

MOORABOOL SHIRE COUNCIL ROADSIDE WEED AND RABBIT ACTION PLAN 2022 – 2026

PROJECT FUNDED THROUGH VICTORIAN GOVERNMENT ROADSIDE WEEDS AND
PESTS MANAGEMENT PROGRAM



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Council Details

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KEY CONTACT

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STATEMENT OF RESPONSIBILITIES

In implementing this program Council will:

- Coordinate the implementation of this plan on Council managed roadsides in accordance with the investment principles stated in this plan and the control measures specified in Table 2.
- Implement best practice weed hygiene principles and protocols.
- Maintain accurate records sufficient to provide evidence that the plan has been carried out and provide these to Agriculture Victoria on request.
- Obtain approval from Agriculture Victoria before substantially modifying or varying the plan.
- Carefully consider any proposals from Agriculture Victoria to modify or vary the plan in response to changed circumstances.

In Implementing this program Agriculture Victoria will:

- Inform Council of:
 - any extension activities being undertaken by Agriculture Victoria
 - any enforcement programs being undertaken by Agriculture Victoria within the municipality

PART 1: OVERVIEW OF ROADSIDE WEEDS AND RABBITS ACTION PLAN



REGIONAL CONTEXT OF NOXIOUS WEED AND RABBIT MANAGEMENT

Moorabool Shire covers 2110 square kilometres and is located on the western urban/rural fringe of the Melbourne metropolitan area, extending to the outskirts of Ballarat to the west. The Shire is characterised by its distinctive rural landscapes which comprise a diversity of ranges, plains, ancient gorges, and areas of intensive horticulture.

Agriculture is the major sector in Moorabool's economy and contributes to the rural landscape setting that typifies the Shire.

The environmental assets (including the Brisbane Ranges National Park, Lerderderg State Park, Werribee Gorge State Park, Wombat State Forest, and Long Forest Nature Conservation Reserve), as well significant waterways and landscapes, contribute to the Shire's numerous places of natural and cultural heritage significance.

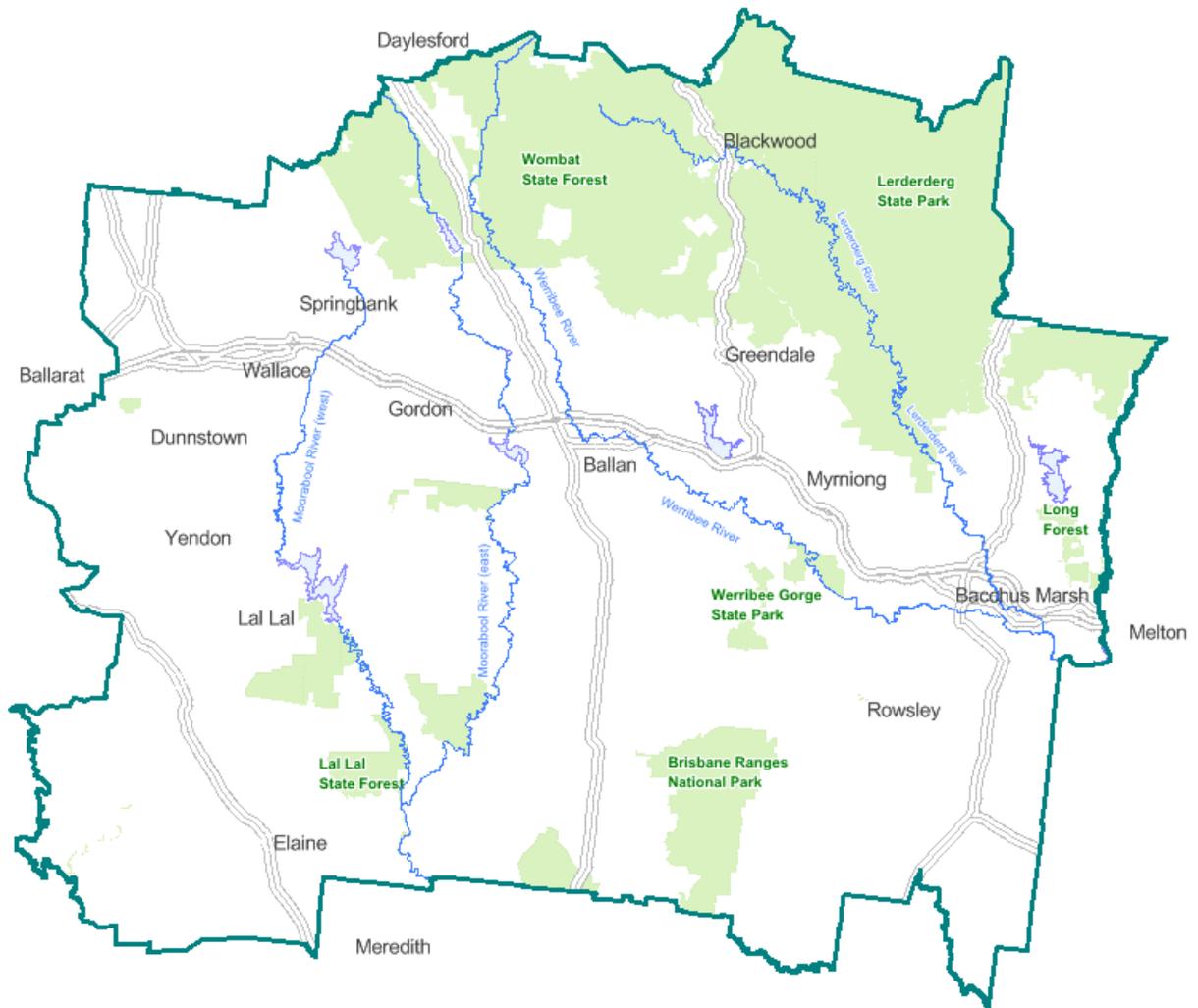
The Agricultural and environmental values of Moorabool Shire need to be conserved not only for their intrinsic environmental and landscape values but also as economic and recreational resources to the Shire.

Moorabool Shire Council is responsible for the management of over 1,440km of local road network (Draft Moorabool Shire Council Road Management Plan 2013-2017). Maintaining this road network and its associated roadside vegetation is a significant task, requiring dedicated project management, site monitoring and significant annual financial investment.

Moorabool is dedicated to managing weed infestations on council managed land and committed to the early prevention and control of weed species newly identified in the area. Undertaking weed control activities is an important part of Council's role as a land steward, and a major investment in protecting the Shire's significant agricultural and environmental assets.

For many years, Moorabool Shire has implemented programs to limit the spread and reduce infestations of declared weeds and established pest animals, through both past Federal and State Government funding initiatives.

Moorabool's Roadside Weed and Rabbit Action Plan 2022 – 2026 is the continuation of Council's commitment to effective weed control. It provides an action plan for ongoing weed control activities throughout Moorabool's Road network. It also presents a range of opportunities to improve the efficiency of Council's roadside maintenances and outlines the funding commitments required to achieve effective control of some of the Shire's most damaging weed and pest animal species.



