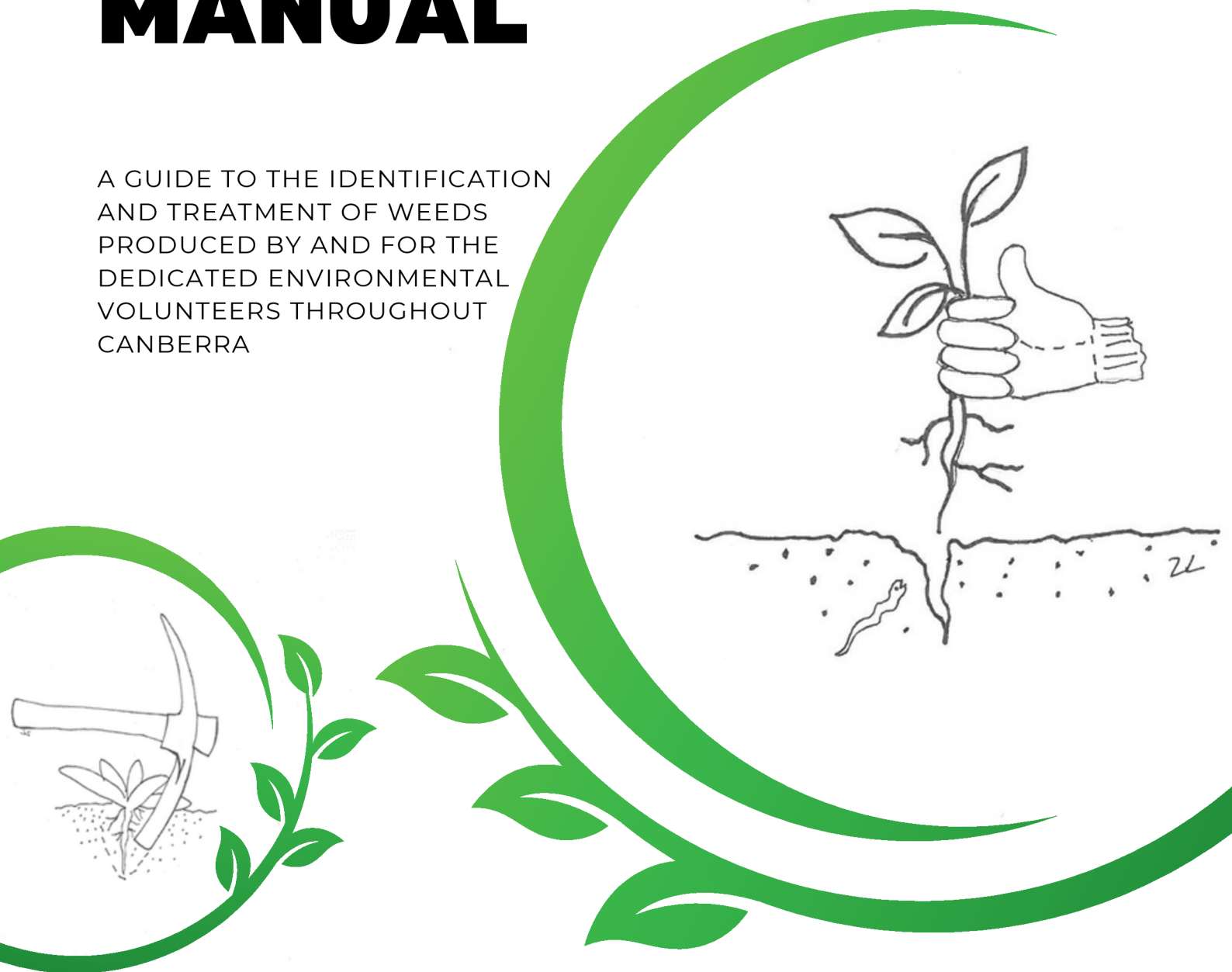


ACT WEEDS

MANUAL

A GUIDE TO THE IDENTIFICATION
AND TREATMENT OF WEEDS
PRODUCED BY AND FOR THE
DEDICATED ENVIRONMENTAL
VOLUNTEERS THROUGHOUT
CANBERRA



Supported by



ACT
Government



Friends of
Grasslands

The best time to control a weed was five years ago, the second best time is now

Acknowledgements

We would like to acknowledge the Ngunnawal, Ngunawal and Ngambri peoples, who have taught, and continue to teach us how to care for Country.

This manual was created for volunteers by a large group of people within the Canberra environmental community. It is a testament to the level of expertise and capacity contained within this community.

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Introduction

This guide is intended to help volunteer groups working on reserves in Canberra Nature Parks (CNP) and urban parks make weeding decisions and provide practical advice on controlling priority weeds. Technical information provided has been checked by the team of experts from ACT volunteer groups, the ACT government and ecologists for accuracy.

You are probably reading this manual as you are also caring for an area of land. Many people just like you have helped produce this manual; people who pop out occasionally to pull a weed from their favourite reserve, others who have dedicated their lives to skilling themselves and teaching others how to identify and treat weeds. This manual is a collaboration and combination of much knowledge, passion and collective community effort to share information on what to do about weeds. So go on, get out and use this manual to help care for Country.

Why remove weeds?

We weed to remove or reduce the competition experienced by the plants we want from the plants we don't want. Most of us learn about weeding in our home gardens where weeds can usually all be removed, albeit with constant effort. Weeding the bush is different; we can't hope to remove all the weeds. The best that we can do is reduce their impact by strategising and prioritising where and how we apply our effort. The principles, and the guidance on dealing with individual weeds that follow will help you do that. Leave your gardening hat behind when you go into the bush and put on a land caring one.

Weeding in the bush needs to be done with a focus on improving the natural biodiversity of the area rather than eradicating every weed on site. We are not gardening the area; we are giving nature a hand. Improving biodiversity means improving the ecological function of the area. Think about what animals use the site, whether there is habitat for small birds, reptiles, invertebrates? What about the type and range of plants? This may mean certain low priority woody weeds are retained to provide habitat until they can be replaced, it may also mean woody debris is left on the ground to provide important habitat for fungi, reptiles and invertebrates, or to protect an area from grazing.

Types of weeds

A weed is a plant growing in an area it is not wanted. Weeds are generally classified into invasive species, transformer species or sleeper weeds depending on their environmental impact.

Invasive species: Weeds that adversely impact natural areas are termed invasive species. The International Union for the Conservation of Nature (IUCN) definition shows the difference between weeds and invasive plants: "Invasive alien species are animals, plants or other organisms, introduced by humans, either intentionally or accidentally, into places outside of their natural range, negatively impacting native biodiversity, ecosystem services or human economy and well-being". So, all invasive plants are weeds, but not all weeds are invasive plants.

Transformer species: Transformer species are weeds that alter the ecology of the area they grow in. For example, transformer species can excessively use resources, promote or suppress fire, promote erosion, accumulate litter/sand/sediment and accumulate salt. Around 10% of invasive plants are transformers, causing substantial ecosystem wide impacts.

Sleeper weeds: Sleeper weeds are plants that have naturalised to an environment and have a potential to become invasive. When prioritising which weeds to remove, it is important to monitor populations of sleeper weeds and be ready to remove them if the populations increase.

Invasive species and transformer species are priority weeds.

Sleeper weeds are ones to keep an eye on.

The ACT weeds program and priorities

The ACT has a Biosecurity Strategy which has broad goals to “quickly find, contain, and eradicate any new incursions, and minimise the impacts of widespread invasive species”. Under this sits the five-year Invasive Plants Control Plan which aims to:

1. Identify the invasive plants that cause the most environmental, economic and social damage.
2. Stop or slow the spread of these invasive plants.
3. Prioritise the protection of the assets that are under immediate threat.
4. Undertake control measures that are cost-effective.
5. Evaluate outcomes of control measures.

All land managers have responsibilities to manage weeds and apply a risk assessment to make decisions. Prevention is the first step; stopping new weeds from establishing and jumping on any new incursions early and hard. Many weeds we deal with are already well established, so the goal becomes limiting the spread and impact, protecting high quality areas. There are risk ratings for all the weeds in the ACT, and these are also used to determine which weeds are covered in this manual. A risk triaging model is used, whereby efforts are undertaken which target the greatest threat to biodiversity with the highest chance of success.

It is a good idea to work closely with the respective land manager when planning your weeding efforts.

More information about the plan and how to assess risk and prioritise treatment can be read on the Invasive Plants Operations Plan 2020-2025

(<https://actgov.maps.arcgis.com/apps/MapJournal/index.html?appid=cd59d70662c94c75a0492635f7925384>)

A note on scientific names

This manual uses accepted common names, and the latest agreed scientific names. Common names can be confusing because they may refer to one or more plants, and different plants in different countries. Scientific names are generally more reliable. For example, if you are looking online for more images, or treatment options, then we recommend searching using the scientific name. Be aware of the sources in your search results – are they Australian, government or council, from a trustworthy author or organisation? Advice given for treating a plant in another country or environment may not be relevant here.

