LC							
Salsola tragus	Buckbush			LC	LC	✓	✓		✓			
Santalum acuminatum	Quondong			LC	LC		✓		✓			
Scaevola humilis	Inland Fan-flower			NT	RA				✓	✓		
Senna artemisioides sp. (petiolaris)	Desert senna			NT	LC		✓					✓
Senna artemisioides ssp coriacea	Broad-leaf Desert Sen			LC	LC		✓					✓
Setaria constricta	Knobby But-grass			LC	RA	✓	✓		✓	✓		
Sida corrugata	Corrugated Sida			LC	NT		✓		✓			
Stackhousia monogyma	Creamy Candles			NT	LC			✓	✓	✓	✓	
Teucrium racemosum	Grey Germander			LC	LC			✓				
Themeda triandra	Kangaroo Grass			LC	LC		✓	✓		✓	✓	✓
Velleia arguta	Toothed Velleia			RA	RA				✓	✓		
Vittadinia blackii	Narrow-leaf New Holla			LC	LC	✓		✓	✓	✓		✓
Vittadinia gracilis	Woolly New Holland Daisy			LC	LC					✓		✓
Walwhalleya proluta	Rigid Panic			NT	LC	✓		✓	✓	✓	✓	
Zygophyllum aurantiacum	Shrubby Twin-leaf			RA	RA			✓	✓			

Table 2: Combined Species List by Andrew Allanson and Adrian Shackley – Species found in Creeklines

SPECIES	COMMON NAME	Koolchunga Creek	Kooliata Creek	Barunga Creek
Acacia pycnantha	Golden Wattle	1	1	
Aristida behriana	Brush Wire-grass	1	1	1
Aristida contorta	Keroseene Grass	1		
Arthropodium fimbriatum	Nodding Vanilla-lily	1	1	upstream
Arthropodium strictum	Common Vanilla-lily	1		
Atriplex semibaccata	Berry Saltbush	1	1	
Atriplex stipitata	Bitter Saltbush		1	
Austrostipa blackii	Crested Spear-grass	1	1	1
Austrostipa elegantissimma	Feather Speargrass	1		1
Austrostipa eremophila	Rusty Spear-grass	1		
Austrostipa nodosa	Tall Spear-grass		1	
Austrostipa spp	Spear Grass		1	1
Boerhavia dominii	Tar-vine	1	1	1
Bothriochloa macra	Red-leg Grass			upstream
Cyperus gymnocaulus	Spiny Flat-sedge	1		1
Einnadia nutans	Climbing Saltbush	1	1	1
Enchylaena tomentosa var.	Ruby Saltbush	1	1	1
Enchylaena tomentosa prostrate	Ruby Saltbush	1		
Enneapogon nigricans	Black-head Grass	1	1	1
Enteropogon acicularis	Umbrella Grass	1	1	1
Eucalyptus camaldulensis	River Red Gum	1	1	1
Eucalyptus porosa	Mallee Box	1	1	
Haloragis aspera	Rough Raspwart			upstream
Lomandra densiflora	Soft Tussock Mat-rush	1		
Lomandra effusa	Scented Mat-rush	1	1	upstream
Lomandra multiflora ssp. dura	Hard Mat-rush	1	1	upstream

SPECIES	COMMON NAME	Koolchunga Creek	Kooliata Creek	Barunga Creek
Lysiana exocarpi	Harlequin Mistletoe			
Maireana aphylla	Cotton-bush		1	
Maireana brevifolia	Short-leaf Bluebush	1	1	1
Maireana rohrlachii	Rohrlach's Bluebush		1	
Muehlenbeckia florulenta	Lignum			1
Opercularia turpis	Twiggy Stinkweed (Way Pt 1740)	1	1	
Rhagodia parabolica	Mealy Saltbush	1	1	1
Rytidosperma caespitosum	Common Wallaby-grass	1	1	1
Salsola tragus	Buckbush	1	1	1
Setaria constricta	Knobby But-grass	1	1	1
Sida corrugata	Corrugated Sida		1	
Themeda triandra	Kangaroo Grass			upstream
Vittadinia blackii	Narrow-leaf New Holla			upstream
Vittadinia gracilis	Woolly New Holland Daisy	1	1	upstream
Walwhalleya proluta	Rigid Panic	1	1	1

References:

Davies. R.P. (1997), "Weed Management in Temperate Native Grasslands and Box Grassy Woodlands in South Australia", Botanic Gardens of Adelaide, Athelstone, SA 5076

Gammage, B, (2011), "The Biggest Estate on Earth, How Aborigines Made Australia" Allen and Unwin, Crows Nest, NSW 2065.

Pritchard. G.H. and Turnbull. K. 2002. "Evaluation of herbicides for the control of the environmental weed bridal creeper (*Asparagus asparagoides*)" in Plant Protection Quarterly Vol. 17 (1)

Climate and weather data http://www.bom.gov.au/climate/averages/tables

Native title data https://data.environment.sa.gov.au/NatureMaps

Further Reading:

Berkinshaw. T. 2006., "Native Vegetation of the Northern & Yorke Region", Greening Australia for Northern and Yorke NRM Board,

Hobbs. R. J. and Yates. C.J. 2000., "Temperate Eucalypt Woodlands in Australia", Surrey Beatty and Sons, Chipping Norton, NSW 2170

Lindenmayer. D. Bennett. A and Hobbs. R. 2010., "Temperate Woodland Conservation and Management", CSIRO Publishing, Collingwood, Victoria 3066

Richardson. F.J. Richardson. R.G. and Shepherd. R.C.H. 2011., "Weeds of the South East. An Identification Guide for Australia. Second Edition", Meredith, Victoria 3333

Robertson. E.L. 1999., "Restoration of Grassy Woodland Watiparinga Reserve Management Plan", The National Trust of South Australia, Adelaide, SA 5000

Shackley. A. Allanson. A. and Kuys. J. 2014., "A Biological Survey of Lower North Grasslands of South Australia", Irongrass Environmental Rehabilitation Services and Gawler Environmental Heritage Association, South Australia.

