



CENTRE FOR
INVASIVE SPECIES SOLUTIONS

BEST PRACTICE MANAGEMENT FOR THE CONTROL OF *gorse (Ulex europaeus)*

ADDENDUM TO THE WEEDS OF NATIONAL SIGNIFICANCE GORSE NATIONAL BEST PRACTICE MANUAL



weeds.org.au

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ALWAYS READ THE LABEL: Users of agricultural chemical products must always read the label and any permit, before using a product, and must strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

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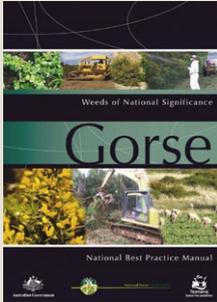
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Cover images

Front — Gorse growing through a paddock fence in Tasmania. Image by Gillian Basnett, Centre for Invasive Species Solutions.

Back — Gorse overrunning a paddock. Image by Kate Blood, Department of Primary Industries, Victoria.

How to use this addendum



The gorse national best practice manual was first published in 2006 and updated in 2009. [Available online](#), the manual provides information on the weed and best practice management options. Any updates to the information contained within the manual are included in this addendum and should be taken as the most current source of information.

Note: the addendum is not a standalone document and should be read in conjunction with the manual.

The addendum focuses on updates to control options, including mechanical, chemical and biological control methods. It also includes updates on available herbicides and where to go to find additional information on gorse (or furze) and its management.

When new or additional information is provided in the addendum, page numbers reference the related text in the original manual.

Chapter 2 Gorse control

2.4 Developing a gorse control plan

Page 24 – In your planning process, step 1 should also include setting your goals. These should be clear, realistic and time-bound based on your site assessment and mapping. They should reflect what you are trying to achieve. For example, are you trying to prevent weed spread throughout your property or to protect a significant asset?

It can be useful to set goals for the near term (one to two years) and also for the medium or longer term (5–10 years or beyond).

Setting goals

A useful starting point to determine your goal is to consider the level of gorse invasion and assign an appropriate management objective. Then, turn your management objective into on-ground action.

For example:

MANAGEMENT OBJECTIVE	DESCRIPTION	MANAGEMENT ACTIVITIES
Prevention	Prevent new gorse from arriving and / or establishing	Surveillance Hygiene / spread prevention Education and awareness
Eradication	Eliminate all gorse plants and propagules from an area, where there is limited or no potential for reinvasion	Survey to determine extent (delimitation) Hygiene / spread prevention Integrated management (chemical and/or physical/mechanical)
Containment	Prevent the further spread and establishment of gorse beyond a predefined area (core infestation) and reduce the impact within the area it occurs	Hygiene / spread prevention Integrated management (chemical and/or physical/mechanical)
Asset protection	Reduce the adverse impacts of gorse on high value assets by protecting and restoring those assets	Hygiene / spread prevention Integrated management (chemical and/or physical/mechanical)

Adapted from Sheehan and Potter (2017), pp 54-55.

Online tools for mapping infestations

A map is an effective way to record infestations of gorse. There are many free mapping tools available online; for example:

- the Atlas of Living Australia (www.ala.org.au) provides a [free tool to make maps](#)
- Tasmanian people can use the free, easy-to-use app online called LISTmap (<https://maps.thelist.tas.gov.au/listmap/app/list/map>) that allows you to view, create and share your own customised maps.

2.5 Preventing spread of gorse

Page 27 – The links for detailed guidelines for hygiene and washdown are out of date. Instead, visit:

- [Weed and Disease Planning and Hygiene Guidelines](#) (PDF, 6.6 MB) from Tasmania’s Department of Primary Industries, Parks, Water and Environment (page 23 onwards)
- [Best practice serrated tussock weed hygiene guide](#) (PDF, 3.3 MB) from the Victorian Serrated Tussock Working Party (page 8 onwards). [Although this focuses on serrated tussock, it deals with other priority weeds and provides excellent guidelines for good hygiene practices and auditing to prevent the spread of all weeds.]

The risk of weed invasion dramatically increases during and after an emergency such as drought, fire or flood. After these events, while dealing with other pressing emergency response and recovery issues, the spread of weeds can often be overlooked.

However, these events can provide opportunities to expedite the control of weeds that have been burned in a hot wildfire or cleared from a riverbank by flood.

The case study in Victoria below shows that preplanning and allocating resources for effective gorse control after such an event can prevent regrowth and reduce much effort and cost in the future.