Principles for tackling weeds

- **Weed from the good areas out** (one of the original principles of the Bradley Method of Bush Regeneration, first developed by the Bradley sisters in Sydney). These might be gullies, grassland patches or rocky outcrops. Start at the top of a watercourse, gully or rise, as the seeds and plant parts may work their way down. A 'good patch' is an area of higher ecological value, which may be so for a number of reasons. For example, it may provide habitat for a vulnerable species like the Golden Sun Moth (*Synemon plana*), be a relatively undisturbed remnant with high biodiversity, or have value as a connection between other patches. It is beyond the scope of this manual to explore this in detail, but keep in mind that all groups working in reserves and urban open spaces have a work plan, and this will likely include these good patches.
- **Try to create as little disturbance as possible when you weed** (another Bradley Method principle). Avoid bare ground. This is especially true on steep slopes where weeding can lead to erosion. Removing one type of weed can lead to other weeds germinating, which may happen more quickly than native germination. If bare ground is unavoidable then apply clean mulch, direct seed or schedule regular follow up.
- **Practice good weed hygiene.** Many types of weeds, such as Mullein, St John's Wort and Paterson's Curse, can simply be piled in large heaps on site, where they will compost and seeds are unlikely to germinate and if they do, are concentrated in one spot. This has been tested by Park Care groups and found to be very effective. Keep in mind that some weeds will continue to set seed even after being pulled up. It's best to choose a bare or weedy spot to make your pile, as a big pile may kill whatever might be growing there. Weeds which may re-root, such as Ivy or Honeysuckle, can be laid on rock or logs to prevent contact with the soil. Consider removing them from the site if possible. You may be able to organise a Parks and Conservation (PCS) ranger to pick them up in bulk. Also pile weeds without seeds somewhere, (away from a fire trail or path) so you can see where and what you have been weeding. Remember also that you may carry weed seeds on clothing and footwear from one area to another. Note that volunteers in urban open spaces will need to arrange collection of their weeds in consultation with their Volunteer Coordinator, as weed material cannot be left on site.
- **Weed disposal off site.** If you do take weeds off site, the majority of weeds (including the plant, fruit and seed) can be disposed of in your green bin or taken to the tip as green waste. The high temperatures that are produced in the natural composting process at Corkhill Brothers reach around 55 - 65° C. This temperature kills the weed and majority of weed seeds. However, particularly noxious weeds with seeds (particularly grasses), such as African Lovegrass, Chilean Needle Grass and Serrated Tussock seeds need higher temperatures to kill the seeds. For these grassy weed seeds you can burn the seed heads, place in a plastic bag exposed to the sun for six months, or dispose of them in Landfill (red bin).
- **Prioritise new incursions before they get out of control.** Watch for garden escapees – Viburnum, Ornamental Pistachio, Seaside Daisy etc. Do not make the mistake of starting with the weediest spots. The priority is to keep good areas good; look after high quality habitat first, then work out to the lower quality weediest spots.

- **Think about why you are weeding** – is it to keep a patch in good shape, to arrest the seeding/spread of a weed, to assist an endangered species, or to control a weed of importance?
- **Make sure you know it is a weed before removing.** Many plants, grasses in particular, can be hard to identify, especially for beginners. Flowers and seed heads make this process much easier, as do the resources listed. Check also 'Some suggestions for identifying new plant' (page 108) for assistance and use NatureMapr and iNaturalist for help with identification. If you are not sure, take some photos, note the location and then find out what it is. When you start, it may seem impossible that you will be able to tell the difference between plants that other people seem to identify immediately. Don't worry, this comes with practice.
- **Add a patch to your calendar** and be prepared to return every year for several years, otherwise, the initial effort may be wasted. Plan to weed before seed set if possible. If you have totally removed or killed a dense patch of something, like African Lovegrass for example, you should check it in a few months at the latest to remove opportunistic weeds which may crowd out slower to germinate natives. These two photos show a small patch of *Echium* (*Figure 1*) germinating where African Lovegrass has been sprayed, and then after their removal native germination, in this case a species of *Desmodium* (*Figure 2*).



Figure 1 (VK) weeds amongst dead weeds



Figure 2 (VK) emerging natives

- **What will replace the weeds you have removed?** More weeds? That might be ok, if the weed is a lower risk one, but perhaps direct seeding, planting or mulching could be helpful – as will follow up. This approach has been successful in restoration work undertaken through reserves in the ACT
- **Some weeds provide habitat for birds.** For example, a dense patch of Honeysuckle or a large prickly Hawthorn might be a place where birds are nesting, so check and time removal outside breeding season. Where there is little tree or shrub cover for birds, consider planting replacements for what you plan to remove and deferring removal until they grow. Woody weeds can be used as habitat or protection from grazing. For example, cut branches of Briar Rose laid on the ground after seeds are removed, can allow grasses and forbs to go to seed in drier seasons as they are protected from kangaroo grazing.
- **Consider cultural values.** This land has been Ngunnawal, Ngunawal and Ngambri land for many thousands of years, and many reserves contain identified cultural sites. There may also be other cultural values which you are not aware of but are nonetheless significant. If in doubt, seek advice.
- **Consider the implications of herbicides.** They are very useful, essential for some tasks, but they need to be used correctly. Off-target damage (when a neighbouring plant is affected) is a risk, as is destroying soil life if the incorrect application rate is used. Incorrect use of herbicides can also lead to herbicide resistance forming in invasive plant populations, for example, Serrated Tussock is becoming resistant to Flupropanate in certain areas of NSW. Always follow the directions on the label when mixing or timing spraying, or seek advice.
- **Consider fire risk.** For example, making large piles of woody weeds may result in un-wanted fuel loading. Leaving such piles directly under larger Eucalypts and Kurrajongs where weeds were growing may also cause more damage to the large trees in case of fire. Instead, store weed piles away from mature trees.
- **Monitor paths and animal paths for weeds** as new infestations are often inadvertently introduced by visitors. Likewise, path users may pick up weed seeds on clothing, fur and muddy feet and spread them elsewhere. Consider removing significant weeds from near paths.
- **After prescribed burns monitor areas for the appearance of weeds.** Deep-rooted weeds such as St John's Wort and African Lovegrass can be the first to appear after a burn. In this situation, they are easily located and can be sprayed with less risk of off-target damage to native vegetation.
- **Don't forget to map your efforts on Field Maps.** This is an app to map both treated and untreated weeds in the ACT, used by land managers to prioritise weeding efforts. Further information about using Field Maps is given at the end of the manual.
- **Keep notes and monitor effectiveness of your efforts** – photo points are an easy way to track progress. **Celebrate your efforts!**

Tips on how to prioritise weeds

It can often get overwhelming to know where to start, so here are a few tips on tackling weeds on your site:

- Protect areas of high natural biodiversity. Work to keep weeds out and reduce the weed load in these areas. These areas of high biodiversity can be expanded, work from the edges of these good areas out, slowly increasing the size.
- Choosing a weed species or area to focus on can help to methodically reduce the weed load.
- Soil is healthier when covered. Soil retains more water and nutrients when covered. Once weeds are removed, cover area in mulch or plant native grasses and ground covers.
- High priority areas include tributaries (any weed seeds falling here can be spread downstream), hill tops (weeds can be spread by wind into surrounding landscape)
- Accept that it is impossible to remove all weeds from site. Prioritising which weeds to remove is important. In fact, some weeds in an area contribute to ecosystem function ie. an introduced flowering ground cover Storks bill (*Erodium cicutarium*) growing amongst plantings can provide a natural mulch (retaining water and competing with other undesirable weeds species).

Level of weed infestation	Description	Actions
None	No weeds on site	Work to prevent weeds entering area, clean tools, shoes, beware of weed seeds in mulch etc.
Low density	< 20% of area has weeds. Small number of weeds in contained area	Prevent spreading of weeds into weed free areas. Monitor and remove any new weeds on site. Efforts tackling new incursions of weeds will be of immense value for the site
Medium density	20 - 50% of area has weeds, weeds are not contained and are widespread	Work to protect areas of biodiversity value.
Highly infested area	>50% cover of weeds Weeds are widespread and dominating site	Work to protect areas of biodiversity value.

Working on PCS or TCCS land

ACT PCS carries out weed control targeting priority weeds in priority areas. Volunteers provide essential additional weed control in Canberra's reserves and parks. As funding for weed management is limited, volunteer groups should inform themselves of PCS/Transport Canberra and City Services (TCCS) planned works and priorities to ensure that any treatment is complementary.

Each ACT Government Directorate has different rules and regulations on the use of power tools and herbicides. Identify whether you are working in the nature reserves (PCS) or in urban open space (TCCS). Ensure you review the current volunteer policies and handbooks prior to engaging in weed management activities. For PCS volunteers these can be found on the [Park Care Hub](#), and for TCCS volunteers these can be found on the [City Services website](#). These policies and handbooks also contain valuable information about working safely, operational guidelines and other considerations. Different rules apply on National Capital Authority land and at the Arboretum, and this manual does not cover those.

ParkCare is currently undergoing a trial program for volunteer use of power tools (as of February 2025). For those approved to use power tools, PCS supplied brushcutters and pruning saws can be used in the removal of weeds. For additional support that requires the use of power tools or chainsaws, volunteers can also contact the ParkCare management team for support.

PCS volunteers who are Australian Qualification Training Framework Level 3 (equivalent to ChemCert and SMARTtrain 3) accredited can undertake approved weed control using herbicide products containing active ingredients Glyphosate 360 g/L (Round Up), MCPA 750 g/L (Agritane), Fluroxypyr 400 g/L (Fireball 400) and Metsulfuron Methyl 600 g/kg (Brushoff). Herbicides containing active ingredients other than those listed can only be used upon prior approval from the Volunteer Coordinator. Cut-stump (cut and dab) herbicide application may only be undertaken by volunteers who are not accredited if they are under the direct supervision of an AQF3 qualified volunteer or staff member. All herbicide activities should be mapped on the 'Treated' layer of Field Maps.

TCCS volunteers are not able to use power tools. If undertaking works that require power tool use, please contact the TCCS Volunteer Coordinator for support. Volunteers who are Australian Qualification Training Framework Level 3 (equivalent to ChemCert and SMARTtrain 3) accredited can undertake weed control using herbicide products containing active ingredients Glyphosate 360g/L (Round Up). Furthermore, weeded material may not be left on site in urban open space, and removal must be organised.

In the ACT there is legislation which supports weed control. The *ACT Biosecurity Act 2023* is the key legislative tool governing the control of invasive plants, and can be accessed at the ACT Legislation Register (<https://www.legislation.act.gov.au/>) if needed.

Private leaseholders and Landcarers outside of the ACT must have the relevant permits, and act in accordance with their local Council guidelines.

Weed control methods

Timing

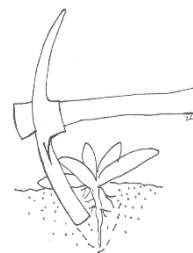
The weed profiles in this manual indicate the best times to control weeds and should be observed when possible. While best treated when actively growing, many weeds can be treated at any time of year. You may wish to experiment with timing and methods (although not herbicide rates and prescriptions) from one season to another, and document your results, as precisely as possible. Share your results with the Park Care community, whether your feedback contradicts or confirms previous thoughts. Healthy discussion is useful.

Long term weed control

In some circumstances it is appropriate to plant shrubs and trees that will eventually shade weedy areas and make them less suitable habitat for many weed species. Consider Acacias, Cassinias and Drooping Sheoaks for this, after consultation with PCS or TCCS.