Jones. Alan. 1978., Snowtown: the first century, 1878-1978 compiled by Alan Jones in association with the Snowtown Centenary Committee

Hundred of Cameron, Hundred of Barunga Survey Diagram Books and Survey Field Books 1865-1890 available through State Records SA.

Marshall. Adrian Williams. Nicholas. Morgan John. 2015., Land of Sweeping Plains: Managing and Restoring the Native Grasslands of South-eastern Australia CSIRO.

Addendum:

Table 3: Additional native plant species recorded in or close to rail corridor.

Species to watch out for, many could potentially be planted back into rail corridor or nearby

Scientific Name	Common name	Bruce Copley 1960s	Adrian Shackley 22,23,24	Other Biol. Survey	Aust	SA	NY region rating	St Vin. sub-region	Locality of plant records
Acacia continua	Thorn Wattle	x					NT	RA	0.5 mile SSW of Barunga Gap
Alectryon oleifolius ssp. canescens	Bullock Bush		x				LC	LC	Near Koolchunga Creek
Amphipogon caricinus var. caricinus	Long Grey-beard Grass	x					RA	RA	Rail Reserve opposite Lochiel turn-off on Bute-Snowtown Road. Barunga Range
Atriplex crassipes	Saltbush	x					NE	NE	Ca 6 km SW of Snowtown on Bute Rd
Austrostipa acrociliata	Graceful Spear-grass			x			NT	LC	Hd. Cameron, Sect. 634.; Site: BS63-LOC0201, Patchid: 11803
Austrostipa nitida	Balcarra Spear-grass			x			LC	LC	Hd. Cameron, Sect. 634.; Site: BS63-LOC0201, Patchid: 11803
Austrostipa platychaeta	Flat-awned Spear-grass			x			LC	LC	Hd. Cameron, Sect. 634.; Site: BS63-LOC0201, Patchid: 11803
Austrostipa scabra sp.	Rough Spear-grass		x				LC	LC	Near Kooliata Creek
Bulbine bulbosa	Bulbine Lily	x	x				RA	EN	Railway Reserve, above Lochiel turnoff on Bute-Snowtown road
Calytrix tetragona	Fringe-myrtle	x					NT	VU	Near Barunga Gap Cemetery
Cheilanthes austrotenuifolia	Green Rock-fern	x	x				LC	LC	Rail reserve above Lochiel turnoff on Bute - Snowtown road
Chenopodium desertorum ssp, microphyllum	Desert Goosefoot	x	x				LC	LC	Hd. Cameron, Sect. 634.; Site: BS63-LOC0201, Patchid: 11803
Chloris truncata	Windmill Grass	x					LC	LC	Near Barunga Gap
Convolvulus remotus	Grassy Convolvulus		x				LC	LC	Whiting Creek

Scientific Name	Common name	Bruce Copley 1960s	Adrian Shackley 22,23,24	Other Biol. Survey	Aust	SA	NY region rating	St Vin. sub-region	Locality of plant records
Crassula colorata var. acuminata	Dense Crassula		x				LC	LC	Whiting Creek
Crassula decumbens	Spreading Crassula		x				LC	LC	Whiting Creek
Cryptandra campanulata	Long-flower Cryptandra	x				R	RA	RA	Railway Reserve above Lochiel turnoff on Bute to Snowtown Road. Barunga Gap
Digitaria brownii	Cotton Panic-grass		x				LC	LC	Whiting Creek
Dodonaea hexandra	Horned Hop-bush	x					RA	RA	Barrunga Gap Cemetery
Drosera macrantha subsp. planchonii	Climbing Sundew	x	x				RA	RA	Railway Reserve above Lochiel turnoff on Bute to Snowtown Road
Eragrostis dielsii	Lovegrass	x					LC	RA	Railway Reserve above Lochiel turnoff on Bute to Snowtown Road
Eutaxia microphylla	Common Eutaxia	x					LC	LC	6 miles from Bute on Snowtown Road
Geranium retrorsum	Grassland Crane's-bill	x	x				NT	VU	Rail Reserve above Lochiel turnoff Bute-Snowtown Road, Barunga Gap
Geranium solanderi	Austral Crane's-bill	x					RA	EN	1 mile E of Barunga Gap
Glycine rubiginosa	Twining Glycine	x					NT	VU	Rail reserve above Lochiel turnoff, Bute-Snowtown Road, Barunga Gap
Goodenia pinnatifida	Cut-leaf Goodenia	x	x				NT	LC	Barunga Range. Above Lochiel turnoff, Bute - Snowtown Rd. Just E of crossing in rail reserve
Goodenia pusilliflora	Small-flower Goodeni		x				LC	LC	Adjacent or in Barunga Gap parklands
Goodenia willisiana	Silver Goodenia	x	x				NT	LC	Barunga Gap cemetery
Hyalosperma glutinosum	Golden Sunray		x	x			LC	LC	Michael property Kooliata Creek
Kennedia prostrata	Scarlet Runner	x					NT	EN	In Rail reserve above Lochiel turnoff on Bute-Snowton Road. Barunga Gap
Leiocarpa websteri	Narrow Plover-daisy	x					NT	RA	Barunga Range. Railreaserve above Lochiel turnoff on Bute to Snowtown Road
Leptorhynchos elongatus	Lanky Buttons	x				EN	EN	EN	E of crossing in rail reserve. Above Lochiel turnoff Bute-Snowtown Road