MAP 1: MOORABOOL SHIRE AREA – KEY FEATURES

OBJECTIVES OF THE PLAN

The Moorabool Shire Council Roadside Weed and Rabbit Action Plan 2022 – 2026 aims to outline the actions that will be undertaken by Moorabool Shire Council between 2022 and 2026 with the goal of preventing the further spread of pest plant and animal species currently present within and outside the Shire. The plan recognizes the contribution made to managing the roadside weed and rabbit issue through past community action and investment by Moorabool Shire and via Federal and State Government funding.

This document provides a detailed breakdown of planned works to control pest plant and animal species on roadsides throughout Moorabool Shire. In doing so, this document aims to:

- Summarise the current context and extent of pest plants and animals occurring on roadsides within Moorabool Shire.

- Outline rationale for selecting priority target species for control.
- Provide transparency on available program budget and the potential extent of works.
- Detail programs that will be implemented to control priority pest species on municipal roadsides.
- Identify other potential priority target species and control programs that could be implemented, should funding increase in the future.
- Outline potential actions that would improve the efficiency of roadside weed control programs into the future.

In addition to outlining actions that Moorabool Shire Council will undertake in managing weeds and rabbits on roadsides over this period, it is hoped that this action plan will promote the coordination of pest plant and animal control activities with State Government agencies, neighbouring Local Government Authorities, Landcare Groups, and residents.

BUDGET

The Moorabool Shire Council Roadside Weed and Rabbit Action Plan 2022 – 2026 is a jointly funded project between Moorabool Shire Council and the Victorian Government Roadside Weeds and Pests Management Program.

As announced in 2021 the program has an annual budget of \$84,898 (ex GST) as shown in Table 1. This budget has been used to forecast and plan for future operations. Amendments to this plan will be made following any changes to the announced budget.

Recurrent 'roadside management' budget	\$40,453 (ex. GST)
Victorian Government Roadside Weeds and Pests grant funding (2022/23)	\$44,445 (ex. GST)
Total annual budget:	\$84,898 (ex. GST)

TABLE 1: BREAKDOWN OF ANNUAL FUNDING FOR THE MOORABOOL SHIRE COUNCIL ROADSIDE WEED AND RABBIT ACTION PLAN 2022.

TIMEFRAME OF PLAN

This Action Plan will commence July 1, 2022, and will run until 30th June 2026, subject to available funding and unless extended or replaced with Agriculture Victoria approval.

Should variations to the planned programs be required, Moorabool will seek approval from DEDJRT and the document will be updated to incorporate changes.

AREAS COVERED BY THIS PLAN

Moorabool Shire is the responsible authority for the management of over 1,440 km of municipal roadside. Works within this roadside weed and rabbit action plan are primarily focused on rural roadsides throughout Moorabool. In total this plan focusses on approximately 1,210 km of rural roadside. Unless directed by Agriculture Victoria or in the support of coordinated community

action, no works will be undertaken on roadsides which are speed limited to 60kph (or less) or are within the following zones:

- Residential Zones
- Neighbourhood Residential Zones
- Township Zone
- Mixed Use Zone
- Commercial Zones
- Industrial Zones

Other roads (or roadside vegetation) throughout Moorabool are managed by other agencies, including Regional Roads Victoria, DELWP and Parks Victoria. These roads are not included within Council's roadside weed and rabbit action plan. Efforts will be made however to engage with these other management agencies, align target species and to collaborate on control works.

ROADSIDE WEED AND RABBIT MANAGEMENT PRIORITIES

Moorabool Shire Council's overall roadside weed, and rabbit management objective is to undertake effective and proactive management of invasive species on Council managed roadsides across the Shire to protect environmental, agricultural and community values.

To achieve this goal, investment of funds will be prioritised towards:

1. Treatment for the eradication of Regionally Prohibited Weed infestations.
2. Treatment for the containment or reduction in area of infestations of Regionally Controlled Weeds and rabbits – aligned to Agriculture Victoria
3. Supporting the coordination of investment in weed and pest control projects by the local community and other key stakeholders.
4. Contributing to other previous investment and follow-up treatment in the control of Regionally Controlled and Regionally Prohibited pest plant and animals.
5. Protect identified assets such as the Brisbane Ranges National Park, Werribee Gorge State Park, Lerderderg State Park, Long Forest Conservation Reserve, and significant roadside vegetation under threat from weed invasion.
6. Addressing other declared noxious weed infestations on roadsides causing concern to the Shire's community (such as Chilean Needle Grass and African Lovegrass)
7. Control emerging weed threats not listed under the Catchment and Land Protection Act (through co-investment by other State Government agencies, Council, and the local community). NB These undeclared weeds will not be controlled with funding from the RWPP.

COMMUNITY CONSULTATION

The Moorabool Shire Council Roadside Weed and Rabbit Action Plan 2022 – 2026 is based on, and an extension of, previous Roadside Action Plans. At the inception of these plans, significant stakeholder engagement was undertaken to determine a list of priority species and actions. This feedback led into the development of the initial control programs for roadside gorse, serrated tussock, and rabbits; species which remain the major targets of this current plan.

In the development of the Moorabool Shire Council Roadside Weed and Rabbit Action Plan 2022 – 2026 further stakeholder engagement was undertaken with stakeholders via the Moorabool Environment and Sustainability Advisory Committee (MESAC). Further discussions were also held with the facilitators of Moorabool's Landcare groups/network.

Engagement with these stakeholders included reviewing data related to the success/failures of previous programs and discussions regarding potential alterations to the plan. Broadly, feedback on the direction of the planned programs was positive and supportive of works continuing to target the priority species to capitalize on the investments made.

Common themes from the feedback received included:

- Prevent gorse and serrated tussock from returning to previously controlled areas
- Develop a blackberry control program
- Prevent emerging weed species becoming established
- Protect environmentally significant roadside vegetation
- Improve coordination with the work of Landcare
- Publicize roadside works and advocate for additional funding

This plan has made efforts to address this feedback by incorporating additional programs into the Action Plan. Given the limitations of the program however, not all feedback could be addressed.

Feedback also suggested that more efforts should be made to review works annually. This will assist Landcare and community members plan programs that integrate with roadside works. It is proposed that an annual forum be held with stakeholders to review programs and discuss target areas for the upcoming year.

REPORTING AND MONITORING

It is important that the actions undertaken from this plan are transparent and accessible for the public, in line with the appropriate use of public funds. Therefore, alongside this plan, an annual report listing the roadsides treated and the total length of works achieved in the previous financial year will be generated and made available on the council website.

Accurate data regarding weed and rabbit infestations on roadsides is critical to making informed decisions on target species, target areas and budget allocations. It is recommended that, as part of this program delivery, the following roadside mapping is undertaken. It is recommended that this mapping continues the approach of the previous decade, as described below.

In 2013 and 2018 Moorabool Shire engaged independent consultants to undertake assessment across the entire road network, mapping the distribution of key weed species. Similar mapping was undertaken in 2018, mapping priority species and noting observations of emerging species. Data from these two reports (available on the council website) provides important baseline data used to evaluate the effectiveness of control works. It is recommended that similar mapping be undertaken by an independent consultant at five yearly intervals to ensure effective program reporting and monitoring for new threats. It is also recommended that the report generated from such mapping be made available on the council website.