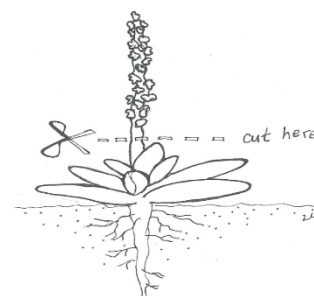
Manual methods

Chipping: This is a useful method for many herbaceous plants and grasses and can be done year-round. Use the sharp flat edge of a hand mattock to chip out the whole plant. A long-handled hoe may also be used, which can be helpful for levering out larger plants. Aim for about an inch below the surface so it is severed below any green growth. Take care not to disturb the soil too much. Pile up the plants so you can see where you have worked, and to control any seeds.



Hand pulling: Good for controlling the seedlings of many weeds such as Privet, Lavender, Viburnum, small Cootamundra Wattle and newly emerged Hawthorn and Briar Rose. It is easier to do when the soil is moist but still feasible if plants are small. Grip the plant close to the ground and ease out, ensuring that the roots come with it, and minimising disturbance. After wet weather, even St John's Wort can be manually removed. A two-pronged weeder may be useful for weeds with a long taproot.

Removing seedheads: It is often worth removing the seed-bearing parts of a weed to reduce seed load. Ideally these should be carefully bagged and removed from the site or alternatively piled together. A good example of when this might work is for mature Verbascum, where the flower and seed stalk can be cut off instead of the laborious process of digging out the whole plant. This can be done above ground level at about 30 cm, which is more ergonomically friendly and faster (In urban open space, all stems must be cut as low to the ground as possible to avoid trip hazards) Timing is important, as new flower stalks can regrow if done too early. December/January is often appropriate, but this will vary with seasonality.



Herbicide methods

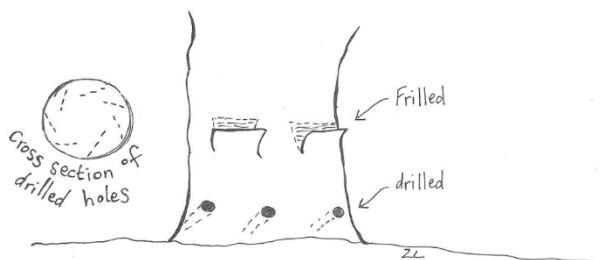
Cut and dab: (also called **cut and paint**) Clear around the base of the plant if needed, to ensure all stems are visible on a multi-stemmed plant. Some weeds send up sneaky side stems. Cut stem as close to the ground as practically possible and apply herbicide immediately; within 15 seconds. The cut stem should be thoroughly coated with a dabber or wand, but without excessive dripping. The herbicide needs to be applied quickly because the plant will mount a defence to prevent the herbicide entering its vascular system and thus working effectively. For a multi-stemmed plant, treat one to three stems at a time. Remove stems as you go, to ensure all stems are treated, and also for safer working. The exception is if the stems are too big or providing some habitat. Smaller stems can be cut with loppers, larger with a saw. On larger stems, the most important part of the cut stem to cover with herbicide is the outer circumference as the transfer of herbicides (and nutrients and water) takes place just under the bark.



The general formula is one part Glyphosate 360 to one part water, or as advised in the individual weed profiles. (See also NSW WeedWise, listed in the Further Resources section). Adding a few drops of red dye to the mix makes it easier to see how much you have applied, and which stems have been treated. It is important that cut and dab is not done when the temperature is too low (below 13 degrees) or too high (above 30 degrees) or in drought when plants are stressed, as the uptake of herbicide and thus efficacy will be reduced. Do not use this method during rain; however, rain forecast need not be an obstacle as uptake is rapid and runoff not an issue.

Plants should be actively growing when treated. This generally means that evergreen plants like Privet may be treated year-round (noting temperature and other considerations), however, most deciduous plants should only be treated when in leaf during spring, summer and early autumn.

Drill, Frill and fill: Very similar to the method above, but useful for larger plants which are difficult to saw or need to be left *in situ* for habitat, or to avoid undue soil disturbance.



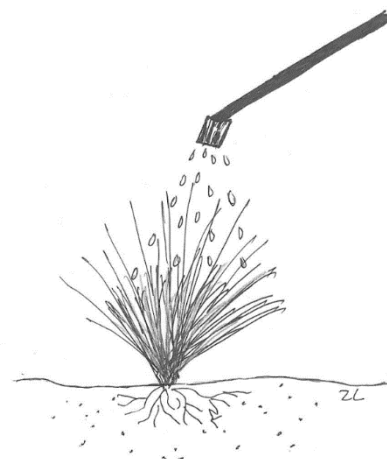
- Drill holes at a 45 degree angle down and across the bark, and spray or inject with a syringe using one part Glyphosate 360 and one part water
- For frilling, cut pouches into the stem with a sharp hatchet at a 45 degree angle into bark, below any branching if possible and safe. Cut and spray each pouch as you go, making pouches about 2 cm apart. Spray with one part Glyphosate 360 to one part water. Do not ringbark. Note that in urban open space, you will need the land manager's permission to remove trees over 15 cm in diameter.

Spot spraying: Use a handheld spray bottle or knapsack sprayer to target individual plants. Useful for small patches of African Lovegrass, Serrated Tussock, St John's Wort and some other weeds. Refer to individual weed profiles for herbicide type, mixing rates and application times. It is important to spray in times of light to no wind and forecast dry conditions to avoid off-target damage. Spraying can only be done by volunteers with Chemcert or SmartTrain accreditation. It is usually recommended to add surfactant (a wetting agent) to ensure herbicide penetrates the leaves. Surfactant is not recommended for use with Glyphosate except for specific weeds, identified in the weed profiles. There are different types of surfactants, but the standard surfactant issued by PCS is Wetter 1000, which contains 1000 g/L of nonionic alcohol ethoxylates. The maximum rate recommended for such surfactants is 1 ml per L of spray mix.

Surfactant mixing rates in the weed profiles here apply to Wetter 1000, so be sure to check the instructions for the surfactant you are using if different. Red vegetable dye is also usually added to indicate where you have sprayed. It is also helpful for identifying leaks and spills if they occur. The standard rate recommended is no more than 1 ml/L, but check the instructions for the dye you are using.

It is important that spot spraying is not done when the temperature is too low (below 13 degrees) or too high (above 30 degrees) or in drought when plants are stressed, as the uptake of herbicide and thus efficacy will be reduced. Do not use this method during rain, and when more than 1 mm of rain is forecast for the following four to eight hours, as the uptake of herbicide by uncut foliage takes some time.

Use selective herbicides to minimise off-target damage. The effects on weeds may take some time to show. Selective herbicides affect broad leaved plants and not grasses. For example, use Fluroxypyr on St John's Wort, not Glyphosate. Check labels for mixing instructions.



Understanding how herbicides work and how to use them

Selective and non-selective herbicides: Herbicides work in various ways. Fluroxypyr and MCPA disrupt plant cell growth, and Metsulfuron Methyl and Glyphosate inhibit amino acids production. Susceptible plants are not able to metabolise the herbicide quickly enough to avoid being killed. Of the four herbicides PCS volunteers are allowed to use (TCCS volunteers are restricted to Glyphosate), Fluroxypyr, MCPA and Metsulfuron Methyl are considered 'selective' herbicides. They are used to target broadleaf plants specifically to minimise off target damage to non-target plants. They do not work on grasses, which are able to produce enzymes which metabolise the herbicide before it can cause damage. Glyphosate is non-selective and will essentially kill any plant it is applied to. For these reasons all spraying of grasses by volunteers is done using Glyphosate, whereas broadleaf weeds should be sprayed with the recommended herbicide given in each profile. Although it may seem convenient to take a sprayer with a Glyphosate mix and just treat all the weeds in your patch, it is not good practice. Instead, target particular weeds in each spraying session using the recommended herbicide.

Using herbicides: A variety of methods are used to control weeds, and herbicides are just one of the suite available. Some important general notes on herbicide use are:

- Volunteers preparing herbicides for use must have undergone Chemcert training, and use appropriate PPE (personal protective equipment) including impermeable gloves, eye protection, face masks and overalls
- The labels for individual herbicides and additives such as surfactant and marker dye can be downloaded as needed from the manufacturer's website
- Some plants can develop resistance to herbicides. If a resistant plant is allowed to reproduce, the resistance spreads to more plants that will be resistant to that particular herbicide. This means it is very important to ensure treatment is correctly applied, i.e. at the correct dosage, time and weather conditions
- When spraying with herbicides, aim for the early bud stage as a general rule as this is most likely to also sterilise seed. Late application of herbicide may kill the plant but still allow viable seed development.
- Consider potential off-target damage from spray drift and use another method if there is any risk to other valuable species growing nearby
- Herbicides can adversely impact soil flora if incorrect rates are used

Safety

Always wear appropriate clothing for the task: generally leather gloves and long-sleeved sturdy shirts for most methods. When spraying add gloves with broad range chemical protection such as impermeable nitrile gloves. Eye protection and gloves to the elbow are recommended for weeds like Blackberry and Hawthorn, whose stems and thorns are savage, and for weeds with a toxic sap that can cause irritation e.g. *Euphorbia*. Refer to handbooks on the Park Care Hub and City Services website for more safety information.

Ready reference guide to approved herbicides and mixes for PCS volunteer use

Note: these are general guidelines: please refer to individual weed profiles for more specific treatments. Product labels also specify mixing rates and usage, and it is critical that these are adhered to.

Herbicide	Herbicide rate for spraying	Weed	Notes
Glyphosate 360g/L (Roundup) Do not apply if rain is likely within six hours	10 ml/L Plus 1 ml/L red marker dye and surfactant if recommended for the specific target weed.	African Lovegrass Chilean Needlegrass Serrated Tussock	Will damage/kill other forbs/herbs
Fluroxypyr 400g/L (Fireball 400) Do not apply if rain is likely within one hour	Varied dosages Plus 1 ml/L surfactant Plus 1 ml/L red marker dye	Cobbler's Peg Egg-leaf Spurge St John's Wort	Will damage/kill other forbs/herbs
MCPA 750g/L (Agritane) Do not apply if rain is likely within six hours	2.7 ml/L Plus 1 ml/L surfactant Plus 1 ml/L red marker dye	Horehound ¹ Paterson's Curse ² Thistles	¹ Apply in autumn at seedling stage ² Apply at rosette stage Will damage/kill other forbs/herbs

Herbicide	Herbicide rate for spraying	Weed	Notes
Metsulfuron Methyl 600g/kg (Brushoff, Bow Saw) Do not apply if rain is likely within four hours Note: This is a granular powder. A quarter of a teaspoon (1.25 ml) weighs 0.85 g.	0.05 g/L Plus 1 ml/L surfactant Plus 1 ml/L red marker dye	Mullein (Verbascum) Paterson's Curse	Grasses unaffected; will kill other forbs and herbs
	0.1 g/L Plus 1 ml/L surfactant Plus 1 ml/L red marker dye	Blackberry Briar Rose ³ Bridal Creeper Cobbler's Peg Euphorbia Hawthorn Japanese Honeysuckle Periwinkle	¹ May not kill old large shrubs
Glyphosate 360g/L (Roundup) Do not apply if raining	1:1 (1 part Roundup to 1 parts water) Plus red marker dye	Many woody weeds	Same rate is applied for frilling.