Case study: Using a post-wildfire window to target gorse in south-west Victoria

by Lisette Mill, Landcare Network Facilitator, Basalt to Bay Landcare Network and member of the Victorian Gorse Taskforce

The Princes Highway (A1) at Garvoc is a two-lane major arterial route between Colac and Warrnambool in south-west Victoria. To the north of it is farmland, to the south is the Warrnambool to Geelong railway line, and to the west is the small rural community of Garvoc.

The road reserve on the A1 is a Themeda triandra-dominated remnant of the Natural Temperate Grasslands of the Victorian Volcanic Plains, which is listed as a ‘Critically endangered’ community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

This grassland co-occurs with areas of Plains Grassy Woodland, a listed community under the Victorian *Flora and Fauna Guarantee Act 1988*. It is threatened at Garvoc by a number of weeds – including gorse, broom, pampas grass and blackberry – as well as exotic pasture grasses and forbs.

During a project to map the presence of gorse in 2016, it became apparent to the Landcare Network Facilitator, Lisette Mill, that roadside control of gorse by contractors was not always achieving a reduction in infestations.

Upon completion of the mapping project, Lisette used the data to advocate for increased investment in control on all VicRoads gorse sites in the local government areas of Moyne and Warrnambool. This included the site at Garvoc, where control was previously only carried out on an ad hoc basis.

In March 2018, a wildfire swept over Garvoc, burning the road reserve and adjoining areas. An emergency recovery response was rapidly deployed to restore services and infrastructure, such as road and rail infrastructure, power poles and fencing.

The fire removed all visible signs of the weeds that previously occupied the site; however, the seed bank and root stock remained. Following the fire, it became evident that the original gorse infestations had spread further. Lisette was proactive in advocating the need for a coordinated response to weed control and for it to be incorporated into the broader fire-recovery plan.

In May 2019, Moyne Shire Council received funding to boost their roadside gorse-control program. The Basalt to Bay Landcare Network partnered on the project, providing an audit of the subsequent gorse control on the VicRoads sites and a report on contractor control effectiveness to both council and VicRoads.



a)



b)

(a) The gorse site near Garvoc immediately after the wildfire in March 2018;

(b) Regrowth of gorse and other weeds at the site three years later, in March 2021, before treatment.

The audit, conducted in July 2019, showed that the gorse infestation had doubled in size postfire and that significant areas of gorse had been missed by the appointed contractor. This was because of factors such as timing of application, low efficacy and an insufficient weed-control budget.

The site was subsequently retreated; however, within six months there was significant gorse seedling emergence, warranting further treatment. Unfortunately due to the COVID-19 pandemic, this follow-up did not occur.

In 2021, Basalt to Bay Landcare met with Regional Roads Victoria and Fulton Hogan to demonstrate how much gorse and blackberry growth had been triggered by the fire three years before. This conversation resulted in funding for gorse and blackberry control, with works commencing in mid-2021.

Basalt to Bay Landcare have now repeated the previous audit, concluding that there has been a dramatic improvement in control efficacy.

This is a positive step towards reducing the impacts of gorse and blackberry on the state and commonwealth listed native vegetation communities. Continuing to audit the site will help to determine if current treatments are reducing the weed extent and spread over time, and will help to inform management decisions and future investment.

Lessons

- Fire provides a window of opportunity for weed control in sensitive environments. We need to act fast when weeds start to emerge, and to follow up frequently.
- Contractors need to be experienced in identifying and treating target weeds, and understand the management objective and the significance of the site.
- The best outcomes occur when people work collaboratively, cross tenure to protect environmentally sensitive areas.
- Threatened Ecological Communities and the processes that affect them (such as weed invasion) need be considered when planning postfire recovery programs, and integrated with other emergency responses.

2.8 Mechanical clearing

Page 31 – Slashing, grooming and mulching are possible all year round. However, it should be avoided during:

- wet conditions because of safety risks to operators, risk of machinery bogging and risk of compacting the soil
- hot, dry conditions because of fire risk.

Burning the decaying mulch after a year may be a cost-effective follow-up control method.

Before you undertake any form of mechanical control, it is very important to ensure you have adequate hygiene measures in place. Ideally, carry out works when gorse seed is not present; and ensure all machinery is inspected and cleaned for seed, other propagules and soil that may contain seed.

Gorse mulching or grooming

Page 32 – A more recent application of the mulching technique has also been used on dense infestations in northern Tasmania.

Sites were treated with a track loader and forestry mulcher; the mulcher turns the gorse into a fine layer of organic material.