Scientific Name	Common name	Bruce Copley 1960s	Adrian Shackley 22,23,24	Other Biol. Survey	Aust	SA	NY region rating	St Vin. sub-region	Locality of plant records
Leptorhynchos squamatus subsp. squamatus	Scaly Buttons	x					LC	RA	Just E of crossing in rail reserve above Lochiel turnoff, Bute-Snowtown Road.
Leptospermum coriaceum	Dune Tea-tree	x					RA	VU	Barunga Gap Cemetery
Lomandra collina	Sand Mat-rush	x	x				LC	LC	Barunga Gap Cemetery
Lomandra leucocephala subsp. robusta	Woolly Mat-rush	x	x				VU	RA	Barunga Gap Cemetery
Maireana excavata	Bottle Fissure-plant		x			V	RA	VU	Adjacent or in Barunga Gap parklands
Nitraria billardierei	Nitre-bush		x				LC	LC	Snowtown Bute Road on S side
Pauridia glabella var. glabella	Tiny Star	x	x				LC	LC	E. of Lochiel turnoff on Bute-Snowtown Road
Pimelea curviflora var. sericea	Curved Riceflower		x				VU	EN	Adjacent or in Barunga Gap parklands
Poa labillardieri	Common Tussock-grass		x				LC	LC	Whiting Creek
Pogonolepis muelleriana	Stiff Cup-flower		x				LC	LC	Adjacent or in Barunga Gap parklands
Ptilotus spathulatus	Pussy-tails		x				LC	LC	Rail reserve, Whiting Creek
Rhagodia preissii subsp. preissii	Mallee Saltbush		x	x			LC	LC	Hd. Cameron, Sect. 634.; Site: BS63-LOC0201, Patchid: 11803
Rhodanthe pygmaea	Pigmy Daisy		x				LC	LC	Adjacent or in Barunga Gap parklands
Roepera glauca	Pale Twinleaf	x					LC	LC	East of Lochiel Turnoff on Bute- Snowtown Road. (Railway Reserve.)
Scaevola albida	Pale Fanflower			x			NT	VU	Roadside near Barunga Gap
Sclerolaena diacantha	Grey Bindyi		x				LC	LC	Rail reserve
Setaria jubiflora	Warrego Summer-grass						RA	RA	Barunga Creek
Solanum coactiliferum	Western Nightshade	x					RA	LC	Barunga Tennis Courts
Solanum esuriale	Quena		x				LC	RA	Adjacent Koolchunga Creek
Solanum simile	Kangaroo Apple	x					NT	RA	N side [of] Bute - Snowtown R[oa]d.

Scientific Name	Common name	Bruce Copley 1960s	Adrian Shackley 22,23,24	Other Biol. Survey	Aust	SA	NY region rating	St Vin. sub-region	Locality of plant records
Swainsona stipularis	Orange Swainson-pea	x					DA	CR	Rail Reserve above Lochiel turnoff on Snowtown-Bute Road, E of crossing
Thelymitra megcalyptra	Scented Sun-orchid	x					NE	NE	Rail Reserve above Lochiel turnoff, Bute - Snowtown Road. Barunga Gap
Thysanotus patersonii	Twining Fringe-lily	x					LC	LC	Barunga Range. In rail reserve along Lochiel turnoff on Bute to Snowtown Road,
Thysanotus tenellus	Grassy Fringe-lily	x					RA	VU	In Rail Reserve above Lochiel turnoff, on Bute to Snowtown Road,
Vittadinia cervicularis var. cervicularis	Waisted New Holland Daisy	x	x	x			LC	LC	Hd. Cameron, Sect. 634.; Site: BS63-LOC0201, Patchid: 11803
Vittadinia megacephala	Giant New Holland Daisy		x				LC	LC	Rail reserve, Whiting Creek
Wahlenbergia capillaris	Tufted Bluebell	x					LC	LC	1 mile E of Barunga Gap
Wahlenbergia luteola	Yellow-wash Bluebell	x					LC	LC	Barunga Range, in Rail Reserve above Lochiel turnoff on Bute to Snowtown Road
Wurmbea latifolia ssp.latifolia	Broad-leaf Nancy	x		x		VU	VU	VU	Seed Conservation Centre 2024

Notes

Most of these records are available from Atlas of Living Australia. Some of the Copley records appear near Lochiel - not correctly positioned with map coordinates.

Barunga Gap cemetery has a few different species in a sandy area different to rail line soils

"Lochiel turnoff" will be Whiting Rd junction with Snowtown Bute Road.

Whiting Creek is just on south side of Snowtown Bute Road east of Barunga Gap

Table 4: Locations of Uncommon Plant Species along the Barunga Gap Rail Corridor

Waypoint	Species		Latitude	Longitude	Y projection	X projection
1539	*Calocephalus citreus*	Lemon Beauty-heads	-33.826596	138.131623	6253369.43	234532.082
1745	*Dampiera rosmarinfolia*	Rosemary Dampiera	-33.828167	138.111822	6253143.85	232703.804
1409	*Dampiera rosmarinfolia*	Rosemary Dampiera	-33.827168	138.114253	6253260.99	232925.753
1741	*Gahnia lanigera*	Black Grass Sword Sedge	-33.827144	138.114403	6253264.04	232939.565
1521	*Gonocarpus elatus*	Hill Raspwort	-33.823661	138.155615	6253756.7	236744.236
1507	*Lomandra collina*	Sand Mat-rush	-33.817099	138.160546	6254497.22	237180.662
1740	*Lomandra collina*	Sand Mat-rush	-33.827135	138.114486	6253265.26	232947.221
1506	*Minuria leptophylla*	Minnie Daisy	-33.817274	138.160771	6254478.38	237202.031
1739	*Opercularia turpis*	Twiggy Stinkweed	-33.827129	138.115021	6253267.31	232996.732
1501	*Ptilotus angustifolius*	Yellow-tails	-33.817178	138.163394	6254495.73	237444.597
1492	*Santalum acuminatum*	Quondong	-33.820233	138.172375	6254179.74	238285.451

Table 5: Outline of each Status Category used in species tables

(adapted from: Guidelines for Using the IUCN Red List Categories and Criteria V6.2, 2006 all categories except Regionally Extinct and Rare; Guidelines for Application of IUCN Red List Criteria at Regional Levels V3.0, 2003 - Regionally Extinct category; National Parks and Wildlife Act, 1972 Rare category).