Native plants that can become weedy

Common name	Scientific name
Cootamundra Wattle	<i>Acacia baileyana</i>
Rosemary Grevillea	<i>Grevillea rosmarinifolia</i>
White Tea Tree	<i>Kunzea ericoides</i>
Tasmanian Blue Gum	<i>Eucalyptus globulus</i>

The conundrum of native weeds

To pull or not to pull!? You know it is a native, but it is also a weed ... what to do!?

These native plants have been classified as weeds as they are not native to the ACT and have the potential to spread or transform a habitat. For example, they can form dense growth which shades out other native species from growing. To prioritise how to deal with these plants it is helpful to look at your patch from an ecosystem perspective. What role do they play in the ecosystem and how much of a threat are they?

For example, in an area where the few shrubs for small birds are a low risk weed like Rosemary Grevillea (*Grevillea rosmarinifolia*) you may choose to retain the plants in the landscape until suitable local natives have established. Removing seedlings and leaving the mature plants can also be a good option. In this case you may choose to leave the plant; in another situation you may choose to remove it. Choose what is best to do for your patch. The Biosecurity team advises that “most of the medium to very high-risk exotic species will always warrant attention before the non-local native species. Unless there is a specific situation where a non-local native plant is invading a sensitive area or overrunning a part of a reserve”.

The most important thing to remember is that you are caring for a habitat, an area that supports many species. There is no right or wrong, just a choice you make to care for your land as best you can. You should also seek approval from PCS or TCCS before removing native plants.

ACT Weeds

The environmental impact and priority assessments come from the [ACT Advisory list of naturalised alien plants - species assessment](#). If you are outside ACT, access to this list can be obtained by emailing ACTBiosecurity@act.gov.au.

Common Name	Scientific Name	Environmental Impact	Priority
African Boxthorn	<i>Lycium ferocissimum</i>	Major	Medium-High
African Lovegrass	<i>Eragrostis curvula</i>	Massive	Very high
Blackberry	<i>Rubus anglocandicans</i>	Massive	Very High
Box Elder	<i>Acer negundo</i>	Major	High
Briar Rose (Sweet Briar)	<i>Rosa rubiginosa</i>	Major	Moderate
Bridal Creeper (Florist's Smilax)	<i>Asparagus asparagoides</i>	Massive	Extreme
Broad-leaved Privet, (Large-leaved Privet)	<i>Ligustrum lucidum</i>	Major	Very High
Broom (Scotch Broom, English Broom)	<i>Cytisus scoparius</i>	Massive	Extreme
Cape Broom (Montpellier Broom)	<i>Genista monspessulana</i>	Major	Very High
Chilean Needlegrass	<i>Nassella neesiana</i>	Massive	Very High
Chinese Privet (Small-leaved Privet)	<i>Ligustrum sinense</i>	Massive	Very High
Cobbler's Pegs and Greater Beggars Ticks	<i>Bidens pilosa</i> var. <i>minor</i>	Moderate	Moderate
	<i>Bidens subalternans</i> var. <i>subalternans</i>	Data Deficient	Medium-High
Coolatai Grass	<i>Hyparrhenia hirta</i>	Massive	Very High
Cootamundra Wattle	<i>Acacia baileyana</i>	Major	High
Cotoneaster (Large-leaved Cotoneaster)	<i>Cotoneaster glaucophyllus</i>	Major	High
Egg-leaf Spurge (Caustic Weed)	<i>Euphorbia oblongata</i>	Moderate	Moderate
English Ivy	<i>Hedera helix</i>	Major	High
Firethorns (Orange Firethorn, Nepal Firethorn, Red Firethorn)	<i>Pyracantha angustifolia</i> <i>Pyracantha crenulata</i> <i>Pyracantha fortuneana</i>	Moderate	Moderate

Common Name	Scientific Name	Environmental Impact	Priority
Fireweed	<i>Senecio madagascariensis</i>	Major	Very High
Gleditsia (Honey Locust, Thorny Locust)	<i>Gleditsia triacanthos</i>	Major	Very High
Hawthorn	<i>Crataegus monogyna</i>	Moderate	Moderate
Horehound	<i>Marrubium vulgare</i>	Moderate	Low
Japanese Honeysuckle	<i>Lonicera japonica</i>	Major	High
Lavender (Spanish Lavender)	<i>Lavandula stoechas</i>	Data deficient	Medium-High
Mulleins (Great Mullein, Moth Mullein & Twiggy Mullein)	<i>Verbascum thapsus</i> subsp. <i>thapsus</i> , <i>Verbascum blattaria</i> & <i>Verbascum virgatum</i>	Moderate	Medium-High
Olive (African Olive)	<i>Olea europaea</i> subsp. <i>cuspidata</i>	Major	Very High
Paterson's Curse (Viper's Bugloss)	<i>Echium plantagineum</i> <i>Echium vulgare</i>	Moderate	Moderate
Periwinkle (Blue Periwinkle, Greater Periwinkle)	<i>Vinca major</i>	Major	High
Prickly Pear	<i>Opuntia stricta</i>	Major	High
Radiata Pine	<i>Pinus radiata</i>	Major	Very High
Serrated Tussock	<i>Nassella trichotoma</i>	Massive	Very High
St John's Wort	<i>Hypericum perforatum</i>	Moderate	High
Tree of Heaven	<i>Ailanthus altissima</i>	Major	High
Viburnum (Laurustrinus)	<i>Viburnum tinus</i>	Data deficient	Moderate

African Boxthorn

Lycium ferocissimum

Description: Woody large sized shrub which forms impenetrable thickets (*Figure 3*). It has small smooth and fleshy leaves which can drop in cold or drought. It has savage thorns and small white to purple flowers followed by bright orange/red berries (*Figure 4*). It is spread by birds and foxes and suckers from roots. Can also form roots on cut branches in suitable conditions

NatureMapr link: <https://canberra.naturemapr.org/species/7963>



Figure 3 (SB) African Boxthorn growth habit



Figure 4 (MB) African Boxthorn leaves and fruit

Seed life: Each berry contains 35-70 seeds. Unripe fruit on cut branches can continue to ripen and produce seed. Seed can germinate any time of year with the right conditions. Seed longevity thought to be low

Environmental impact: Major. Also a Weed of National Significance (WONS)

Risk Priority: Medium high

Situation in which to control: All small infestations in CNP

Control methods:

- Hand pull seedlings
- Cut and dab mature shrubs with 1 part Glyphosate 360 to 1 part water, exercising great care due to thorns. Recommend eye protection and welding gloves.
- Foliar spraying is used for large infestations, but several treatments are required to kill mature plants

Time to control: Year round

Follow up: Check treated areas for re-growth after six months, then annually for three years for seedling emergence. Plants will not set seed in first two years

Similar species: May be mistaken for Australian Blackthorn (*Bursaria spinosa*) if there are no flowers or fruit, but Australian Blackthorn has much smaller and more delicate spines, rather than thorns (*Figure 6*). It is also much more open in its growth. African Boxthorn flowers are light purple whereas Australian Blackthorn flowers are white (and sweet smelling).



Figure 5 (JW) The invasive African Boxthorn



Figure 6 (VK) The native Australian Blackthorn

African Lovegrass

Eragrostis curvula

Description: Dense perennial tussock grass. Several varieties occur differentiating by size (0.5 m and 1 m), leaf colour and density. It has fine 3 mm wide pale green to blue-green/grey leaves with rolled edges which in winter can look pink-ish. The flowerhead is a spreading and finely branched panicle, dark blue-grey to black when mature (*Figure 8*). Small plants may be grazed. The ACT has tall and low forms of African Lovegrass (ALG). ALG can quickly become dominant, crowding out everything else (*Figure 9*). It has been widely spread in southern Canberra through mowing, and makes up the dominant grass on many roadsides and urban open spaces. A 3D model of ALG is available from the NSW DPI online at: <https://sketchfab.com/dpicomms/models>

NatureMapr link: <https://canberra.naturemapr.org/species/4912>



Figure 7 (MB) Growth pattern of African Lovegrass



Figure 8 (MS) African Lovegrass seedhead

Seed life: Seeds are present from mid-summer to autumn. Each seedhead can produce 300 to 1000 seeds. Seeds have high viability in the first year and after five years, more than half of the seeds are still viable. Some seed can remain viable for up to 17 years. Seeds germinate slowly and the plants have poor seedling vigour, making them susceptible to competition from other grasses, or shading from trees

Environmental impact: Massive. It is a transformer species.