Annual assessment and mapping of priority weed infestations is required to generate a target roads list, reducing the time contractors spend on roadsides without weed infestations. This mapping focuses only the priority weed species, with little more than presence/absence data, giving a broad overview of infestations. It is recommended that Council staff continue to generate this data as a means of maintaining the efficiency of the programs.

For transparency, it is important to provide data relating to works undertaken within this program. A report detailing the location of works each year, from each of the projects, will be generated annually and made available on the council website.

PART 2: SELECTION AND PRIORITISATION OF ACTIONS



SELECTION OF TARGET SPECIES

Given the current extent of declared and undeclared weeds and pests occurring on roadsides throughout Moorabool, and given the annual budget available, it is not feasible to implement specific and targeted programs for each species of concern. Instead, select species will be prioritized for action to focus works on the species of greatest threat and with the potential for control or substantial impact minimisation.

Several factors must be considered when choosing which species are to be prioritized for control. These factors include:

- The potential impact of the species if not controlled
- The current extent of species infestations
- The need to align Council actions with the actions of community/Landcare
- Capitalization of previous investments

HIERARCHY OF WEED CONTROL NEEDS:

To critically select species to be prioritized for action and the proportion of budget each species receives, the below rubric (Table 2) has been generated. The 15 species shown are noted as species of concern on roadsides among stakeholders and the community.

Moorabool acknowledges the many additional weeds present throughout the shire and encourages action to control weed species, both those on this list and those not listed.

The following eight factors were used to assess the need for prioritization of each weed species:

- A. Weed/pest classification
 - o 3 - Regionally prohibited
 - o 2- Regionally controlled
 - o 1- Restricted or environmental weed
- B. Weed/pest distribution
 - o 3 - Early invasion and minor outbreaks
 - o 2- Not yet reached full potential
 - o 1- Established species across all suitable range
- C. Presence on roadsides
 - o 3 - Weed/pest is primarily found on roadsides
 - o 2- Weed/pest is widespread on roadsides and private property
 - o 1- Weed/pest is primarily on private property
- D. Potential landscape impact
 - o 3 - Significant impact on agriculture and environment
 - o 2- Significant impact to landscape where land management aids spread
 - o 1- Unlikely to cause widespread impact
- E. Previous investments
 - o 3 - Significant and long-term investment from council
 - o 2- Intermittent or project-based Council action
 - o 1- Limited or no council action
- F. Community action
 - o 3 - Significant and long-term investment from Landcare and community
 - o 2- Intermittent or project-based community action
 - o 1- Limited or no community action

G. Customer service requests

- o 3 - High proportion of customer service requests
- o 2- Regular customer service requests
- o 1- Occasional or no customer service requests

Species were assessed against each factor resulting in a score of 1, 2, or 3, with a higher score suggesting a greater need for control, greater opportunity to effectively control, or greatest return on investment. The total score from these eight factors, combined with input from stakeholder engagement, has been used to select species for priority actions.

	A	B	C	D	E	F	G	Total
Serrated tussock	2	2	2	3	3	3	2	17
Rabbits	2	1	2	3	3	3	3	17
Gorse	2	1	2	3	3	3	2	16
Caltrop	3	3	3	3	2	1	1	16
Blackberry	2	1	2	3	2	2	3	15
African love grass	2	3	3	2	1	1	1	13
St John's wort	2	3	3	2	1	1	1	13
Prickly pear	2	3	1	3	1	1	1	12
Spanish heath	1	3	3	2	1	1	1	12
African boxthorn	2	2	2	3	1	1	1	12
Artichoke thistle	2	2	2	2	2	1	1	12
Chilean needle grass	1	2	3	3	1	1	1	12
Wheel cactus	2	3	1	3	1	1	1	12
Broom spp.	2	2	2	2	1	1	1	11
Bluebell creeper	1	3	2	2	1	1	1	11
Sweet Briar	2	1	2	3	1	1	1	11

TABLE 2: RUBRIC ASSESSING THE IMPACT AND POTENTIAL FOR EFFECTIVE CONTROL OF ROADSIDE PEST SPECIES. A GREATER TOTAL SCORE SUGGESTS GREATER POTENTIAL RETURN ON INVESTMENT OR GREATER OPPORTUNITY TO ACHIEVE CONTROL.

Four species scored a cumulated score above 15 on the above rubric. These species are well established but have received significant control actions from Council and community over many years and omitting any of these four species from future control programs would compromise that investment. It is recommended that Council undertakes dedicated control programs targeting the following species:

- Serrated tussock
- Rabbits
- Gorse
- Caltrop
- Blackberry

For clarity, these five species will hereby be referred to as “priority species”

Many species within this rubric can be termed ‘emerging species’, having currently only restricted populations or extents. It would be feasible and recommended for these ‘emerging species’ to be broadly targeted through a roadside control program. Weeds that could be regarded as ‘emerging species’ and could therefore receive control works as part of this program include:

- African love grass
- St John's wort
- Prickly pear
- Spanish heath
- African boxthorn
- Artichoke thistle
- Chilean needle grass
- Bluebell creeper
- Sweet Briar
- Wheel cactus

EXTENT OF PRIORITY WEED AND PEST ANIMAL INFESTATIONS

In 2017/18 Moorabool undertook weed mapping of selected weed species across all municipal roadsides. The results of this mapping show the widespread extent of weed infestations on roadsides (Table 3).

This mapping identified the presence of gorse on approximately 547 kilometres of roadside. This equates to approximately 33% of roadsides containing gorse plants, which was a reduction from 2008 mapping where gorse was present on approximately 41% of shire roadsides.

Blackberry was present on approximately 795 kilometres, or more than 51%, of roadside throughout Moorabool in 2017/18. As well as being widespread, the average size of blackberry infestations is also exceptionally high.

Using the State Government's containment line for serrated tussock control, as well as observations from previous years of mapping and control, there are approximately 474 kilometres of roadside that have serrated tussock infestations or that require annual inspection to maintain control.

Total length of municipal roadside	1,440 km
Extent of roadside gorse infestations (2018)	547 km
Extent of roadside serrated tussock infestations	496 km
Extent of roadside Blackberry infestations	795 km

TABLE 3: CURRENT EXTENT OF PRIORITY WEED INFESTATIONS ON ROADSIDES WITHIN MOORABOOL SHIRE.

It is difficult to quantify the extent of rabbit infestations on roadsides throughout the shire as no detailed mapping has taken place outside of historical target areas. Adding to this difficulty is the presence of dense weedy harbour on roadsides that provide shelter for rabbits and obscure warrens.

In 2017, a pilot study was undertaken on approximately 3.5 kilometres of roadside, north of Ballan. A dense roadside blackberry infestation was mechanically removed, and the rabbit burrow entrances underneath were then mapped. A total of 2426 burrows were identified on the 3.5 km of roadside. This equates to approximately 339 burrows per hectare. Using a common approximation of 1.8 rabbits per burrow, this equates to an estimated 4366 living on this 3.5 kilometres of roadside. While populations of this density are unlikely to be the standard across the entire road network, roadsides are housing significant rabbit populations.

Detailed mapping of the identified 'emerging weeds' will be required to determine the exact size of infestations. In general, these species are restricted to several small populations throughout the road network but have the potential to rapidly expand given suitable conditions.