Status Category Definition / Use

RE Regionally Extinct	A taxon is **Regionally Extinct** when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, in the case of a former visiting taxon, individuals no longer visit the region.
CR Critically Endangered	A taxon is **Critically Endangered** when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
EN Endangered	A taxon is **Endangered** when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.
VU Vulnerable	A taxon is **Vulnerable** when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
RA Rare	A taxon is **Rare** if it occurs in small numbers, and the best available evidence indicates that it meets any of the criteria A to D for Rare, and it is at some risk due to low numbers. Taxa in this category are usually localised within restricted geographical areas or are thinly scattered over a more extensive range. This may include taxa which are perceived to be at risk for which there is insufficient information available to assign them any other category, and taxa that are considered to be dependent on ongoing conservation programs to prevent them moving into the Critically Endangered, Endangered or Vulnerable categories.
NT Near Threatened	A taxon is **Near Threatened** when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered, Vulnerable or Rare now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
LC Least Concern	A taxon is **Least Concern** when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, Rare or Near Threatened. Widespread and abundant taxa are included in this category.
DD Data Deficient	A taxon is **Data Deficient** when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that a threatened classification may be appropriate. It is important to make positive use of whatever data are available. In many cases great care should be taken in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively restricted, and/or if a considerable period of time has elapsed since the last record of the taxon, threatened status may be well justified.

NE Not Evaluated

A taxon is **Not Evaluated** when it has not been evaluated against the criteria. (Used for flora with taxonomic issues and not rated.)

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

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Reference: POL20250325

Mr Bruce Michael

PO Box 86
92 Torakina Road,
SNOWTOWN SA 5520

By email: torakina2019@outlook.com

Dear Mr Michael

Thank you for your email dated 15 March 2025, to the Minister for Infrastructure and Transport (the Minister). The Minister has referred your query regarding the responsibility for weed control along the unused rail line between Snowtown and Bute - to the Northern and Yorke Landscape Board (the Board).

The Wakefield Regional Council entered into a licence agreement memorandum with the Minister on 24th May 2022 to manage certain parcels of land which make up the Snowtown to Bute rail corridor. The agreement sets out the terms of management of the land including the responsibility for the control of animal and plant pests. Page 9, Section 23 of the agreement states that "The Licensee must, as is reasonably practical, control all animal and plant pests as required by the relevant authorities pursuant to the *Native Vegetation Act 1991 (SA)* and the *Landscape South Australia Act 2019 (SA).*"

As the licensee for the whole of the land the Wakefield Regional Council is therefore responsible for control of all declared weeds on the land.

The Board works closely with all local Councils in the region to assist with prioritising works on council managed land as well as roadsides in the region. For further information or assistance regarding this matter, please contact Northern and Yorke Landscape Board on 8841 3444.

Yours sincerely

Paul O'Leary
Landscape Operations and Compliance Manager, Northern and Yorke Landscape Board

25/ 03 / 2023

Snowtown Viterra – Aurizon Rail Corridor History of Work 2010 – 2024 Report by Peter Clark, Manager Casuarina Land Management Consultants



Since August 2010 **Casuarina Land Management Consultants** [CLMC] has been managing the vegetation within the Snowtown Grain Rail Line Corridor on behalf of Aurizon rail company. The experience of managing this corridor can be helpful with managing the line to the west, particularly those areas that were original native grassland similar to that which would have existed in the area managed by CLMC.

The Grain Rail Line Corridor consists of all the land between the Main Line switches (Adelaide Road, Snowtown) through to the Barunga Homestead Road crossing. This land is part of the original rail line running from Snowtown to Bute Kadina and Wallaroo.The map shows the area with yellow line surround [about 8.5 hectares] and east of Augusta Highway blue line [bit over 2 hectares]. Adjoining land is cropping/grazing land plus the Viterra Grain Handling Unit

Vegetation Management: A number of vegetation management issues are found within the Rail Line Corridor apart from the corridor itself. This includes the disposal of stormwater from Viterra land (road runoff and dam leakage and overflow) as well as from the creek line from the north-west, weed infestation and invasion from the properties to the north and south (artichoke, salvation jane, horehound, caltrop, rye grass and wild sage etc).

Work Regime: Since 2010 to 2025 the following work programs have occurred on an annual basis.

Month / Year	Management Activity
August 2010 – December 2024	Slashed the rail reserve land 21 times mainly winter and spring
August 2015 – December 2024	Sprayed Artichokes 5 times
August 2012 – December 2024	Other weeds sprayed in the corridor 12 times
August 2013 – December 2024	Removed rubbish and weed trees 3 times

The annual slashing program was extended in 2012 to include the use of a reach arm mower which allowed for the slashing of artichokes along the slopes of the rail embankment. Removal of old fencing occurred and since 2015 weed control on the embankment has been broadscale or spot spraying. The artichoke infestation has significantly reduced.

Area A on Map: Located between the Augusta Highway and Barunga Homestead Road crossing.