Risk Priority: Very High

Situation in which to control: In patches with good biodiversity. New, small incursions. Around the edge of good patches to contain the spread

Control methods:

- Manual removal (chipping) for small numbers. Bag and remove plants from site if possible, as seed is prolific. Dispose of in general waste not green waste. Note that seed can be produced at the base of the plant. If not much native cover is present, consider sowing with other grass/forb seed, as ALG seedlings are susceptible to competition
- Spot spray mature plants with Glyphosate 360 (10 ml/L water and optionally 1 ml/L surfactant). Make sure entire plant is covered. Usually two spray sessions per season are recommended as seedlings frequently appear; once in late spring and once in summer. When working in good areas, use a grid pattern to ensure all plants are found and sprayed
- In larger areas, follow up spray may be useful after burning by rangers



Figure 9 (MB) African Lovegrass growth



Figure 10 (MB) African Lovegrass old seedheads

Time to control: Chipping any time but ensure correct identification. This is easiest with flowerhead present. Dry flowerhead can stay on plants for several months. Spray when plant is green and actively growing, usually October/November to April/May

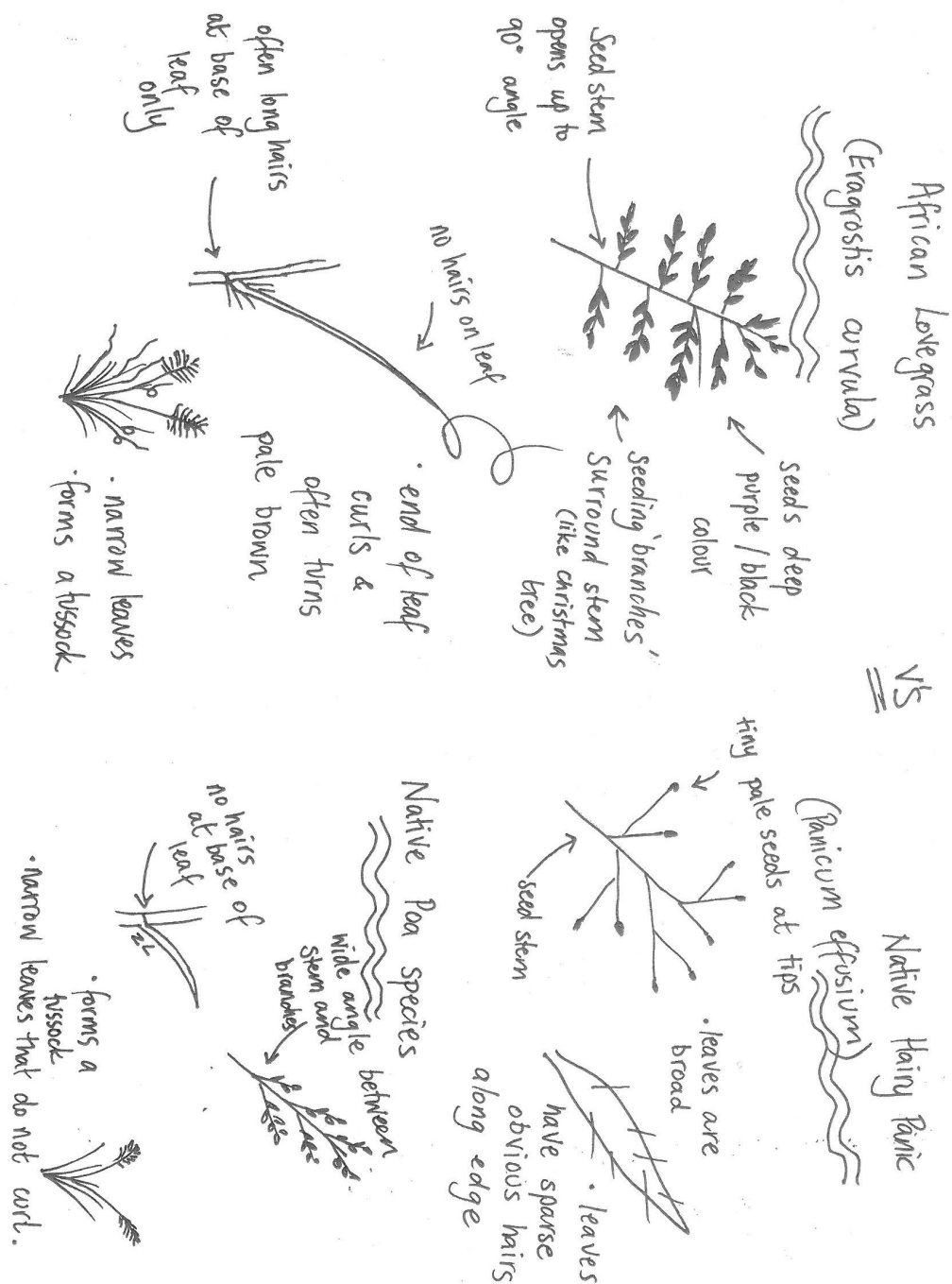
	Winter – plant is pale brown, empty flowerheads may still be present	Spring – plant starts to get green shoots and may send up flowerheads	Summer – plant is green, flowerheads present	Autumn – flowerheads start to dry out
Manual removal	✓	✓		
Manual removal and bagging			✓	✓
Spot spray		If plant is green	If plant is green	If plant is green

Follow up: Forever. Note that every minute of work before treatment carefully clipping ripe seed heads and bagging for removal is time well spent. However, this is impractical for large infestations. In those cases, the location will need to be revisited for possible control each year for many years - ALG seed bank is long lived.

Similar species: Native *Eragrostis* species. The native species tend to be lower in height, have brighter green leaves and lighter coloured seed heads which are not as upright. Young ALG may be mistaken for young Barbed-wire Grass (*Cymbopogon refractus*), but the flowerheads are completely different. This is another reason to treat ALG whilst flowering, for easier identification

Native Hairy Panic (*Panicum effusum*) has similar flowerheads but thick leaves with distinct hairs along the tip. Native Poa species (*Poa* spp) also have flowerheads that superficially look like African Lovegrass panicles, but on closer inspection Poa have no hairs on the leaves and a wide angle between the stem and branches of the panicle. Stem surrounded by seeds/flowers, like a Christmas tree. On Poa species the seeding branches do not surround the stem (i.e. you can see the stem along one side)

Figure 11 (ZL) African Lovegrass Identification tips



Blackberry

Rubus anglocandicans

Description: Rambling plant with prominent thorns on square stems. Quickly forms dense clumps (*Figure 13*), particularly along water courses. Roots from cane tips where they touch the ground, and suckers vigorously when cut. Also spreads from seed carried by birds eating the berries, and by water movement. Is an excellent soil stabiliser, so consider replacement plants if removing large patches manually. The berries (*Figure 12*) provide food for introduced animals and Currawongs year round, and the thickets provide shelter for rabbits and foxes.

NatureMapr link: <https://canberra.naturemapr.org/species/11759>



Figure 12 (MB) Blackberry fruit



Figure 13 (MS) Blackberry growth habit

Seed life: Each berry has 20-30 seeds, and there may be thousands of seeds/sqm under a mature bush. Approximately 1 per cent of seed germinates in the first year, and 10 per cent within 3 years. The longevity of seed in the soil is currently unknown. Germination is higher for seeds that have passed through animals

Environmental impact: Massive. Also a Weed of National Significance (WONS). It is a transformer species

Risk Priority: Very High

Situation in which to control: Any new small plants appearing. In good patches. In all reserves.

Control method:

- Cut stump and dab with one part Glyphosate 360 to one part water. Ensure cut stump is at or below ground level to ensure all canes are treated, and herbicide is applied within 15 seconds. This method should only be attempted where the plants are small and have few stems. Be sure to clear thoroughly around the base of the plant so that you can see all stems. Some will grow off to the side and be hard to see, but it is very important to treat all of them
- Stem scrape and dab with one part Glyphosate 360 to one part water
- Spot spray small plants with Metsulfuron Methyl 600 g/kg (Brushoff) (0.1 g/L water plus 1-2 ml/L surfactant). Do not use Glyphosate as it causes excessive off-target damage to surrounding grasses and sedges when sprayed on Blackberry thickets. Spraying is the most effective method for Blackberry, and should be done when the plants are actively growing and have new growth. Retreatment within 12 months may be necessary. Larger clumps can be mapped on Field Maps app, communicated to PCS, and are then best left to PCS/contractors for spraying
- Brush-cutting followed by spraying regrowth is also effective. This can reduce spray drift, and make it easier to access the whole plant. Note that, at time of writing, brush-cutting must only be done by PCS/TCCS staff or trained volunteers
- Manual removal including entire root. Note that follow up treatment will be needed for re-sprouting stems. Manual removal should only be used for very small new seedlings, as it is very hard to remove the roots, and can lead to more re-growth
- Grazing with goats in heavy infestations, but this obviously needs to be done by the land manager
- Note that Blackberry was previously considered to be part of the *Rubus fruticosus* complex or aggregate. *Rubus anglocandicans* is the most widespread and common taxon within that complex and the name now applied to Blackberry in the ACT and NSW
- Wear long leather gloves, a disposable or half mask respirator and eye protection when spraying. Wear gloves and eye protection when treating Blackberry as the thorny stems may fling around

Time to control: Cut stump and manual removal any time, spray when actively growing between October-April, however DO NOT spray when flowering, to protect pollinating insects, or when fruiting as many people pick blackberries to eat

	Winter	Spring	Summer	Autumn
Manual removal of small plants	✓	✓	✓	✓
Cut and dab	✓	✓	✓	✓
Slashing (must be followed by spraying)	✓	✓	✓	
Spraying new growth after slashing before flowering		✓ (new growth, no flowers)	✓ (plants growing, but no flowers or fruit)	✓ (if plant is still growing, but no flowers or fruit)

Follow up: Annually for a number of years

Similar species: Native Raspberry. Leaves of Blackberry are darker and larger, stems of Blackberry square in cross section (*Figure 14*) and much sturdier with bigger thorns. Blackberry stems readily root from the end of stems to form new plants. Fruit on blackberries is black when completely ripe whereas those of the Native Raspberry remain red (*Figure 15*)

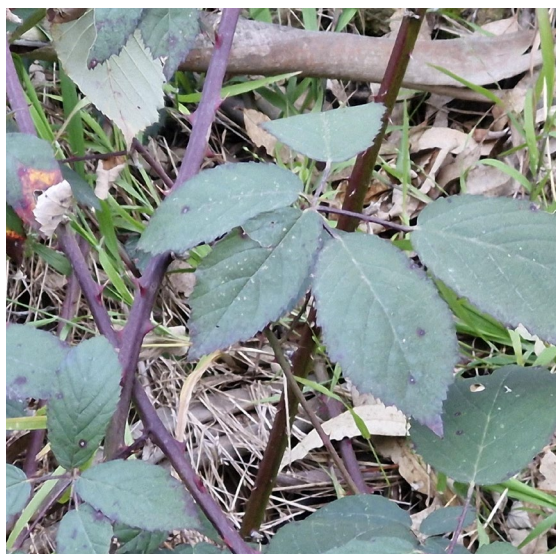


Figure 14 (TP) The invasive Blackberry



Figure 15 (WP) The local Native Raspberry

Box Elder

Acer negundo

Description: Medium sized deciduous tree, sometimes with multiple stems, in the maple family, commonly seen as a street and garden tree (*Figure 16*). It has lime green oppositely arranged compound leaves with 3-7 leaflets (*Figure 17*). The leaves turn bright yellow in autumn. The tree can have an unkempt look. Box Elders have separate male and female plants. Female plants have two-winged fruit arranged in drooping clusters (*Figure 18*) which are green over summer, turn brown in autumn and may stay on tree through winter. There has been a rapid expansion of this weed in the last 10 years, particularly along waterways and other wet areas. It can quickly create dense infestations which crowd out native plants, trap sediments, cause erosion and deplete oxygen levels in the water by shedding large amounts of leaves. It is fast growing and can spread by seed and by vigorous re-shooting from both stems and roots.