COSTS OF CONTROLLING PRIORITY SPECIES

It is possible to ascertain the approximate costs of controlling some priority weed species across Moorabool's Road network using the costs of previous years' control programs to determine a costs per kilometre calculation (see Appendix 1).

Gorse:

Using the past three years of gorse control data (see Appendix 1) the average cost of roadside gorse control is approximately \$300 per kilometre of roadside treated. This data is obtained from works that had contractors targeting priority roadsides, meaning that contractors spent little to no time assessing roads that did not contain moderate levels of gorse. It should be noted that this figure is an average from work that included the control of very large patches as well as isolated plants. Therefore, more targeted works, focusing only on large infestations would cost more than this figure.

The most recent mapping of roadside weeds indicates that gorse is present on approximately 547km of roadside throughout Moorabool. This would suggest that the annual cost of controlling all roadside gorse infestations in a single year would be approximately \$164,100. This spend would reduce over time, as infestations become controlled, but would be required at a similar level for multiple years. An ongoing baseline management spend would also be required to maintain the success of the program and prevent reinvasion.

Serrated tussock:

Using the previous three years as reference (Appendix 1) the average cost per kilometre of roadside tussock control is approximately \$70. This treatment is cheaper than woody weed control for several reasons, including the reduced herbicide use, smaller size of pest plants and

the need for contractors to also inspect lengthy roadsides that contain only few plants to enforce the containment of this weed.

Where works are undertaken throughout the buffer zone, where infestations are currently low, a figure of \$70/km of roadside is adequate. However, if works were to be undertaken in the 'core' area, east of the buffer zone where infestations are significantly larger, significantly higher costs would be incurred. It is estimated that works within the 'core' area would be approximately double the buffer zone rate, at \$140/km

Serrated tussock is present on approximately 496km of roadside throughout Moorabool Shire. Of these roads, 384km are within the buffer zone and 112 km are within the 'core' area. Therefore, it is estimated that to undertake roadside serrated tussock control across the entire road network would cost approximately \$42,560. This figure would be applicable for several years while large infestations are reduced and would then reduce.

Blackberry:

The cost of controlling roadside blackberry is comparable with the cost of controlling roadside gorse. Given that blackberry has been mapped on approximately 795km of roadside throughout Moorabool, and the average cost of control being \$300/km, it is estimated that to control all roadside blackberry in a single year would cost approximately \$238,500 with annual follow-up works decreasing over time.

As with the above gorse control estimates, this spend would be required for multiple years to consolidate control works. An annual baseline spend would also be required to prevent reinvasion and regrowth.

PROPOSED ROADSIDE WEED CONTROL PROGRAMS

Proposed program 1. Roadside gorse control program:

While a program that annually targets any gorse plants across the entire road network would be most efficient, control can be achieved with a more targeted program, costing less annually but likely required for more years.

It is proposed that a targeted roadside gorse program continue using the following basic three-step approach:

1. Annual mapping of gorse infestations across road network by Council staff.
2. Prioritising those areas where control is more needed (e.g., in line with community action, re-emergence of infestations, new outbreaks, remaining dense infestations)
3. Contractors engaged to undertake control on priority roadsides

It is expected that, with the budget available, approximately 200km of roadside can be treated for gorse annually and given the current level and extent of gorse infestations, it is expected that this program can reduce infestations to negligible levels over the next five years.

Proposed program 2. Roadside serrated tussock control program:

Serrated tussock has been included as a priority species primarily because it is currently restricted to the eastern portion of Moorabool Shire but has the potential to spread much further. As such, it is proposed that a roadside serrated tussock program be implemented with the aim of containing infestations to their current range.

This proposed program would develop a broad containment zone (in line with the state government's containment line) that receives annual inspection and serrated tussock control. It would be the intent of this program to slow the potential spread of serrated tussock into the western portion of the shire.

Unfortunately, this approach would mean that heavy infestations of serrated tussock on the eastern side of the containment zone would not receive any control works.

Proposed program 3. Roadside rabbit control program:

Undertaking rabbit control on roadsides will only be effective if control is also undertaken on adjoining properties, given the high proportion of burrows that exist under boundary fence lines. Therefore, it is proposed that roadside rabbit control works only be undertaken when there is the ability to incorporate these works into a landscape-scale rabbit control program led by Landcare or similar community group. A stakeholder forum will be held annually to discuss the actions of Landcare and the potential for collaboration on rabbit control.

Budget will be allocated towards rabbit control annually to support a landscape-scale control program and to provide leverage for Landcare to attract funding to undertake a project. In those years where no landscape-scale rabbit control program is being coordinated, money allocated to roadside rabbit control will instead be diverted towards woody weed control as a means of rabbit harbour removal.

Proposed program 4. Caltrop control program:

Caltrop is an emerging Regionally Prohibited weed of significance that is currently known to occur only within the Bacchus Marsh Township, on approximately 10km of roadside. It is proposed that a program be implemented with the aim of eradicating this infestation. The program would utilise contractor labour to undertake multiple controls (approximately 5) throughout the summer season on all roadsides believed to contain caltrop plants. Progress will be monitored throughout the year, with contractors required to arrive on site soon after rainfall has stimulated plant growth.

Proposed Program 5. Roadside Blackberry Control to Support Community Action

While it is recommended that additional funding be sought to commence a broadscale roadside blackberry control program throughout the whole road network, Council can facilitate and support collaborative community action to control this weed.

Like the roadside rabbit control project above, it is recommended that budget be set aside to offer on-ground support to suitable projects (via control of roadside infestations within project area). Suitable projects would need to demonstrate cross-tenure collaboration and a long-term commitment to landscape improvement. In those years where no suitable project is available, budget for this project would be added to the roadside gorse control program to extend its scope and reach.

Proposed program 6. 'Emerging weeds' control program

It is proposed that a small-scale program be commenced to target 10 'emerging weeds' that currently have limited distribution throughout the shire's road network but have the potential to greatly expand if left uncontrolled. These 10 species are:

- African love grass
- African boxthorn
- Artichoke thistle
- Bluebell creeper
- Chilean needle grass
- Prickly pear
- Spanish heath
- St John's wort
- Sweet Briar
- Wheel cactus

It is proposed that this 'emerging weeds' control program uses the following basic three-step approach:

1. Mapping of infestations across road network by Council staff using historic data and current observations.
2. Prioritising those areas where control is more needed or where program efficiencies can be found (e.g., by tying works into other roadside programs that target similar species).
3. Contractors engaged to undertake control on priority roadsides

The addition of this program to the action plan also offers a level of flexibility and response to new threats. It is recommended that this program also be used to control any high-threat species that are not yet known to occur within road reserves in Moorabool Shire, but which appear throughout the life of this plan.

Proposed program 7. High-value environmental roadsides protection program

Many roadsides throughout Moorabool contain vegetation that is environmentally significant. This includes many species and communities that are protected under state and commonwealth legislation such as the Flora and Fauna Guarantee Act and the Environment Protection of Biodiversity Act.

To protect these significant areas of roadside vegetation, it is proposed a small-scale weed control program be implemented on these roads. This program would target a wide range of species that have the potential to compromise the natural function of these environments.