Source: Monster Mulching

This technique is thought to:

- reduce fire risk from gorse plants
- protect the soil from erosion
- minimise soil disturbance and thus reduce the germination of gorse seedlings
- reduce the above-ground gorse material without use of chemicals
- improve access for follow-up control
- avoid the need to pile the gorse material and later burn it.

Follow-up control is required, and spraying is typically used. This method uses significantly less chemical than would have been required to reduce the original infestation with spraying alone.

However, mulching can be costly, so research whether this method is suitable for your situation.

More information on gorse mulching, including a short video, can be found on the [Victorian Gorse Taskforce website](#).

2.9 Cultivation

Page 33 – Monitoring and follow-up cultivation/use of other treatment methods are vital for a successful gorse control program.

2.10 Herbicides

Page 34

Herbicide labels and legislation

The Australian Pesticides and Veterinary Medicines Authority (APVMA) regulates the availability of all pesticides, which includes herbicides. Herbicides are registered with the APVMA for specific applications, as stated on the label. State governments regulate the use of pesticides after sale. A herbicide label is a legal document that defines where, when and how a herbicide can be used on which weed species and at what rate.

Note: not all registered herbicides are commercially available. Often, companies improve herbicide formulations and only market the new formulation. For example, many herbicides are being marketed in higher concentrations. This reduces transport, storage and container-disposal costs.

In addition to herbicides being registered and described 'on-label' for specific weeds and situations, herbicides can sometimes be used through permits or 'off-label' use. These situations are described below.

Minor use and emergency use permits

APVMA may issue minor use and emergency use permits for herbicide applications that are not otherwise registered for that particular use. Minor use permits are sometimes referred to as 'off-label' permits. Minor use and emergency permits are valid ('in force') for a limited time. See the [APVMA website](#) to find current permits.

Some states also have permits for the control of 'declared' weeds and may not specifically list the weed species to be controlled. These permits will often list a range of herbicides that can be used for the control of declared or environmental weeds. To find these permits for your state:

- go to the [APVMA permits database](#) search
- enter 'declared weeds' or 'environmental weeds' in the SEARCH box
- click the search term 'Pest/purpose'
- click 'Search'.

It is also recommended that if you are unsure which herbicides can legally be used on a particular weed in your state, contact the relevant biosecurity section of your state department of agriculture. When using herbicides in aquatic situations, only use those that are registered or permitted for use in and around aquatic areas.

Any minor use permits relevant to gorse at time of publication are listed in Table 4.

Off-label use

Off-label use is the use of a registered chemical to address a specific issue that is not covered by the APVMA-approved label. Off-label use is to:

- control a different weed (or pest)
- apply at a different rate (only lower)
- apply in a different manner (not allowed in ACT, NSW and Tasmania).

Off-label use is permitted in all states and territories; however, conditions vary in each jurisdiction (Table 1). Any minor use permits relevant to gorse at time of publication are listed in Table 4.

Table 1. Where to find specific rules relating to herbicide use, including off-label use, in each state and territory

STATE/ TERRITORY	WEBSITE AND FURTHER INFORMATION
ACT	Agvet chemical use https://www.accesscanberra.act.gov.au/s/article/pest-and-weed-control-tab-Agvet-chemical-use
NSW	Pesticides https://www.epa.nsw.gov.au/your-environment/pesticides/pesticides-nsw-overview Weed control and identification https://www.dpi.nsw.gov.au/biosecurity/weeds/weed-control
NT	Chemical use https://nt.gov.au/industry/agriculture/farm-management/using-chemicals-responsibly
Qld	Chemical use https://www.business.qld.gov.au/industries/farms-fishing-forestry/fisheries/aquaculture/chemicals/registered
SA	Rural chemicals https://pir.sa.gov.au/biosecurity/rural_chemicals Weed control handbook https://www.pir.sa.gov.au/_data/assets/pdf_file/0020/232382/WEB_8867_PIRSA_Weed_Control_Handbook_2018.pdf (PDF, 4.2 MB)
Tas	Agricultural and veterinary chemicals https://nre.tas.gov.au/agriculture/agvet-chemicals Weeds https://nre.tas.gov.au/invasive-species/weeds
Vic	Off-label chemical use https://agriculture.vic.gov.au/farm-management/chemicals/offlabel-chemical-use
WA	Using pesticides safely https://ww2.health.wa.gov.au/Articles/U_Z/Using-pesticides-safely

Herbicides available for use on gorse are listed in Table 3 and Table 4.