NatureMapr link: <https://canberra.naturemapr.org/species/229>



Figure 16 (MS) Growth Habit Box Elder



Figure 17 (MS) Box Elder leaves

Seed life: Generally plants must be at least five years old to produce seed but more commonly ten. There is one seed in each wing, seeds are ripe when the wings turn brown. The seeds are wrinkled. Seeds initially have high viability but are reported to germinate poorly after five years. They can be spread up to 5km by wind, and long distances in water. They are known to germinate in mass events after flooding, even amongst dense vegetation. The seeds are carried on the female plants so it may be useful to target these first.



Figure 18 (MB) Box Elder winged seeds

Environmental impact: Major

Risk Priority: High

Situation in which to control: Any plants if newly emerging in an area. If established, target seedbearing plants, preferably starting upstream and working down

Control method:

- Seedlings can be successfully pulled up without breaking the roots in the first year. Typically plants will be up to about 30cm tall. Best to do when ground is damp
- Scrape and paint with undiluted Glyphosate 360. This is the preferred method. Use a knife or secateurs to scrape a 20cm long area of bark from the root or stem to expose the cambium, close to the ground. Apply

herbicide with a dabber within 15 seconds. Make several scrapes without ringbarking the stem

- Cut stump with undiluted Glyphosate 360 for small plants. Cut the stems at ground level, thoroughly clearing around base to ensure a very low cut. Apply herbicide with a dabber within 15 seconds. Ensure cut stems are not left in proximity to the soil where they may re-sprout
- Drill and fill using undiluted Glyphosate as close to the ground as possible. Leave about 2.5cm between each hole, so that the tree stays alive and can circulate the herbicide through the plant. Treat any exposed roots.
- Spot spray suckers with Glyphosate 360 (20ml/L water). Do not use surfactant or other herbicides mentioned in this manual near waterways

Time to control: Seedling removal any time, cut stump and drill and fill when actively growing however late summer and autumn are the best times

Follow up: Repeat control method every 6 months for two to three years. Even when applying the treatment methods for plants larger than seedlings correctly there is a high chance the plant will sucker from cut stems and roots, making follow up essential

Briar Rose/Sweet Briar

Rosa rubiginosa

Description: Woody deciduous perennial plant with upright or scrambling thorny stems forming dense clumps from suckers over years (*Figure 19*). The leaves are pale green with five to seven oval leaflets and toothed edges (*Figure 21*). Flowers are a simple pink rose with yellow centres to 4 cm across (*Figure 20*), followed by bright red fleshy rosehips to 2 cm wide (*Figure 21*). These are attractive to birds, which then spread the seeds. Spreads through reserves and disturbed areas.

NatureMapr link: <https://canberra.naturemapr.org/species/11742>



Figure 19 (JW) Growth Pattern of Briar Rose



Figure 20 (MS) Flower of Briar Rose



Figure 21 (MS) Fruit of Briar Rose

Seed life: Seeds remain viable in the soil for up to four years, and can germinate at any time of year. Seeds are ripe when the rosehips turn red in late summer and autumn, and some will remain on the bush into winter.

Environmental impact: Major

Risk Priority: Moderate

Situation in which to control: Most reserve areas. Consider what other plants are around to provide alternative habitat for small birds. Removed stems can provide suitable protection from kangaroo grazing for desired plants.

Control method:

- Cut stump with one part Glyphosate 360 to one part water. Cut stem very close to ground (5 cm or lower) and apply herbicide within 15 seconds using dabber.
- Clear around the base of the plant before starting to ensure you can see and cut all the stems - they can easily grow sideways and be missed
- Dig out very small plants, ensuring all roots are removed, as plants re-sprout from suckers
- Spot spray with Metsulfuron Methyl 600 g/kg (Brushoff) (0.1 g/L water plus 1-2 ml/L surfactant)

Time to control: Cut stump only when plant is actively growing and has green leaves. This plant is deciduous and cutting during winter or without herbicide results in vigorous re-sprouting. Late summer drought may also be a poor time to treat, even when plants still have leaves. Spot spray when actively growing. Grub out small plants any time

Similar species: Native Raspberry, Blackberry. The similar exotic plant Dog Rose (*Rosa canina*) should be treated the same way. Rosa is a much more upright plant, with brighter green leaves and distinctive red 'rosehips'

Bridal Creeper/Florist's Smilax

Asparagus asparagoides

Description: Vine with shiny mid-green leaves on wiry stems, pointed at the tips and broad at the stem (*Figure 22*). The berries ripen to a dark red and are fleshy to about 1 cm diameter. This vine quickly smothers other plants, and can re-shoot from the fat root tubers (*Figure 23*), which out-compete native plants. It is spread by birds and other animals eating the seeds and by dumped garden waste. The leaves tend to die back in summer and then re-shoot from the tubers the following season. It is not yet widespread in the ACT, so any sightings should be dealt with promptly, and reported to PCS/TCCS for treatment.

NatureMapr link: <https://canberra.naturemapr.org/species/1245>



Figure 22 (JDR) Leaves of Bridal Creeper



Figure 23 (BR) Bridal Creeper tubers

Seed life: Usually two to three seeds per berry which are ripe when shiny black inside the red berry. The seeds are usually dormant for several months and then sprout in autumn. Seeds can still be viable after three years in the soil, although germination in the field is minimal after two years. Germination is higher for seeds which have passed through birds

Environmental impact: Massive. It is also a Weed of National Significance (WONS)

Risk Priority: Extreme

Situation in which to control: Any plants identified should be treated immediately

Control method:

- Spray with Metsulfuron Methyl 600 g/kg (Brushoff) (0.1 g/L plus 1 ml surfactant)
- If plants are small, then manual removal may be possible if all the tubers are carefully removed and disposal is off site

Time to control: Spray in spring. Manual removal any time

Follow up: Check annually for several years in case there is re-growth from roots.

Similar species: None in the ACT

Broad-leaved Privet/Large-leaved Privet

Ligustrum lucidum

Description: Small tree, single or multi-stemmed (*Figure 24*), with glossy dark green oval leaves and smooth bark. The flowers are white, tubular in pyramidal clusters to 20 cm long at ends of branches (*Figure 25*, *Figure 26*), and followed by prolific small black berries (*Figure 27*) to 8 mm which turn from green (*Figure 26*) to black (*Figure 27*) in autumn. The berries are very attractive to birds, including overwintering Currawongs, who spread the seed and are also a threat to small birds. Privets do not appear to provide useful habitat or nesting sites for native animals. Seedlings often appear in clumps under trees. Privet also crowds and shades out other plants in moist gullies. It flourishes in many suburban Canberra gardens. Privets thrive in higher nutrient environments. The leaves and fruit are poisonous, and the pollen contributes to hay fever

NatureMapr link: <https://canberra.naturemapr.org/species/7698>



Figure 24 (JW) Growth habit of Privet



Figure 25 (JW) Flowers of Privet

Seed Life: Berries contain two oval shaped seeds, which have high viability and can germinate from the soil seedbank for up to two years. When mature seed-bearing trees are removed a thick carpet of seedlings may appear in the seasons, especially after rain.

Environmental impact: Major

Risk Priority: Very High

Situation in which to control: Isolated plants, in gullies and working out from good patches. Aim to remove plants of flowering/seed bearing age first

Similar species: Small-leaved privet, whose leaves are a lighter green, smaller and sometimes with a frilly edge. Treat the same way. May also be confused with Kurrajong saplings, partly because they often germinate in the same spots; under large trees. Both have shiny green leaves, but Kurrajongs are a lighter green, and often variable shaped, and the stem/trunk is more tan in colour. When

weeding a dense patch it is good to keep an eye out for Kurrajong, as they can be left to grow on and replace the privet

Control method:

- Hand pulling of seedlings from moist soil, ensuring entire tap root comes out
- Cut stump using Glyphosate 360 (half Glyphosate half water), ensuring stump is dabbed within 15 seconds if possible. Smaller stems can be cut with loppers close to ground, larger trees will need to be sawn. When applying herbicide to the stump of larger stems, be sure to concentrate around the area closest to the bark, as this is the growing part which will absorb the herbicide
- Drill and fill using neat Glyphosate 360
- If removing dense patches there will be disturbance and bare patches, making follow up important

Time to control: Year round

Follow up: Return annually to remove emerging seedlings, and check for suckering from around cut stems. This is usually minimal if done correctly. For large infestations consider removing gradually and either planting or allowing replacement plants to grow



Figure 26 (MB) Unripe fruit of Privet

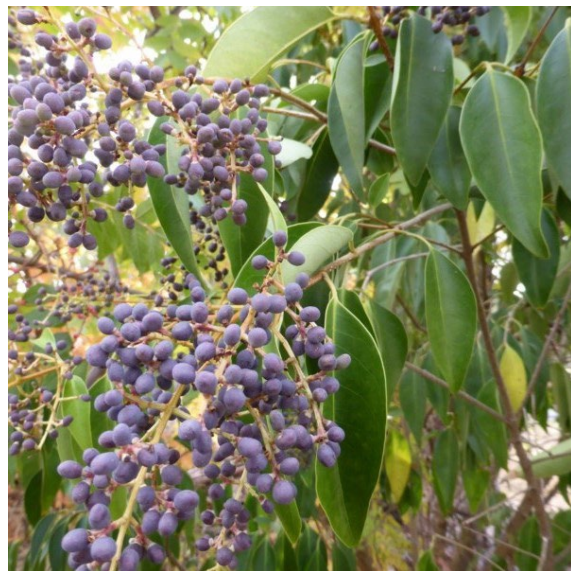


Figure 27 (MS) Ripe fruit of Privet

Broom/Scotch Broom/English Broom

Cytisus scoparius

Description: Upright evergreen shrub from 1- 4 m (*Figure 28*) with mid green trifoliate leaves, yellow pea like flowers (*Figure 29, Figure 30*) followed by hairy pods. Broom is highly invasive and transforms invaded areas. They can be hard to differentiate from other broom species, however they are all weeds to be controlled. Broom is spread by machinery and birds and can germinate in large numbers after disturbance.