Further justification for this project comes from the rationale of the Bradley Method of weed control. This method demonstrates the significant financial benefits of commencing weed control activities in areas with low infestations to contain any further spread, before commencing works on established infestations. This proposed program will protect key sites and prevent the further spread of problem weed species.

It is proposed that approximately 10 roads with the highest environmental values for this program. With the investment of a small proportion of available budget, 2-4 of these roads could be targeted annually, with all selected roads receiving some level of weed control over the five years of this plan.

Given this program would be targeting a range of species, including unlisted environmental weeds, funding for this program would be drawn from Council's recurrent funding and not from the state government's RWPP grant funding.

BUDGET ALLOCATION TO PRIORITY SPECIES

Given the extent of pest plant and animal infestations on municipal roadsides and the budget available to undertake control actions, control works must also be prioritized.

Following the selection of priority species and cost estimations of control approaches (see also Appendix 1), the following annual budget allocations (Table 4) will be made towards each priority species. This allocation of funds will allow for the following control activities on roadside weeds and pests throughout Moorabool's Road network:

- Targeted gorse control program selecting 200km of highest priority roadsides annually for treatment.
- Control of Serrated tussock on approximately 322km roadsides throughout containment zone annually.
- Small-scale targeted rabbit control works where conducted in support of community action. Where no such program is available, money will be invested into weedy harbor removal.
- Continuation of caltrop eradication program throughout urban Bacchus Marsh.
- Small-scale targeted blackberry control works where conducted in support of coordinated community action. Where no such program is available, money will be invested into the roadside gorse control project.
- 'Emerging weeds' control program on approximately 10km of roadside, targeting 10 focal species with restricted ranges.
- Small-scale control of high-threat weeds on high-value conservation roadsides to protect known endangered species and communities.

MOORABOOL SHIRE COUNCIL ROADSIDE WEED AND RABBIT ACTION PLAN 2022 – 2026

Target Species	Program aim	Target road length	Estimated rate	Total budget allocation	RWPP funding contribution	Council contribution
Gorse	Reduction of existing infestations Ongoing control at low densities	115 Km	\$300/km	\$35,000	\$17,500	\$17,500
Serrated tussock	Containment	384 Km	\$70/km	\$26,898	\$19,445	\$7,453
Rabbits	Support of clear, ongoing community projects	NA		\$7,000	\$3,500	\$3,500
Caltrop	Eradication of species from Council managed land	10km x 5 treatments annually	\$60/km	\$3,000	\$1,500	\$1,500
Blackberry	Support of clear, coordinated, and ongoing community projects	17 km	\$300/km	\$5,000	\$2,500	\$2,500
'Emerging weeds' control program	Prevent the further spread and where possible eradicate 10 selected 'emerging weed' species from roadsides	12 km	\$250/km	\$3,000	\$0	\$3,000
High-value conservation roadsides	Protection of nationally threatened species and ecosystems	25 Km	\$200/km	\$5,000	\$0	\$5,000
				\$84,898 (ex)	\$44,445 (ex)	\$40,453 (ex)

TABLE 4: SUMMARY OF ANNUAL BUDGET ALLOCATION TOWARDS EACH PRIORITY PEST SPECIES AND THE AIMS OF EACH PROGRAM.

POTENTIAL PROGRAM EFFICIENCIES

There are many pest species of concern occurring on roadsides throughout Moorabool. It is therefore important for control programs to be as efficient as possible so that species of concern that are not yet a “priority species” begin to receive control action.

While the development of these programs targeting the priority pest species in priority areas will allow for continued reduction/containment of these species, there are several other activities that could significantly boost the effectiveness of roadside pest management. These opportunities are discussed below:

Program integration:

Many of the species of concern that persist on roadsides can be broadly categorised as either ‘woody weeds’ or ‘grassy weeds. Woody weeds include gorse, blackberry, broom, hawthorn, and sweet briar, while grassy weeds include serrated tussock, African love grass and Chilean needle grass.

The species within each of these categories have similar growth habits and control requirements. Given that Moorabool currently coordinates a successful roadside gorse control program and a successful roadside serrated tussock control program, there is a potential efficiency available through having contractors target multiple weed species simultaneously, greatly saving on costs and project management requirements.

While this efficiency is easy to achieve, it is important that broadening of the program targets does not come at the cost of reduced efficiency of the primary target. As the current budget does not yet allow for all infestations of the primary targets to be treated annually, including additional species risks limiting the ability to reach the primary aim of the current programs and therefore risks the gains made to this point. Expanding these programs to include additional weed species is however a logical next step should current infestations be further controlled, or additional funding become available.

Community outreach for private property management:

Municipal road reserves only account for a small percentage of the total area of Moorabool Shire. Most of the land is within private ownership and the management of this land directly impacts the management of road reserves. For example, after 10 years of targeted gorse control on roadsides, the roads that continue to require control works are those where gorse infestations persist on neighbouring properties. This point is even more relevant for the control of serrated tussock which can disperse its seeds many kilometres.

An investment from council to increase its community outreach and education regarding pest plant and animal control has the potential to greatly reduce ongoing costs of programs or prevent the need for some future programs altogether.

Community engagement – improving Landcare partnerships:

The community and the large network of environmental volunteers could help with the effective delivery of this action plan through data collection, observations, and stewardship of roadsides.

With the development of a suitable reporting mechanism, the community could assist by actively mapping their observations throughout Moorabool's Road network. This includes sightings of new and emerging weed species as well as problem infestations of established species. These actions would reduce the costs of Council undertaking in-house mapping and would assist in targeting actions to locations where they are most required.

Similarly, community environmental stewards could also assist with the management of key environmental roadside vegetation by undertaking voluntary weed control and collecting observations of significant native species requiring preservation.

To capitalise on the network of interested community members, Council would need to invest further resources into the operational budget and staffing underpinning their environmental management programs. Action would be needed to expand project partnerships and to provide greater access to data collected by Council in the delivery of this plan. Investing time into developing these programs would however greatly aid in the delivery of this action plan.

Community engagement – outreach and extension:

As discussed, in in this action plan, the effectiveness of Council's roadside weed control programs is largely dependent on the action of adjoining landowners. Increasing the engagement and education of these landowners is therefore one way to increase the effectiveness of roadside programs and reduce costs over the long-term.

Investing in the outreach capacity of Council staff to host community workshops, to attend field days and publicise programs would greatly assist the delivery of the planned projects. This outreach and extension also allow for partnership with both Landcare and Agriculture Victoria who can, respectively, add insight into land management assistance programs and the responsibilities of landowners under current legislation.

Broadscale blackberry control

Blackberry infestations cover approximately 795 km of the 1,440 km road network and the species continues to cause the greatest community angst (measured by Council customer service requests). The small-scale blackberry control project proposed in this plan aims for approximately 17km of roadside to be controlled annually, in collaboration with community action. Undertaking more extensive, broadscale works would be beneficial to the effectiveness of works and have direct benefits to other projects (e.g., rabbit control). To commence a broadscale control program with current budget allocations, however, would draw funding away from other priority species, compromising their efficiency, extending their timeline for success, and increasing costs in the long-term.