Safety and training

Page 34 – Personal protective equipment (such as protective clothing, eye or face shields, and respiratory protection) must be used in accordance with the recommendations stated on the herbicide label or permit. Chemical-use training is required for people using herbicides as part of their job or business. Training is recommended for community groups and may be required if working on public land. Training courses are run by ChemCert, AusChem and TAFE in each state. Other training courses may be available through state agencies (e.g. AgTrain in Victoria, SMARTtrain in NSW), local councils or non-government organisations.

By law, you must read the label (or have it read to you) before using any herbicide product. Always follow the label or permit.

2.10.1 Chemical user certification

Page 34 – Commercial weed-control operators need to be licensed in most states (Table 2). It should also be noted that there is now shared responsibility between landholders and their contractors for any breaches of laws and regulations (such as herbicide drift).

Table 2. Chemical-user certification by state and territory

STATE/ TERRITORY	WEBSITE
ACT	www.accesscanberra.act.gov.au/s/article/pest-and-weed-control-tab-Agvet-chemical-use
NSW	www.epa.nsw.gov.au/your-environment/pesticides/licences-and-advice-for-occupational-pesticide-users
NT	nt.gov.au/industry/agriculture/farm-management/using-chemicals-responsibly/spray-applicator-licences
Qld	www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/chemical-controls/commercial-operators
SA	www.sa.gov.au/topics/business-and-trade/licensing/building-and-trades/pest-control-licence
Tas	nre.tas.gov.au/agriculture/agvet-chemicals/licences-and-certificates/ground-spraying-and-pest-management-licences
Vic	agriculture.vic.gov.au/farm-management/chemicals/licences-and-permits/commercial-operator-licence-for-contractors
WA	https://www.health.wa.gov.au/articles/n_r/pest-industry-licensing-and-registration

2.10.3 Getting the best results from foliar spraying

Page 35 – Successful herbicide control is dependent on the right herbicide for the target species, growth stage of the target species, weather conditions during and after spraying, how thoroughly the herbicide is applied, and the herbicide mix and application rate.

For spraying, wind speeds should be low (< 15 km/h) with no rain expected in the following six hours.

Do not apply herbicide to plants that are under any sort of stress, as herbicide will not be absorbed and translocated effectively, resulting in a reduced level of control. Plants may be stressed due to:

- dry soil
- low humidity
- air temperatures above 30 °C
- frost.

Effectiveness of herbicides can be maximised further by:

- mixing dye with the herbicide to help minimise missed areas and prevent overspraying (double spraying)
- using an adjuvant – an additive that improves herbicide uptake (always read the adjuvant’s product labels to ensure that they are compatible with the particular herbicide and there are no restrictions on their use; e.g. most adjuvants should not be used near waterways)
- ensuring spray equipment is correctly calibrated and maintained, including being thoroughly cleaned between uses.

Spraying in sensitive areas

(Also see page 97) – Herbicide users have a legal obligation to avoid spray drift damage and to ensure that the chemicals applied stay within the target area. Target-weed infestations are often located in areas of native vegetation, so great care should be taken to avoid spraying surrounding foliage and soil. Do not use high pump/sprayer pressures that create small droplets which float in the air. Adjust the nozzle settings to produce coarser droplet sizes.

2.10.4 Choosing a herbicide for foliar spraying

Page 36 – Herbicides available for use on gorse are listed in Table 3 and Table 4.

Table 3. Herbicides permitted for use on gorse under registration

ACTIVE INGREDIENT	COMMERCIAL PRODUCT EXAMPLES ¹	RATE	STATE OR TERRITORY ²	COMMENTS
Situation: Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights of way				
glyphosate ³ (360 g/L)	weedmaster® Duo	1 L/100 L water handgun	All	Add Pulse® as per label. Apply to actively growing bushes. Spray to wet all foliage.
aminopyralid + metsulfuron (375 + 300 g/kg)	Stinger®	30 g/100 L water	All	Handgun application for bushes up to 2 m tall. Add Pulse penetrant.
metsulfuron methyl (600 g/kg)	Associate®	15 g + Pulse®/100 L water handgun	Vic, Tas, SA, NSW only	Apply to bushes up to 2 m tall. Ensure thorough spray penetration and coverage of whole plant. Do not use on alkaline soils if replanting.
aminopyralid + picloram ⁴ + triclopyr (8 + 100 + 300 g/L)	Grazon® Extra	250–350 mL/100 L water 500 mL/100 L water	All	Apply with handgun to actively growing plants. Use higher rate on bushes over 1.5 m high or as an autumn treatment. Add a non-ionic surfactant as per label. Handgun application for winter treatment. Brownout may not be complete until following summer. Add a non-ionic surfactant as per label.
picloram ⁴ + triclopyr (100 + 300 g/L)	Nufarm Conqueror®	250–350 mL/100 L water 500 mL/100 L water	All	Apply with handgun to actively growing plants. Use higher rate on bushes over 1.5 m high or as an autumn treatment. Add a non-ionic surfactant as per label. Handgun application for winter treatment. Brownout may not be complete until following summer. Add a non-ionic surfactant as per label.
aminopyralid + picloram ⁴ + triclopyr (25 + 100 + 200 g/L)	Tordon® RegrowthMaster™ herbicide	375 mL/100 L water	NSW, Vic, SA and Tas only	Spray September to March. Treat any regrowth the following season. Use a minimum of 3,000–4,000 L/ha for dense gorse.