NatureMapr link: <https://canberra.naturemapr.org/species/3907>



Figure 28 (LH) Growth Habit of Broom



Figure 29 (NJ) Flower of Broom



Figure 30 (RP) Flower of Broom

Seed Life: Ripe seeds are yellowish brown to olive in colour and are ejected explosively from the seed pods as they dry on hot sunny days, mainly falling within a few metres of the parent plant. There may be up to 20,000 seeds/sq m, and soil disturbance favours germination. 80% of seed is still viable after four years.

Environmental impact: Massive. It is a Weed of National Significance (WONS). It is a transformer species

Risk Priority: Extreme

Situation in which to control: There are currently no large infestations in Canberra Nature Parks, therefore important to remove any plant immediately. Plants can produce large amounts of seed which remain in the soil for many years

Similar species: Other brooms such as Cape Broom (*Genista monspessulana*), Madeira Broom (*Genista stenopetala*), Spanish Broom (*Spartium junceum*) and coloured cultivars (also weeds and treat similarly). Native shrubs in the pea family have flowers with colours other than yellow present, and do not have hairy pods

Control method:

- Hand pull small plants (often found around mature plants)
- Cut and dab using one part Glyphosate to one part water, applying herbicide within 15 seconds

Time to control: Year round

Follow up: Return to site each year for five years to check for emergent seedlings as the seed soil bank is long-lived. New plants take at least two years to flower and set seed

Cape Broom/Montpellier Broom

Genista monspessulana

Description: Upright shrub (*Figure 31*) with mid green trifoliate leaves (*Figure 33*), beautiful bright yellow flowers (*Figure 32*) followed by hairy pods. It is spread by machinery and birds, and can germinate in large numbers after fire and disturbance, forming dense impenetrable thickets. It fixes nitrogen, thus changing soil fertility and vegetation structure, effectively crowding out natives.

NatureMapr link: <https://canberra.naturemapr.org/species/5749>



Figure 31 (SB) Growth habit of Cape Broom



Figure 32 (VK) Flowers of Cape Broom



Figure 33 (SB) Leaves of Cape Broom

Seed life: The hairy pods contain five – eight seeds which are dark brown to black when ripe and burst out of the pod on hot days up to four metres away. Plants can produce large amounts of seed which remain viable for more than 10 years

Environmental impact: Major. It is a Weed of National Significance (WONS). It is a transformer species

Risk Priority: Very High

Situation in which to control: There are currently not large infestations in Canberra Nature Park, so it is important to remove any plant immediately

Similar species: Other brooms such as Scotch or English Broom (*Cytisus scoparius*), Madeira Broom (*Genista stenopetala*), Spanish Broom (*Spartium junceum*) and coloured cultivars (also weeds and treat similarly). Native shrubs in the pea family have flowers with colours other than yellow present, and do not have hairy pods

Control method:

- Hand pull small plants (often found around mature plants)
- Cut and dab using one part Glyphosate 360 to one part water, applying herbicide within 15 seconds

Time to control: Year round

Follow up: Return to site each year for several years to check for emergent seedlings as the seed soil bank is long lived. New plants can flower and set seed in two years.

Chilean Needlegrass

Nassella neesiana

Description: Perennial tufted grass up to 80cm. It has deep green leaves to 20 cm long and 3 mm wide (*Figure 34*) which are usually flat, and an upper surface which is coarsely hairy and strongly ribbed. The 'lip test' can be useful – when the leaf is gently rubbed between lips it feels very rough. The seedheads are open and drooping to 40 cm long (*Figure 35*). The seeds have a corona at the base, which is a little raised ring around the stem (*Figure 36*). There is also a small tuft of hair at the junction of leaf blade and leaf sheath. A useful 3D model of Chilean Needlegrass can be found online at NSW Department of Primary Industries: <https://sketchfab.com/dpicomms/models>

This weed tends to grow in wetter areas, but the plant is very hardy and can survive drought. Can have hidden flowers and seeds at the base of the plant.

NatureMapr link: <https://canberra.naturemapr.org/species/8864>



Figure 34 (GR) Growth habit of Chilean Needlegrass



Figure 35 (MB) Seed heads of Chilean Needlegrass

Seed life: Flowering is mainly spring or autumn but can happen year round in good conditions. Seed is ripe about a month after flowering and is bumpy and pale brown. Another sign of maturity is the dried and tangled awns (long bristles at the end of the seeds). Each plant can produce many thousands of seeds, which have 90% viability after four years in the soil. Chilean Needlegrass produces many flowering seeds, but also sneaky stem seeds which are hidden in the base of the plant and in the stem joints, making slashing and fire ineffective.

Environmental impact: Massive. This is a Weed of National Significance (WONS). It is a transformer species.

Risk Priority: Very High

Situation in which to control: Any outbreak in reserve, around edges of reserves where entry is likely

Control method:

- Chip out small infestations and bag and remove plants from site, as plants can seed in first year, and may have hidden flowers. Dispose of in general waste, not green waste
- Spot spray with Glyphosate 360 at 10 ml/L and (optionally) 1 ml/L surfactant
- Slashing and burning are not useful

Time to control: Manual removal any time, but helpful to control when in flower to aid identification, but before seed set. Spot spraying best in summer and autumn. Glyphosate more effective in autumn than spring. Note that it can be difficult to dig out in summer where its straggly growth habit makes finding the roots amongst other grasses hard

	Winter	Spring	Summer	Autumn
Manual removal and bagging	✓	✓	✓	✓
Spot spray with Glyphosate		When plant is actively growing	When plant is actively growing and flowering	When plant is actively growing and has flowers or seedheads

Table 1

Follow up: Annually for several years to check for seedlings. Note that every minute of work before treatment carefully clipping ripe seed heads and bagging for removal is time well spent. However, this is impractical for large infestations. In those cases, the location will need to be revisited for possible control each year for many years

Similar species: Distinguish from native Speargrasses, particularly *Austrostipa bigeniculata*. All Speargrasses lack a corona on the seed base (*Figure 38*).



Figure 36 (MB) Seeds of Chilean Needlegrass



Figure 37 (JL) Seeds of native Speargrass *Austrostipa bigeniculata*

Chilean Needlegrass Identification Tips

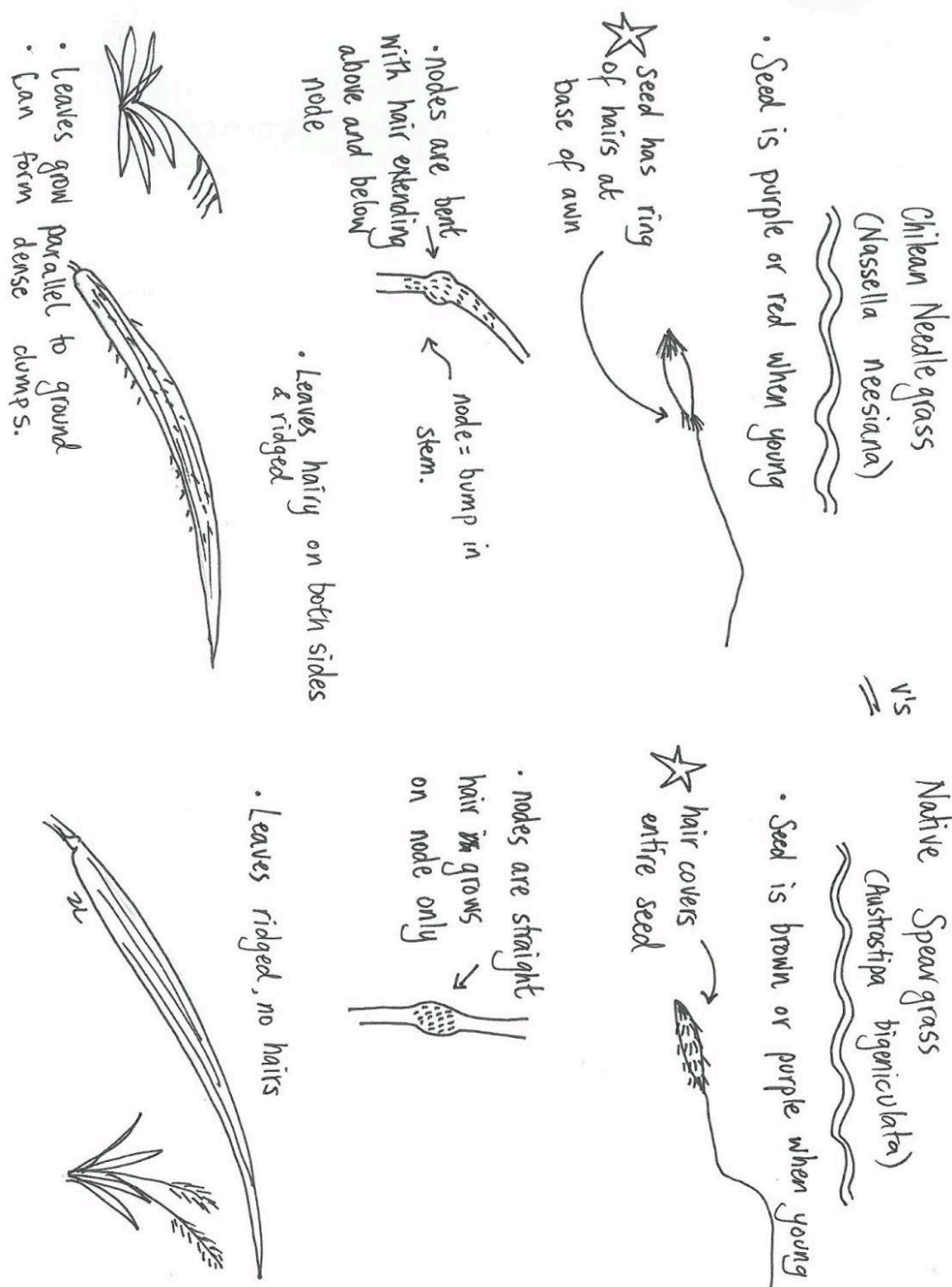


Figure 38 (ZL) Chilean Needlegrass Identification tips

Chinese Privet/Small-leaved Privet

Ligustrum sinense

Description: Small tree, single or multi-stemmed (*Figure 39*), with small bright to dark green leaves (*Figure 40*) and smooth bark. The flowers are white, tubular in pyramidal clusters to 20 cm long at ends of branches (*Figure 40*), which is followed by prolific small black berries up to 8 mm in autumn (*Figure 41*). The berries are attractive to birds. They are one of the main sources of food for overwintering Currawongs, who spread the seed and are also a threat to small birds. Big groups of Currawongs can be seen feasting on seeding trees. Seedlings often appear in clumps under trees. Privets also crowd and shade out other plants in moist gullies. They also flourish in many suburban Canberra gardens. Privets thrive in higher nutrient environments. Privets do not appear to provide useful habitat or nesting sites for native animals. Note that berries are poisonous to people, leaves and berries can cause skin and eye irritation and plants can spark allergic reactions

NatureMapr link: <https://canberra.naturemapr.org/species/7699>



Figure 39 (MS) Growth form of Small-leaved Privet



Figure 40 (MB) Flowers of Small-leaved Privet

Seed life: Seeds are ripe when the berries are blue black, usually autumn and winter. Berries do not continue to ripen after plants are killed. Mature plants can produce millions of seeds, however they last only 6-12 months in the soil. Seeds like to be just under the soil or litter layer to germinate

Environmental impact: Massive

Risk Priority: Very High

Situation in which to control: Isolated plants, in gullies and working out from good patches. Aim to remove plants of flowering/seed bearing age first.