An estimated cost of a blackberry control program (along with the estimated costs of effectively controlling other priority species) has been included in Appendix 1. This cost estimate allows for the development of proposals to seek sufficient funding to commence a broadscale and targeted program across the entire road network

Removal of weedy rabbit harbour:

The first step to implementing a rabbit control program is to remove the above-ground harbour where rabbits shelter from predators and construct their warrens. In most instances the harbour used by rabbits is weedy (e.g., blackberry bushes) and therefore its removal has the dual benefit of rabbit control and weed control.

Given the difficulties of undertaking other rabbit control methods on roadsides (e.g., ripping) harbour removal is a valuable first step towards population reduction. While removing harbour alone does not eliminate rabbits, it does reduce their population and their ability to disperse and breed. As discussed in previous sections, woody weed infestations on roadsides can harbour an exceptionally high number of rabbits and the removal of this harbour creates an instant impact on both the weed and rabbit issues at the site.

Unfortunately, harbour removal on roadsides can be difficult and costly; generally requiring heavy machinery and traffic management plans. Investing in a harbour removal program however would greatly boost the effectiveness of a roadside blackberry program, while also significantly reducing rabbit populations. In addition to this, the visual impact of harbour removal works provides a great opportunity for community engagement and appreciation of works.

Greater investment in new and emerging weed species:

There are currently many weed species on Moorabool roadsides that have a restricted range but also have the potential to greatly expand their range. Roadsides are also common places for new weed incursions to begin, with seeds often spread by vehicles and machinery.

Eliminating weeds while their populations are low, and their range is restricted is the most cost-effective form of control. The low-cost investment of removing a species when it is first detected can save on the need for a years or decades long control program that is required when the species becomes widespread.

Including a small-scale emerging weeds control program within this plan is an important long-term investment. However, should additional funding become available, it is recommended that this program be expanded to quickly eradicate known emerging weed species and to prevent other emerging weed species becoming more prevalent.

Greater oversight of maintenance vehicles on roadsides:

Vehicles are a major vector for weed spread. There is the high potential for Council's maintenance vehicles, including roadside slashing vehicles and drainage maintenance machinery to facilitate weed spread throughout the shire.

Ensuring maintenance vehicles working on roadsides are free from weeds and pests is a simple way to reduce management costs and prevent outbreaks of new species.

Increasing the environment team's capacity to engage with the teams responsible for operating machinery on roadsides and ensuring vehicle cleaning plans are in place would benefit the broader landscape.

PART 3: PLANNED PROGRAMS

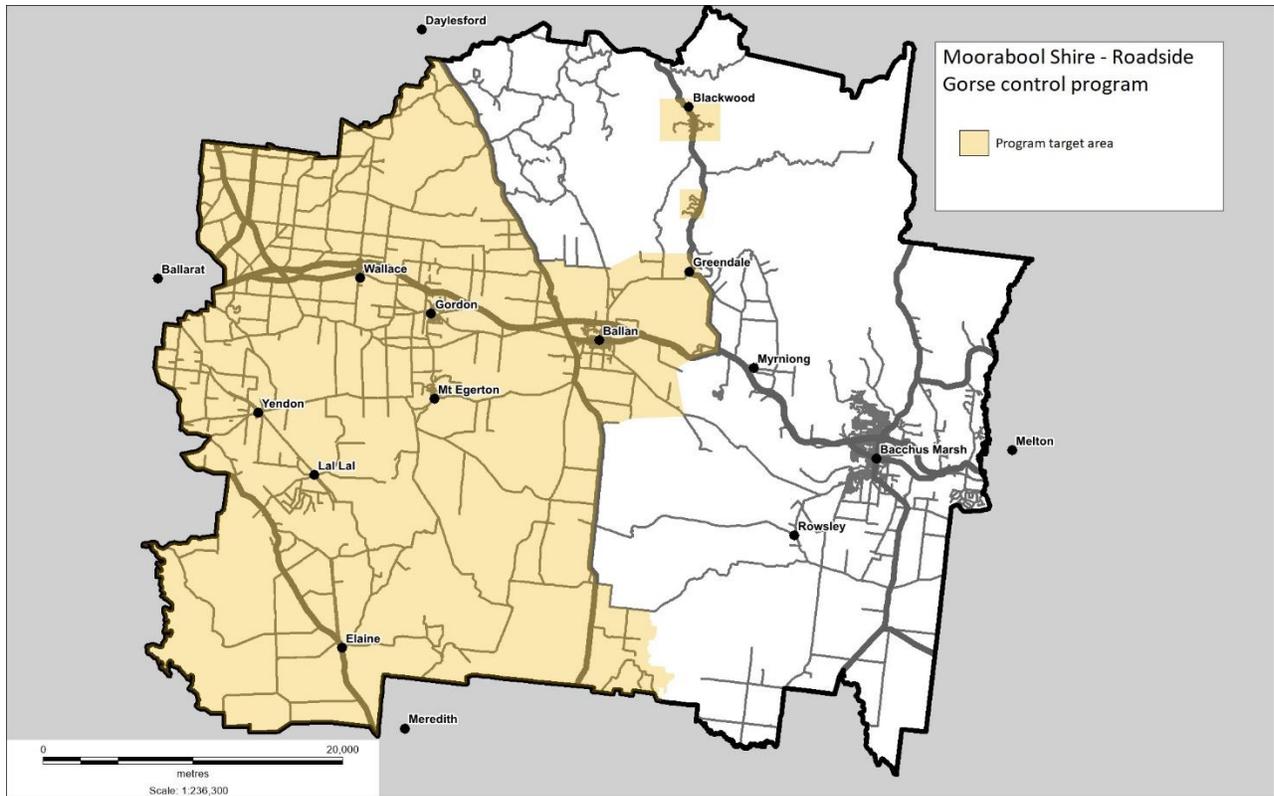


PROGRAM 1: ROADSIDE GORSE CONTROL

Allocated program budget: \$35,000 annually

Annual target road length: 115 km

Program target area:



MAP 2: ROADSIDE GORSE CONTROL PROGRAM – TARGET AREA

Background and project objectives:

Gorse (*Ulex europaeus*) primarily grows in the higher rainfall, western areas of Moorabool Shire. The species has known infestations on approximately 547 kilometres of roadsides, however its potential range is far greater than this.

This program aims for the control (reduction in distribution, extent, and infestation size) across the Moorabool Road network. Given the seed viability and the presence of gorse on neighbouring public and private land, it is unlikely that gorse will be eradicated from the region, however it can be significantly reduced with effective control measures.

Annually, Council staff will map and assess gorse infestations across the road network. From this data, 200 km of roadside will be prioritised for control.

As can be seen on the below matrix, when selecting roads for prioritisation within this program, infestation levels on both the roadside and adjoining property will be considered. In general, the following hierarchy will be attached to roads under consideration. Roads adjoining properties with low infestations will be prioritised for treatment as these works are more likely to be effective in the long term and it will support the actions of private landowners who are taking action to control weeds on their land. Roadsides that adjoin heavily infested properties will receive a lower level of prioritisation as works in these sites are compromised and prone to rapid reinvasion.