ACTIVE INGREDIENT	COMMERCIAL PRODUCT EXAMPLES ¹	RATE	STATE OR TERRITORY ²	COMMENTS
picloram ⁴ + 2,4-D (75 + 300 g/L)	Tordon® 75-D	500 mL/100 L water	Vic only	Apply in spring.
picloram ⁴ (240 g/L)	Picoflex®	104 mL + 100 mL triclopyr (750 g/L)/100 L water 145 mL + 140 mL triclopyr (750 g/L)/100 L water	All	Spring and summer treatment only Add non-ionic surfactant as per label.
		210 mL + 200 mL triclopyr (750 g/L)/100 L water		Winter treatment Brownout may not occur until summer. Add non-ionic surfactant as per label.
		155 mL + 240 mL 2,4-D amine (625 g/L)/100 L water	Vic only	Spring treatment Brownout may not occur until summer. Add non-ionic surfactant as per label.
aminopyralid + picloram (4.5 + 45 g/L)	Vigilant® II	Apply a 3–5 mm layer of gel for stems less than 20 mm diameter. Apply 5 mm layer on stems above 20 mm diameter or greater.	All	Cut-stump method
triclopyr ³ (600 g/L)	Garlon® 600	170 mL or 340 mL/100 L water	All	Apply spring to mid-summer. Add a 100% concentrate non-ionic wetting agent at a rate of 125 mL/100 L water as per label. You may need to retreat regrowth. Use the higher water rate on older, hardened-off plants.
Amitrole + ammonium thiocyanate (250 + 220 g/L)	Amitrole® T herbicide	2 L/100 L water	Vic, Tas and SA only	Handgun Apply during summer before full flowering. Re-spraying will be necessary.

Notes to this table can be found at the bottom of Table 4.

Table 4. Herbicides permitted for use on gorse under minor use permits

PERMIT NO.	SITUATION	EXPIRES	PERMIT HOLDER	ACTIVE INGREDIENT	COMMERCIAL PRODUCTS ¹	RATE	COMMENTS
NSW							
PER89684	<i>Pinus radiata</i> plantations For the control of gorse in <i>Pinus radiata</i> plantations	30 June 2024	Forestry Corporation of NSW Persons who can use the product under this permit: Persons generally	clopyralid (750 g/kg) + hexazinone (750 g/kg) only	Various	As per permit	Add a petroleum spray oil as per permit. Highly damaging to eucalypts.
PER83324	Aquatic situations (non-potable) For the control of certain weeds in aquatic situations (non-potable)	31 August 2025	Snowy Monaro Regional Council Persons who can use the product under this permit: Employees and contractors employed by the Snowy Monaro Regional Council, Queanbeyan Palerang Regional Council, South East Local Land Services, Landcare groups and local weeds groups, who are trained in the preparation and use of agricultural chemicals and under the direction of the permit holder.	metsulfuron methyl (600 g/kg) glyphosate (360 g/L) registered for aquatic situations.	Macspreed Metmac™ 600 herbicide only + Roundup® Biactive	10 g + 200 mL/100 L	Apply by hand-directed spray from knapsack or handgun equipment in a maximum spray volume of up to 600 L/ha. Apply to identified non-potable water bodies only. Refer to permit for critical use comments.
PER12363							
PER12363	Natural Ecosystems (non-agricultural) For control of various environmental weeds in natural Ecosystems using helicopter and unmanned aircraft vehicles (UAVS) Spot-spraying equipment	31 March 2026	National Parks and Wildlife Service Persons who can use the product under this permit: Staff or contractors employed/contracted by the National Parks and Wildlife Service or agencies/organisations represented on NSW Local Land Services Regional Weeds Committees	glyphosate (360 g/L) only + metsulfuron (600 g/kg)	weedmaster® Duo + Macspreed Metmac™ 600	As per permit.	
South Australia							
PER91974	Nature reserve and other native vegetation, roadsides, urban open space and forests For the control of woody weeds in non-crop situations	31 January 2027	Department of Primary Industries and Regions South Australia Persons who can use the product under this permit: Persons generally	triclopyr 600 g/L only	Garlon® 600	1 L:30 L diesel Cut stump or basal bark	