The area from Barunga Homestead Road to the grain loading terminal is now easily accessible for slashing with the removal of dumped steel rail, fencing wire and olive trees. Initially this area was mostly populated by wild oats to the height of 1.5 metres but years of successive winter and early spring slashing and some spraying has seen the wild oat [and grassy weeds such as barley grass, brome grasses etc] population decrease in density and height and this has provided the opportunity for native grasses to increase in diversity and density. A number of native forbs such as Sida corrugata, Euphorbia and Tar Vine as well as some saltbush species also provide increased diversity and habitat in this area. The regime of well-timed slashing and spot spraying [with some general spraying in earlier years of artichoke and some other weeds] has greatly reduced fire hazard with the area retaining a significant level of green-ness through spring and summer.

Since 2019 the access tracks have become populated with rye grass which is a later season germination species and early seasonal spray programs creates the opportunity for this species to colonise the access tracks. Spraying of ryegrass needs to be carefully managed due to potential glyphosate resistance.

Spot spraying of weeds occurs plus the formation is sprayed annually to prevent germination of spilt grain). Brush cutting is undertaken along the sides of the rail line formation.

Near Barunga Homestead Road there is a stand of *Eremophila longifolia* (Weeping Emubush) that was much smaller in size in 2010 and has been managed to allow access to the formation. The stand has increased in size away from the formation and it is intended that the stand will be preserved to allow habitat for birds etc.

The area from the grain loading terminal to Augusta Highway is subject to waterlogging especially in winter because of stormwater runoff from the Viterra site and from the drainage line north east of the Viterra Dam (drainage line runs through the rail reserve under the culvert in the formation and across to the south western boundary). This has made management of slashing and weeds more difficult. New drainage lines have been constructed but issues remain. Some areas with uneven ground are hard to access with slasher. There is a particular problem with high levels of artichokes and other weeds in the paddock adjacent the southern side of the corridor here producing a constant reinfestation problem. Apart from this the management is similar. Results have been similar but it will take longer to achieve the outcome achieved to date on the western part.

Area B on Map: Located between the Adelaide Road crossing, Snowtown, and the Augusta Highway road crossing. This area has gradually had rubbish, fences etc removed [still some to go]. Introduced trees [olive and pine trees growing through the fence and large boxthorn] have been controlled. General area managed over recent years with a combination of slashing, brush cutting and spot weed spraying. The overall aim has been to reduce fire risk, reduce weeds and encourage native plants.

Slashing in winter and spring has reduced annual grass weeds such as wild oats, barley grass and brome grass which were the main fire hazard. The slashing regime [including keeping the slasher at a reasonable height above ground of about 10 cm to avoid obstacles and to assist seed setting off native species] has changed the mix of species present. Vegetation cover now is a mixed grass cover with

more native grasses and less grassy weeds. Chenopod/saltbushes are also present especially at the Snowtown end of the property. The gazetted road reserve on the north side has been slashed since 2014 to assist access to the rail corridor.

Most of the native species present are active summer growers that respond to spring and summer rain. This particularly assists in lowering fire risk as the native plants can be quite green through the fire season.

Native plant species recorded March 2025 – more species likely to be found with spring/summer check

Species	COMMONNAME	Aus Conservating	SA conservation	Northern Yorke region rating	St Vincent sub-region	**Rail Area A**	**Rail Area B**
*Acacia victoriae ssp. Victoriae**	Elegant Wattle			LC	LC	1	1
Aristida behriana	Brush Wire-grass			LC	LC	1	1
Austrostipa blackii	Crested Spear-grass			NT	LC		1
Austrostipa eremophila	Rusty Spear-grass			LC	LC	1	1
Austrostipa nodosa	Tall Spear-grass			LC	LC	1	1
Austrostipa sp	Spear-grass					2	1
Boerhavia dominii	Tar-vine			RA	RA	1	1
Chloris truncata ##	Windmill Grass			LC	LC	1	
Convolvulus angustissimus	Australian Convolvulus			NE	NE	1	1
Convolvulus remotus	Grassy Convolvulus			LC	LC	1	1
Dichanthium sericeum	Silky Blue-grass			LC	LC	1	1
Enchylaena tomentosa	Ruby Saltbush			LC	LC	1	1
Enneapogon nigricans	Blackhead Grass			LC	LC	1	1
Enteropogon acicularis	Umbrella Grass			LC	LC	1	1
Eremophila longifolia	Weeping Emubush			LC	LC	1	
Euphorbia drummondii	Caustic euphorbia			LC	LC	1	1
Maireana brevifolia	Short-leaf Bluebush			LC	LC	1	1
Maireana enchylaenoides	Wingless Fissure-plant			LC	LC	1	
Maireana rohrlachii	Rohrlach's Bluebush		R	VU	VU	1	1
Pimelea micrantha	Silky Riceflower			NT	RA	1	
*Rhagodia spinescens**	Spiny Saltbush			LC	LC	1	1
Roepera glaucum ##	Pale Twinleaf			LC	LC	1	
Rytidosperma caespitosum	Common Wallaby-grass			LC	LC	1	1
Salsola tragus	Buckbush			LC	LC	1	1
*Senna artemisioides coriacea**	Broad-leaf Desert Senna			LC	LC		1
Sida corrugata var. angustifolia	Grassland Sida			LC	NT	1	1
Teucrium racemosum	Grey Germander			LC	LC	1	1
Vittadinia gracilis	Woolly New Holland Daisy			LC	LC		1
Walwhalleya proluta	Rigid Panic			NT	LC	1	1
						27	24

* likely introduced from nearby planting

- not recorded elsewhere in rail corridor survey

Summer active species

Green year-round species

One of the interesting questions is the lack of *Lomandra* and similar tussock plants such as dianella on this section. There are some *Lomandra effusa* plants on the section of unused road reserve just to the south. This area close to the Barunga station homestead was taken up much earlier than other land holdings and no doubt had much heavier grazing in early years and perhaps some cultivation. More research and checking needed.