		Infestations on private property	
		Low	High
Infestation on roadside	Low	Low/Low	High/Low
	High	Low/High	High/High

Priority hierarchy	Infestation level (Private/roadside)
Highest  Lowest	Low/Low
	Low/High
	High/Low
	High/High

Timing and methods:

As shown below, gorse infestations will be assessed during winter and spring, while the plants are in flower and easily observed. Control will primarily consist of herbicide application, which will occur during summer while plants are water stressed. Should significantly large infestations be found, and budget is available for works, mechanical mulching of infestations may occur throughout winter, while the fire risk is reduced. Given extensive previous effort to control gorse on the roadsides of Moorabool Shire, few large infestations requiring mulching remain.

MOORABOOL SHIRE COUNCIL ROADSIDE WEED AND RABBIT ACTION PLAN 2022 – 2026

Action	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Map infestations												
Gorse control – Herbicide application												
Gorse control – Mechanical												

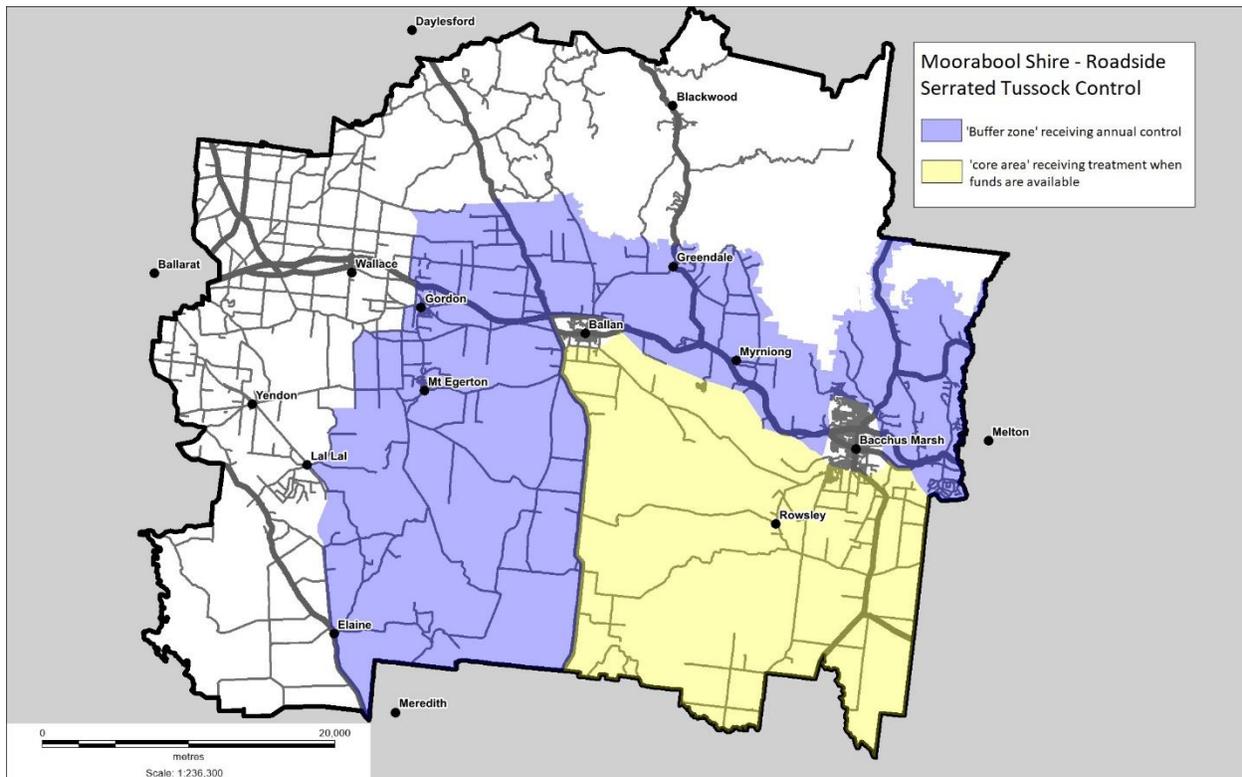
	Scheduled program
	Works subject to available funds

PROGRAM 2: ROADSIDE SERRATED TUSSOCK CONTROL

Allocated program budget: \$26,898 annually

Annual target road length: 384 km

Program target area:



Map 3: Roadside Serrated tussock control program – target area

Background and project objectives:

Serrated tussock is prevalent throughout the eastern region of Moorabool Shire but continues to spread further west as seed is transported via vehicles, livestock, and the wind. To protect the shire's environmental and agricultural assets, it is important to restrict the spread of this species.

This program's aims align with those of the Victorian Government; implementing an area of containment to prevent further spread. This containment zone is shown within Map 3 and all roads within this zone (approximately 384 km) will receive serrated tussock control annually. Any infestations identified on roadsides west this containment zone will be prioritised for immediate control.

Timing and methods:

As shown below, serrated tussock infestations will be assessed prior to seed-set in September and October. Should urgent works be required, these will be completed in spring.

Further assessment will be undertaken in early autumn when new plants have germinated. Most control works will occur throughout Autumn and into winter. Control will primarily consist of herbicide application, which will occur while plants are actively growing.

Action	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Map infestations												
Serrated tussock control – Herbicide application												

	Scheduled program
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PROGRAM 3. ROADSIDE RABBIT CONTROL PROGRAM:

Allocated program budget: \$7,000 annually

Annual target road length: Determined annually based on community-led projects

Program target area: Determined annually based on community-led projects

Background and project objectives:

European rabbits are one of the most damaging pest species throughout Australia and responsible for the endangerment of many native species (both flora and fauna). Rabbits are widespread throughout Moorabool Shire and damage both environmental and agricultural assets.

Managing rabbits can be challenging, given their ability to cross property boundaries and their capacity to quickly re-establish populations following control actions. For these reasons, Council's planned rabbit control program will focus on two core elements:

1. Coordinating action with neighbours
2. Targeting the destruction of rabbit warrens to prevent rebreeding

This program will work with Landcare to select a suitable target area where rabbit control can be implemented across private property and roadsides simultaneously. Without this coordinated action, rabbit control in either of these areas would be ineffective. The objectives of the actions are, through the use of best practice management actions, to reduce rabbit populations by more than 95% and map and destroy all warrens within the target area.

Where coordinated action between Landcare and council can't be arranged, funding for this program will instead be used to remove weedy rabbit harbour on roadsides, in preparation for future rabbit control programs.

Timing and methods:

Rabbit control works undertaken as part of this program will aim to be undertaken in line with best practice. Undertaking rabbit control works on roadsides however is difficult (given road users, underground infrastructure, native vegetation, and fences) so therefore some compromises will need to be made.

The first action undertaken as part of a roadside rabbit control program is thorough assessment

No rabbit baiting will be undertaken on roadsides. Baiting on roadsides is not permissible as the free movement of the public through these spaces makes baiting unsafe for the public. In coordinating a rabbit control program alongside a community-led control program, Council advocates for rabbit baiting to occur on participating private properties, in line with best practice advice and label requirements.

Action	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Map infestations												
Harbour removal												
Warren destruction												
Fumigation												

	Scheduled program
	Harbour removal actions if no community led program is available to support

PROGRAM 4. CALTROP CONTROL PROGRAM:

Allocated program budget: \$3,000 annually

Annual target road length: Approximately 10km

Program target area:



Map 4: Caltrop control program – target area

Background and project objectives:

Caltrop is a regionally Prohibited weed species that is common in northern Victoria but is known only in an isolated population in central Bacchus Marsh. If this species was to spread, it's impact would be severe on public recreation and the local community. A small-scale project is planned with the aim of eradicating this species within Moorabool shire.