PERMIT NO.	SITUATION	EXPIRES	PERMIT HOLDER	ACTIVE INGREDIENT	COMMERCIAL PRODUCTS ¹	RATE	COMMENTS
Tasmania							
PER84775	Non-crop and Bushland areas	30 September 2025	Department of Primary Industries, Parks, Water and Environment Tasmania	metsulfuron (600 g/L)	Associate® ¹	1 g/L + Pulse® Penetrant 2 mL/L Gas gun	
	environmental weeds in non-crop and bushland situations		Persons who can use the product under this permit: Persons generally in Tasmania	triclopyr 300 g/L + picloram 100g/L	Grass-up™	As per label rate. If weed not recorded on label: 350–500 mL/ 100 L Spot spray, knapsack	
Western Australia							
PER13333	Agricultural non-crop areas	31 March 2025	WA Forest Products Commission	Glyphosate 360 g/L or 450 g/L	Roundup	2 mL/drilled hole or cut	Drill, frill, axe or injection.
	Non-crop areas				Roundup CT®	Undiluted to 1 L/5 L water	Paint stump immediately after cutting or paint basal bark.
	Commercial and industrial areas						
	Wetlands, Bushlands and Forests			Dicamba 700 g/kg	Cadence	200g/100 L water plus wetting agent. Or 2 Kg/ha.	Spot spray.
	(Refer to permit for details)					Or label rate for specific weed	
				Triclopyr 240 g/L + Picloram 120 g/L	Access®	1 L/60 L diesel.	Paint stump immediately after cutting or paint basal bark.

1 Commercial products listed here are examples only, and many other products containing these active ingredients are registered for use on gorse. Search at <https://apvma.gov.au/node/10831>

2 Products may be registered for use on gorse/furze in all states and territories (shown as 'All') or only in the specific states and territories listed.

3 Products containing different concentrations of the active ingredients are registered for this use. For example, registered products containing the active glyphosate are available with 350, 450, 510, 540, 570 and 600 g/L and 700, 720 and 800 g/kg concentrations. Check the label for rates.

4 picloram remains active in soil for extended periods and may leach into groundwater.

5 Users of the Agriculture Victoria 'restricted use' chemicals must be the holder of an agricultural chemical user permit (ACUP) or be working under the direct and immediate supervision of an ACUP holder, and must make and keep certain specified records of use for two years.

Note: not all currently registered herbicides are commercially available. Check the company website for a current label.

Note: herbicides are not to be used for any purpose or in any manner contrary to the label unless authorised under appropriate legislation. By law, you must read the label (or have it read to you) before using any herbicide product. The same applies for minor use permits. Always follow the label and permit directions.

2.10.6 “Cut and paint”, or “cut stump”

Page 38 – It is best to cut gorse stems close to the ground and apply the herbicide to prevent future regrowth.

However, for mature plants you may need to cut the gorse further up the stem first to clear the bulk of the weed and gain access to lower stems. Then cut the stem lower to the ground and apply herbicide.

Cut and paint can be used to remove the above-ground mass of material as part of an integrated control program:

- Cut and paint the gorse stems.
- Place the cut material onto the stumps.
- Once dry, burn using a hot fire.
- Then spray the resulting mass seedling germination.

Using a drone to spray gorse

Case study: Using a drone to spray gorse

A land management contractor specialising in weed management in northern Tasmania has been using rotary-wing remotely piloted aircraft, or drones, for the last two years to trial the control of weed species (including gorse) by drones.

Jamie Cooper, from Southern Environmental, has a fleet of drones that can apply herbicides and surfactants in difficult-to-access areas. One of the aircraft used is an M6E-X crop-spraying drone, which is equipped with terrain-following radar and precision-spraying systems to implement cost-effective weed management.

Southern Environmental holds an aerial spraying permit issued by the Department of Natural Resources and Environment Tasmania, and has a commercial aviation licence accredited by the Civil Aviation Safety Authority (CASA). The trials are undertaken in accordance with CASA and departmental regulations to ensure the safe application of crop-protection agents and herbicides according to the label.