CLMC Rear mounted slasher used on rail corridor



Eremophila longifolia patch western end



Good quality native grassland western end March 2025



Still green native grassland species Curly Windmill Grass and *Concolvulus* March 2025



CLMC Manager Peter Clark on site March 2025

Information on pre-farming vegetation – provided by Adrian Shackley

Mapping as attached is based on the vegetation recorded when land was first surveyed in the locality mainly from c. 1868 to 1880 with some 1880s information when Travelling Stock Reserves near Snowtown were surveyed for sale.

The original survey records are held by State Records at Gepps Cross. The 1883 Hundred of Cameron map around Barunga Gap contains some detailed delineation of areas with trees and shrubs compared with open grassland based on surveyor's records.

In summary the Barunga Gap township area and east of the ranges contained significant area of Mallee Box open woodland plus grassland with areas of more shrubby vegetation eastward towards Bute. The remaining land is described as open grassland/blackgrass grassland with some sheoaks.

Since the rail line was installed in 1880 the vegetation has changed somewhat with sheoaks and shrubs expanding in the slopes east of Barunga Gap and a large invasion of Pines spreading from plantings near the town. Most of this change appears to have occurred since c. 1970 when steam engines were replaced by diesel [and burning along the line for fire protection generally ceased] and then later after 1993 when the line closed and maintenance, weed control etc mostly ceased.

A good example of the work of the early surveyors in 1878 is also attached.

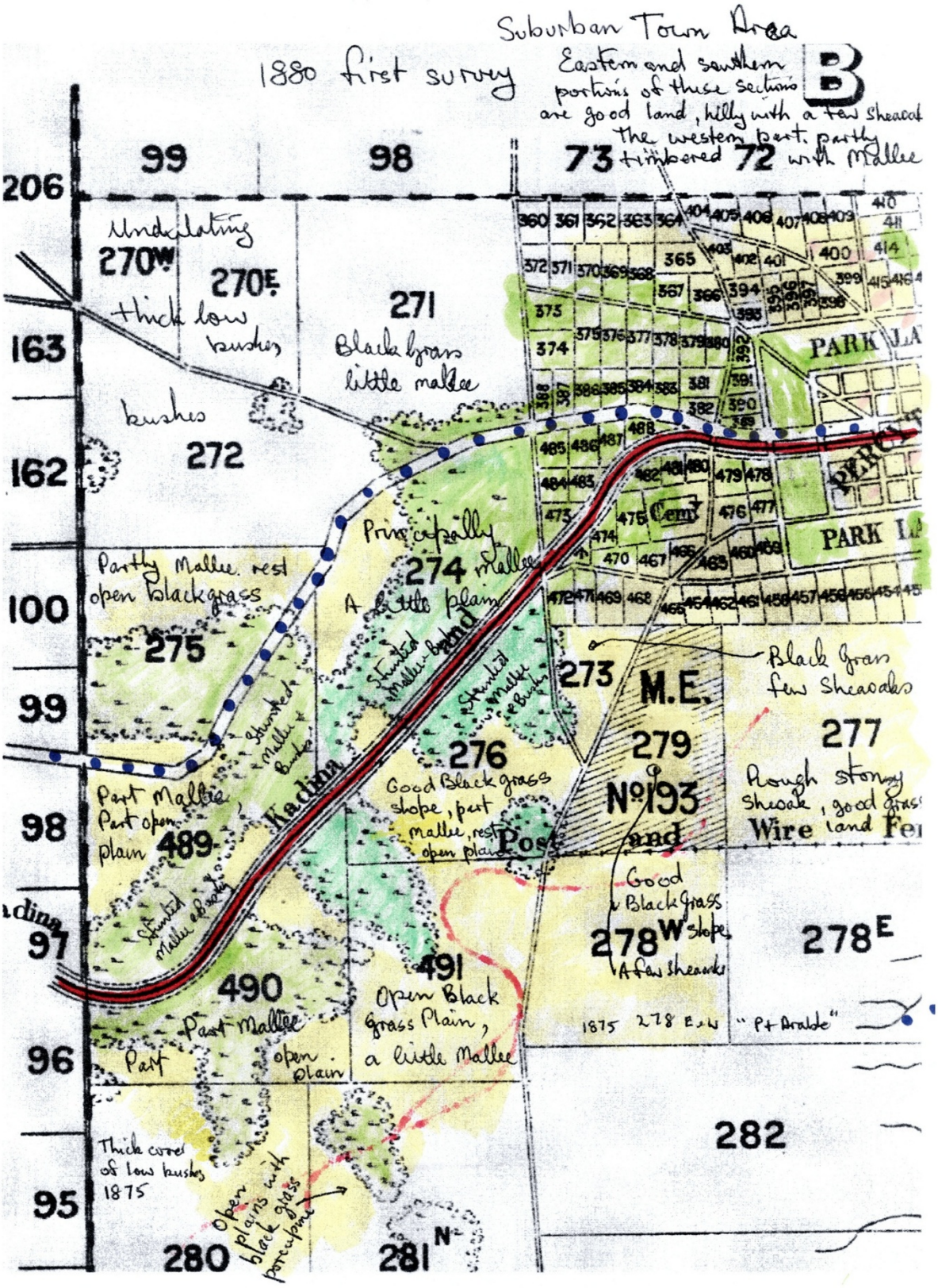


Figure 1: Hundred of Cameron Vegetation map showing information from first surveys c. 1880. Green – trees and shrubs, yellow – grassland with some sheoaks