Timing and methods:

A series of maintenance runs, controlling all visible caltrop plants with herbicide, will be undertaken each year throughout the summer months. Given the speed at which caltrop grows and develops seed, this work will be required prior to seed set to break the germination cycle.

MOORABOOL SHIRE COUNCIL ROADSIDE WEED AND RABBIT ACTION PLAN 2022 – 2026

Action	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Map infestations												
Herbicide application												

	Scheduled program
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PROGRAM 5: ROADSIDE BLACKBERRY CONTROL TO SUPPORT COORDINATED COMMUNITY ACTION

Allocated program budget: \$5,000 annually

Annual target road length: 17 km

Program target area: Determined annually based on community-led projects

Background and project objectives:

Blackberry is one of the most widespread weed species on the Moorabool Shire Road network. Blackberry grows into dense thickets that outcompete native species, prevent access to waterways, degrade productive farmland and provide harbour to several pest animal species.

Managing blackberry can be challenging. As the species is spread via animal vectors, new outbreaks can appear many kilometres from known infestations and will easily spread across fences, waterways, and districts.

Given the current extent of blackberry throughout the road network, crown land and private property in Moorabool Shire, achieving long-term blackberry control will require collaboration and coordination. Therefore, this program will work with Landcare to select a suitable target area where blackberry control can be implemented across private property and roadsides simultaneously. Funding within this project is to be used to control roadside blackberry infestations that occur within the Landcare project target area, where private property is also receiving ongoing blackberry control.

Where coordinated action between Landcare and Council can't be arranged, funding for this program will instead be used to extend the scope and extent of Council's roadside gorse control project.

Timing and methods:

As shown below, blackberry infestations within the program area will be assessed during spring, while the plants breaking dormancy. Control will primarily consist of herbicide application, which will occur during summer while plants are water stressed. Mechanical removal of blackberries would be considered if budgets allow, with this action occurring in Autumn/winter where there is reduced fire hazard.

MOORABOOL SHIRE COUNCIL ROADSIDE WEED AND RABBIT ACTION PLAN 2022 – 2026

Action	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Map infestations												
Blackberry control – Herbicide application												
Blackberry control - Mechanical												

	Scheduled program
	Works subject to available funds

PROGRAM 6. 'EMERGING WEEDS' CONTROL PROGRAM

Allocated program budget: \$3,000 annually

Annual target road length: 12 km

Program target area: All roads within shire, prioritising infestations that occur close to works being undertaken in other programs

Background and project objectives:

Many weed species are present in small populations on roadsides. Controlling these species while infestations are restricted makes economic sense. A number of these species have been selected to receive control over the coming years, to control emerging populations before they become widespread.

Timing and methods:

Mapping of emerging species will be conducted simultaneously to other roadside weed mapping. To deliver this program more efficiently, infestations of emerging species on roads that are already receiving control within another program (e.g., roadside gorse control) will be prioritised for action.

Broadly, these emerging weed species can be classified as 'woody weeds' or 'grassy weeds'. Generally, woody weed control will be undertaken during summer and grassy weed control undertaken throughout Autumn and spring.

Action	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Map infestations												
Herbicide application (woody weeds)												
Herbicide application (grassy weeds)												

	Scheduled program
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PROGRAM 7. HIGH-VALUE ENVIRONMENTAL ROADSIDES PROTECTION PROGRAM

Allocated program budget: \$5,000 annually

Annual target road length: Approximately 25 km

Program target area: 10 roads with highest environmental values (see below)

- Ingliston Rd
- Ballan – Meredith Rd
- Parwan – Exford Rd
- Egerton – Ballark Rd
- Reid's Rd
- Long Forest Rd
- Settlement Rd
- Elaine – Blue Bridge Rd
- Ballan – Egerton Rd
- Ingliston Settlement Rd

Background and project objectives:

Many roadsides throughout Moorabool contain vegetation that is environmentally significant. This includes many species and communities that are protected under state and commonwealth legislation such as the Flora and Fauna Guarantee Act and the Environment Protection of Biodiversity Act.

This program will target infestations of multiple weed species that are occurring on roadsides with significant environmental values. Weeds that have the potential to endanger threatened species or ecological communities will be priorities for control on these roads.

Timing and methods:

Work to control weeds within environmentally sensitive roadside environments will primarily be undertaken throughout spring and into summer. At this time the environmental values are readily visible and thus the risk of off-target damage is reduced.

Action	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Map infestations												
Herbicide application (woody weeds)												
Herbicide application (grassy weeds)												

	Scheduled program
--	-------------------

APPENDIX 1: CALCULATING COSTS OF PRIORITY WEED CONTROL

The program spend for the past three years of works on Moorabool Shire Roadsides was used to calculate an average cost per kilometer of roadside gorse and serrated tussock control. These values are shown below (Tables 5 and 6) and have been used throughout this document to estimate the cost of controlling these weed species across the entire Moorabool Road network (Table 7).

Gorse:

Year	Kilometers treated	Spend	Spend/km
2018/19	420	\$34,703	\$236/km
2019/20	170	\$50,396	\$296/km
2020/21	243	\$72,519	\$298/km
Average spend per kilometer = \$276			

TABLE 5: DATA USED TO GENERATE AN AVERAGE COST FOR THE CONTROL OF ROADSIDE GORSE INFESTATIONS

Serrated tussock:

Year	Kilometers treated	Spend	Spend/km
2018/19	335	\$21,055	\$62.9/km
2019/20	265	\$17,447	\$65.8/km
2020/21	322	\$22,579	\$70.1/km
Average spend per kilometer = \$66/km			

TABLE 6: DATA USED TO GENERATE AN AVERAGE COST FOR THE CONTROL OF ROADSIDE SERRATED TUSSOCK INFESTATIONS

Summary:

Using both the known extent of priority weed infestations of roadsides and the average cost per kilometer for control, the estimated total cost of control was calculated for three priority species. This total cost is for the single initial treatment of all roadsides. While further control and follow-up maintenance would be required, ongoing costs would be significantly lower than this initial cost. It should also be noted that there would be cost savings if works were conducted simultaneously, targeting multiple species.

		Cost or control	Total cost
Extent of roadside gorse infestations (2018)	547 km	\$300/km	\$164,100
Extent of roadside serrated tussock infestations	496 km	\$70/km X 384 km*	\$26,880
		\$140/km X 112 km**	\$15,680
Extent of roadside Blackberry infestations	795 km	\$300/km	\$238,500

TABLE 7: ESTIMATED TOTAL COST FOR CONTROLLING ALL ROADSIDE WEED INFESTATIONS, USING PREVIOUS WORKS AS BENCHMARK DATA

* Controlling serrated tussock on roadsides within the 'buffer zone' (384 km) costs approximately \$70/km as this area has received annual treatment for several years and infestations are relatively low.

** Controlling serrated tussock on roadsides within the 'core zone' (112 km) is estimated to cost approximately \$140/km as this area has not received annual control for several years and therefore infestations are very high.