Jamie has been trialling the use of the drones on dense infestations of gorse on slopes. The alternative control option for these infestations is using a dozer to clear strips – allowing access for subsequent ground-based foliar spraying. The drones can apply herbicide at a set height from around 2 m above the gorse in a fully autonomous or semi-autonomous spraying operation.

Results to date are promising. They indicate that effective control of mature gorse by the drones is dependent on a number of factors including herbicide selection, water rates, spray nozzles and timing of application related to growth.

The trials aim to determine whether using drones will provide an efficient and effective method of control for hard-to-access sites. Further research is being undertaken in conjunction with a gorse control project in the Greater Pipers River Catchment of northern Tasmania.

2.11 Hand-pulling

Page 40 – Hand pulling is more effective after rain has softened the ground.

In South Australia and Victoria, a tree popper is often used to manually remove young gorse.

A tree popper is a robust, uncomplicated tool which can be used by one person. It consists of a lever/handle with a grip, and a foot piece which has a plier-like jaw that is used to grip the plant stem. Pushing down on the handle exerts leverage pressure on the plant and pops it out of the ground.

This piece of equipment reduces: bending down while removing young gorse, pressure, and effort required and hence user comfort is improved.

2.12 Fire

Page 40 – Fire is not useful in all situations, but it can reduce the number of years required for a gorse control program by significantly reducing the seed bank.

You need to have the time and resources available to control the expected seedling regrowth following fire.

Planning for the opportunity provided by wildfire to control gorse regrowth is outlined in the case study from Garvoc in Victoria (earlier in this document).

2.13 Grazing

Page 42 – Landholders in Victoria have found that using goats to graze gorse has been effective, but seeds germinated onsite when the goats were removed after several years. Spraying or hand pulling seedlings should then be undertaken.

Landholders have also reported that hares trim young gorse plants.

2.16 Biological control

Page 45 – Four biological control agents have been released in Australia:

- gorse seed weevil *Exapion ulicis* (released in 1939)
- gorse spider mite *Tetranychus lintearius* (released in 1998)
- thrips *Sericothrips staphylinus* (released in 2001)
- soft shoot moth *Agonopterix umbellana* (released in 2007 and 2016–2017).

All four species are established in south-east Australia; seed weevil and spider mite are widespread and cause damage to gorse in some areas.

The following text is sourced from:

Harvey KJ, McConnachie AJ, Sullivan P, Holtkamp R and Officer D (2021) *Biological control of weeds: a practitioner's guide for south-east Australia*, NSW Department of Primary Industries.

Approval from NSW Department of Primary Industries to use this information is gratefully acknowledged.

Effectiveness of agents

Gorse seed weevil

Gorse seed weevil is now widespread in Tasmania, Victoria, South Australia and New South Wales. While larvae are capable of slowing gorse reproduction, the damage is not high enough to reduce overall plant density. Other agents are required to complement the gorse seed weevil's activity.

Gorse spider mite

Gorse spider mite is now widespread throughout the range invaded by gorse in Australia. Their extensive feeding using piercing and sucking mouthparts can kill shoots, reduce plant growth and overall plant biomass.

Although the mites have had a good impact on gorse, predatory ladybirds can decimate populations, reducing their overall impact. Other agents help to complement the mites' activity.

Thrips

Thrips have established throughout temperate Australia. However, their population densities remain low, dispersal is slow and there is limited evidence of their impact.

Soft shoot moth

Soft shoot moth was first released in Tasmania and Victoria in 2007, and later released in South Australia, Victoria and New South Wales between 2016 and 2017. The long-term effects of this agent on gorse have not been determined.

Redistribution of agents

Redistribution programs for all four gorse biological control agents are encouraged.

You can get more information about collecting, rearing and monitoring biological control agents for gorse from the [NSW DPI biological control practitioner's guide](#).

Integration with other control methods

Biological control on its own will not successfully control gorse.

It is just one of the control options that can be incorporated into an integrated management approach along with options such as:

- management of small, often outlying, gorse infestations by killing adult/reproductive-stage plants using chemical or mechanical techniques
- biological control for larger, core infestations to suppress plant health and reproduction.

Discuss the with your local weed or biosecurity officer.

Biocontrol Hub

Information sharing is vital to the success of biological control of weeds. Recording what weed species you are controlling, and the locations of agent-release sites can assist others obtaining access to the right agents for their infestation.

The Atlas of Living Australia (ALA) is a national online biodiversity database that helps information sharing. The Australian Biocontrol Hub is a portal within the ALA that acts as a one-stop shop for data and information sharing on biological control of weeds.