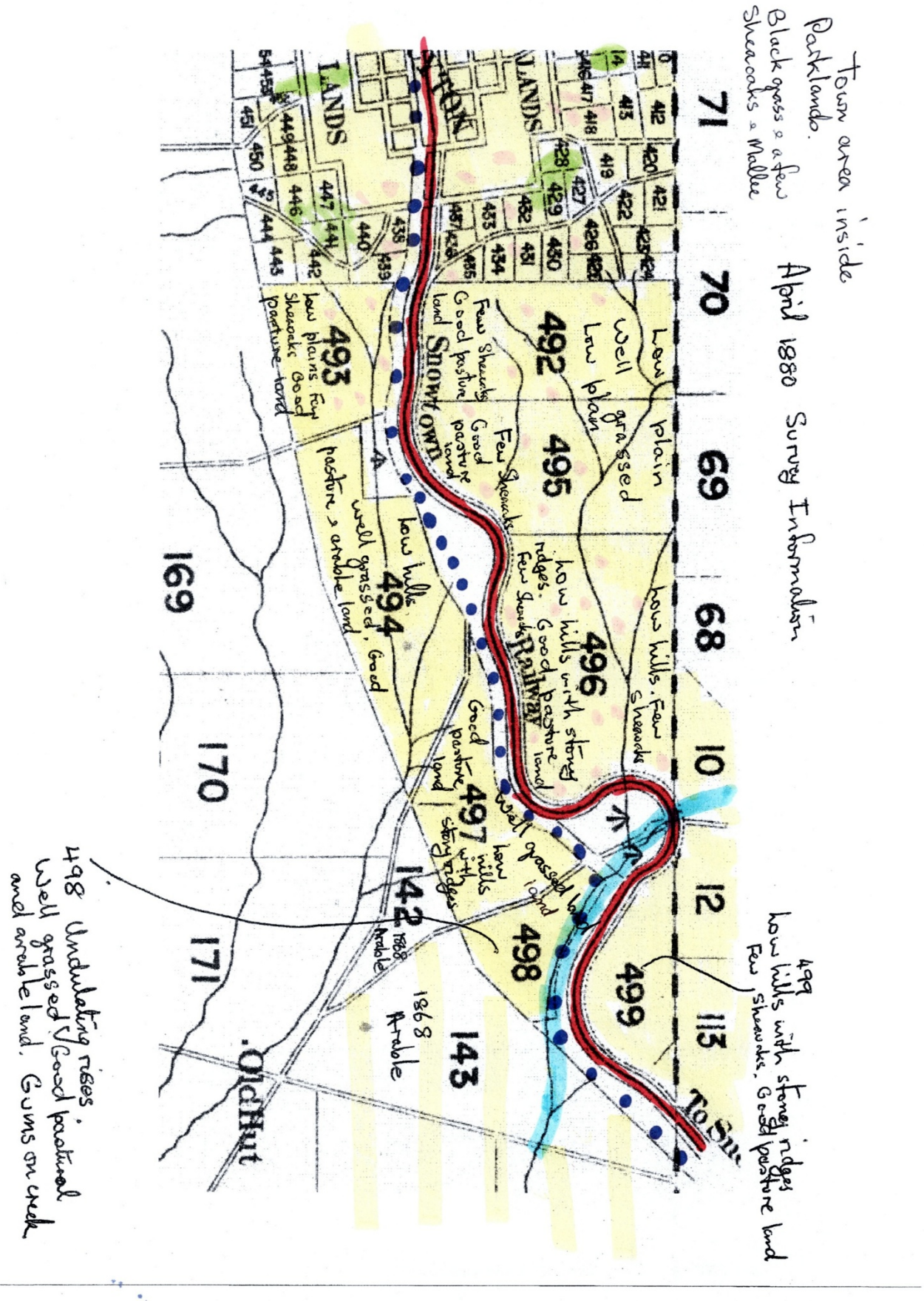


Figure 2: Vegetation map showing information from first surveys c. 1880. Green – trees and shrubs, yellow - grassland with a few sheoaks, blue creek-lines with Redgums