The Biocontrol Hub can:

- facilitate recording of biological-control-agent release and establishment data
- capture observations of biological-control-agent spread
- ensure biological-control-agent-distribution data is readily accessible and
- provide access to biological-control extension material.

For further information on how to contribute to or use information on the Australian Biocontrol Hub, visit the website: <https://biocollect.ala.org.au/biocontrolhub>

Chapter 3.4 Riparian zones

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Using herbicides near water

Never spray herbicides over bodies of water or plants standing in water. Some herbicides are formulated to be a lower risk when used near water (e.g. Roundup® Biactive). NEVER add unregistered adjuvants to herbicides that will be used near water. Some states have publications explaining the safe use of herbicides near water (Table 5).

Table 5. Safe use of herbicides near water by state and territory

STATE/ TERRITORY	WEBSITE
South-eastern Australia	archive.dpi.nsw.gov.au/__data/assets/pdf_file/0011/319448/riparian-habitat-management-guide.pdf (PDF, 1.1 MB)
Qld	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/sustainable/chemical/ground-distribution-herbicide/laws
SA	https://www.epa.sa.gov.au/files/477387_pesticide_water.pdf (PDF, 1.7 MB)
Tas	https://nre.tas.gov.au/Documents/herbicide_guidelinesFINAL2012.pdf (PDF, 689 kB)
WA	https://www.water.wa.gov.au/__data/assets/pdf_file/0016/3355/12149.pdf (PDF, 113 kB)

Regulations and permits for works in riparian zones

Areas on or near the bank of a river or other body of water (riparian zones) are sensitive habitats, and in some states a licence is required to conduct weed-control works (Table 6).

Riparian zones are sensitive habitats and in some states a licence is required to conduct weed control works.

Table 6. Authorities who can advise about regulations and permits for works in riparian zones

STATE/ TERRITORY	DEPARTMENT	WEBSITE
NSW	NSW Department of Planning and Environment – Water	https://water.dpie.nsw.gov.au/
SA	Landscape SA, including 8 regional boards	https://www.landscape.sa.gov.au/
Vic	Catchment management authorities Department of Energy, Environment and Climate Action – Forests and Reserves	https://viccatchments.com.au/about-us/our-cma-regions/ Riparian management licences – www.forestsandreserves.vic.gov.au/_data/assets/pdf_file/0016/31426/Riparian-management-licences.pdf (PDF, 160 kB)

Contacts

STATE/ TERRITORY	DEPARTMENT	PHONE	EMAIL	WEBSITE
National	Australian Pesticides and Veterinary Medicines Authority	02 6770 2300	enquiries@apvma.gov.au	www.apvma.gov.au
ACT	Parks and Conservation	13 22 81	ACTBiosecurity@act.gov.au	www.environment.act.gov.au/parks-conservation/plants-and-animals/Biosecurity/invasive-plants
NSW	Department of Primary Industries	1800 680 244	weeds@dpi.nsw.gov.au	www.dpi.nsw.gov.au/biosecurity/weeds
NT	Department of Environment, Parks and Water Security	08 8999 4567	weedinfo@nt.gov.au	www.nt.gov.au/environment/weeds
Qld	Department of Agriculture and Fisheries	13 25 23	info@daf.qld.gov.au	www.daf.qld.gov.au/business-priorities/biosecurity/invasive-plants-animals/plants-weeds
SA	Department of Primary Industries and Regions	1300 374 731	invasivespecies@sa.gov.au	www.pir.sa.gov.au/biosecurity/weeds
Tas	Department of Natural Resources and Environment	1300 368 550	biosecurity.tasmania@nre.tas.gov.au	www.nre.tas.gov.au/invasive-species/weeds
Vic	Agriculture Victoria	13 61 86	Refer to www.agriculture.vic.gov.au/about/contact-us for contact options	www.agriculture.vic.gov.au/biosecurity/weeds
WA	Department of Primary Industries and Regional Development	08 9368 3333	enquiries@agric.wa.gov.au	www.agric.wa.gov.au/pests-weeds-diseases/weeds

Further information

Victorian Gorse Taskforce website (<https://vicgorsetaskforce.com.au/>):

- their 2021 [best practice guide](#) (PDF, 2.9 MB)
- general [managing gorse](#) page
- [community-led gorse control projects](#)
- a [learning hub](#) with a virtual extension officer, videos, newsletters, reports and guidelines
- the [most frequently asked questions](#).

Weeds Australia gorse profile. Weeds Australia (2019)

<https://weeds.org.au/profiles/gorse-furze/>

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