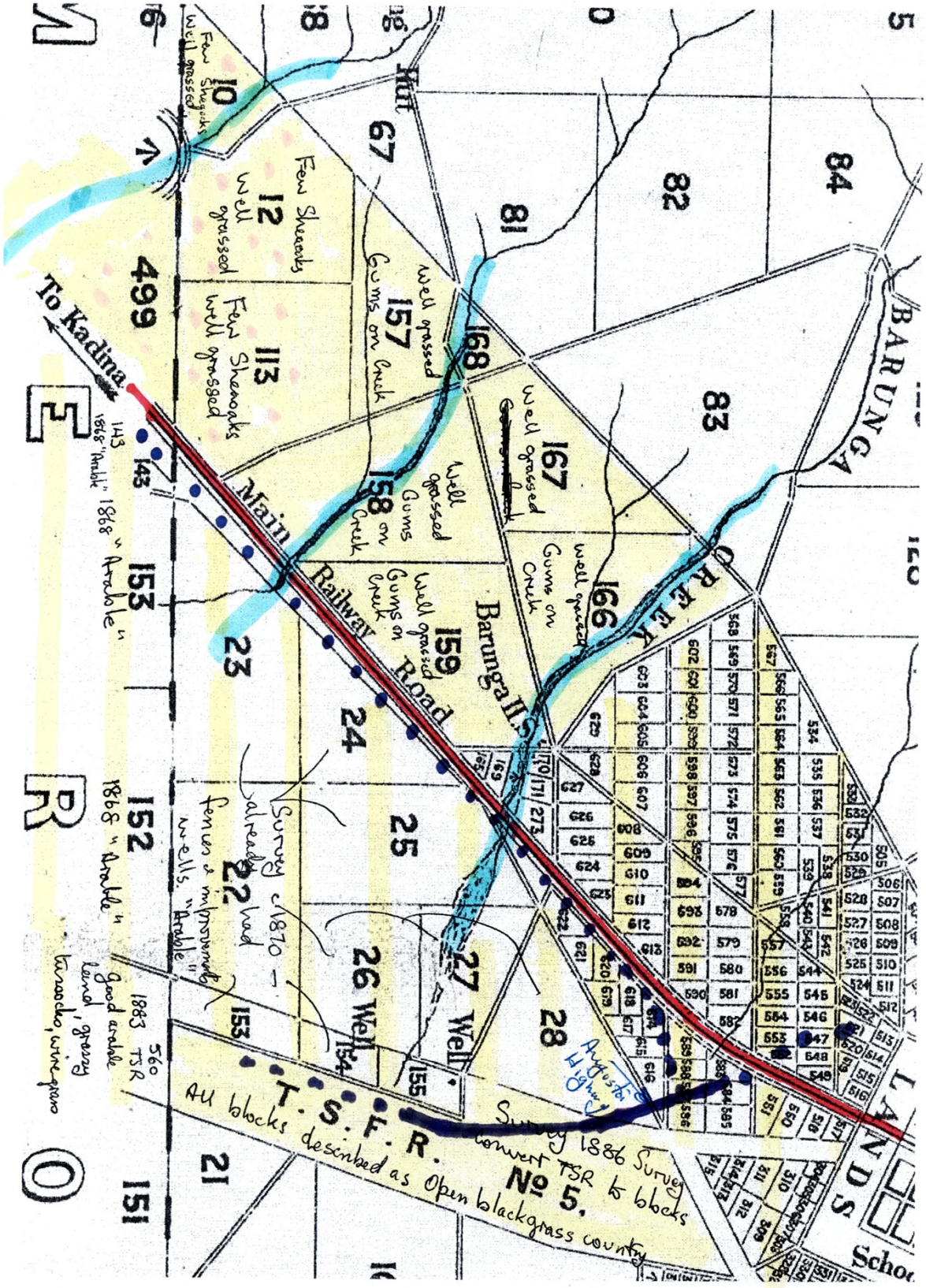


Figure 3: Vegetation map of portion of rail corridor in Hundred of Barunga showing information from first surveys c. 1870 -1886. Yellow - grassland with a few sheoaks, blue creek-lines with Redgums

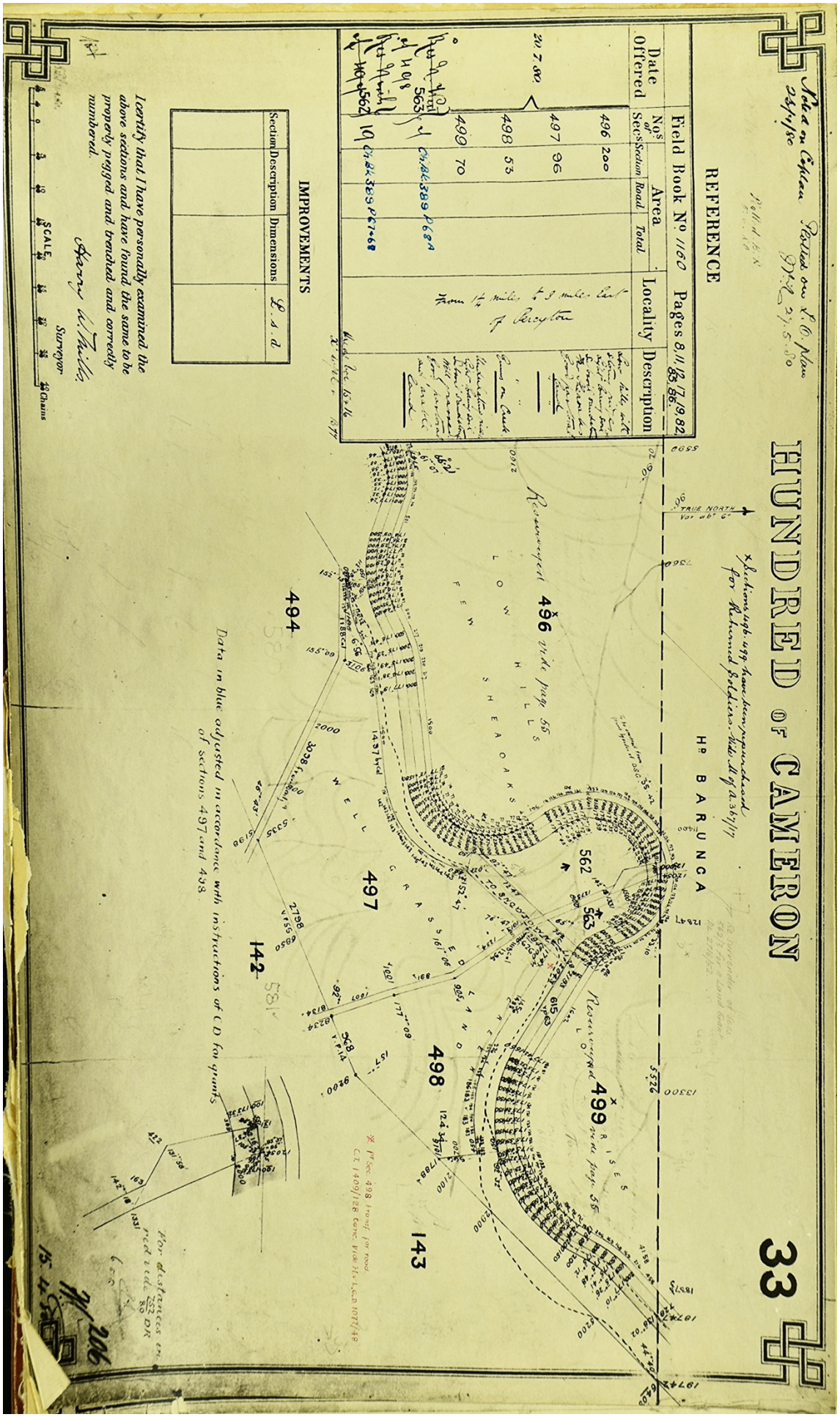


Figure 4: Survey Diagram Book Hundred of Cameron page 33 c 1880.