Control method:

- Hand pulling of seedlings from moist soil, ensuring tap root comes out

- Cut stump using Glyphosate 360 (half Glyphosate half water), ensuring stump is cut within 15 seconds. Smaller stems can be cut with loppers close to ground, larger trees will need to be sawn. When applying the herbicide to



Figure 41 (SB) Fruit of Small-leaved Privet

the stump of larger stems, be sure to concentrate around the area closest to the bark, as this is the growing part which will absorb the herbicide

- Drill and fill using neat Glyphosate 360
- If removing dense patches there will be disturbance and bare patches, making follow up important

Time to control: Year round

Follow up: Return annually to remove emerging seedlings, and check for suckering from around cut stems. Small-leaved Privet is more likely to sucker at base of stem after treatment than Large-leaved Privet.

For large infestations consider removing gradually and either planting or allowing replacement plants to grow

Similar species: Large-leaved privet, which has larger darker green leaves and is more common in Canberra, and is treated the same way

Cobbler's Peg and Greater Beggars Tick

Bidens pilosa var. *minor* and *Bidens subalternans* var. *subalternans*

Description: A short-lived herbaceous plant with upright stems growing up to 1.8 m tall (*Figure 43*). Its stems are square in cross section and green to purplish in colour. Its paired leaves (2.5-13.5 cm long) have toothed margins and vary in nature depending on their position on the plant. They may be either oval in shape, deeply lobed or once-compound with three to seven leaflets. Its small flower-heads (5-15 mm across) have numerous tiny yellow tubular flowers in the centre (*Figure 37*) and sometimes also have some white petals 2-8 mm long. Its dark brown or black 'seeds' (4-16 mm long) are elongated in shape and topped with two or three barbed awns (1-4 mm long) (*Figure 42*). Forms dense stands that cover large areas eliminating native vegetation (*Figure 43*)

NatureMapr link: <https://canberra.naturemapr.org/species/1723>



Figure 42 (SB) Flowers and seeds of Cobbler's Peg



Figure 43 (MB) Growth habit of Cobbler's Peg

Seed life: It is a prolific producer of seeds that stick to clothing and animal fur, meaning they spread widely. Seeds are long lived and survive for many years in the soil seedbank. The seed can continue to ripen on the plant even after it has been pulled out or slashed if it is already flowering

Environmental impact: Moderate

Risk Priority: Moderate to Medium High

Situation in which to control: In good patches. Small infestations can get out of control in a few years



Figure 44 (SB) Leaves of Greater Beggars Tick

Similar species: Greater Beggars Tick (*Bidens subalternans* var. *subalternans*), which has similar flowers and seeds, but much more feathery foliage (Figure 44). also a weed, and may be treated the same way. The link for NatureMapr is

<https://canberra.naturemapr.org/species/1726>

Control method:

- Spot spray with Fluroxypyr 400 g/L (Fireball 400) (2.5 ml/L water plus 1 ml/L surfactant), or Metsulfuron Methyl 600 g/kg (Brushoff) (0.1 g/L plus 1 ml/L surfactant)
- Manual removal for small areas
- Plants with seed heads should be piled to avoid seed spread or cut and bag seed heads.
- Slashing at early flowering stage, followed by further slashing in the same season if flowers reappear is useful to limit seed development and spread

Time to control: Manual removal before plants go to seed if possible. Spot spray while actively growing.

Follow up: Every six months for several years

Coolatai Grass

Hyparrhenia hirta

Description: An erect tussock forming perennial grass native to Africa growing to 150 cm tall (*Figure 45*). This is a major weed in NSW and has in recent years made appearances in the ACT, where a trend toward warmer winters with climate change will favour it. It is very drought tolerant and can invade undisturbed grassland and bushland, surviving in poor soil and harsh conditions, and can out compete native plants. It can seed in as little as two weeks after slashing. It is spread by mowing or slashing, on animals and humans and also by wind due to its light weight seed. There is no data on the persistence or size of the seedbank. It is also herbicide resistant. For these reasons it is important that volunteers be able to recognise and know what to do with Coolatai Grass.

As with many grasses, identification is easiest when flowering. The flowerheads have numerous sets of paired racemes, or branches, 1.5 – 5.0 cm long and soft to the touch. Also distinctive are the prominent white hairs at the base of the branches (*Figure 46*). The leaves and stems are a bluish green, turning orange-red after frost. The leaves feel rough going down, but it is difficult to tell from the leaf alone

NatureMapr link: <https://canberra.naturemapr.org/species/6744>



Figure 45 (HB) Growth form of Coolatai Grass



Figure 46 (HB) Flowerhead of Coolatai Grass

Seed life: Coolatai Grass can flower and seed within weeks when conditions turn favourable. Seed can be produced sexually as well as asexually, without pollen. Seed production is low, but is shed quickly when mature. Like most grasses it is mature when it looks a bit fluffy. There is no information about the size and persistence of the seedbank

Environmental impact: Massive

Risk priority: Very High

Situation in which to control: All infestations

Similar species: Distinguish from three local native grasses; Kangaroo Grass (*Themeda triandra*), Red-leg Grass (*Bothriochloa macra*) and Barbed-wire Grass (*Cymbopogon refractus*). Kangaroo Grass has seedheads which are loose panicles and papery to touch. Both Red-leg Grass and Barbed-wire Grass have flower stems which are alternately red and green between the nodes, whereas Coolatai Grass flower stems are green along their entire length. In addition, Red-leg Grass flowerheads have three to six racemes (as opposed to a pair) arising upwards from a single point. Barbed-wire seedheads are also rough to touch, not soft like Coolatai Grass

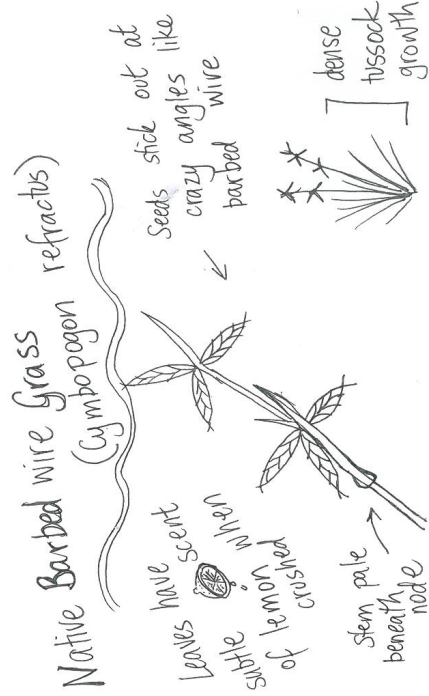
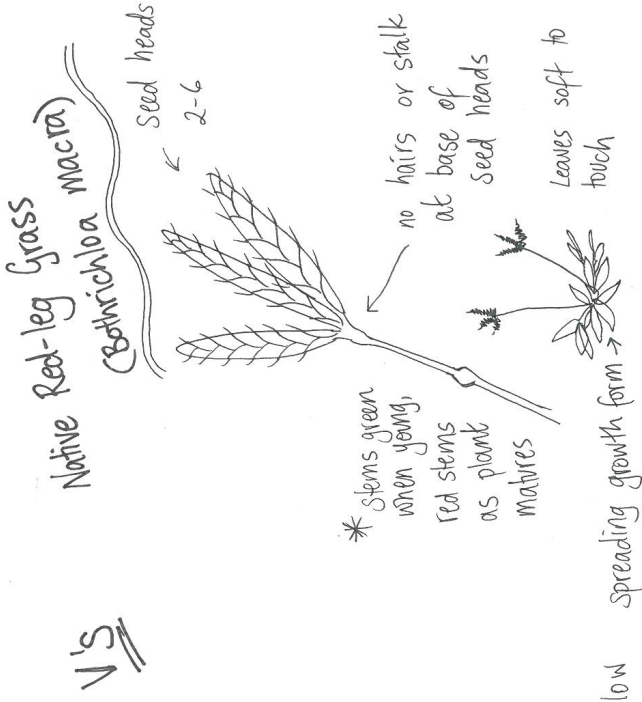
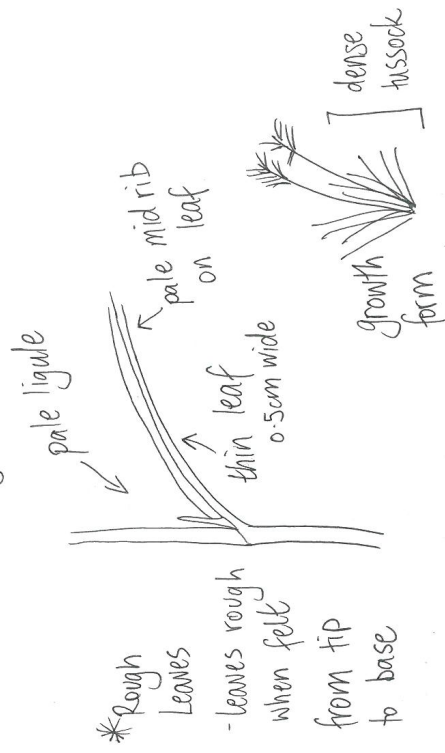
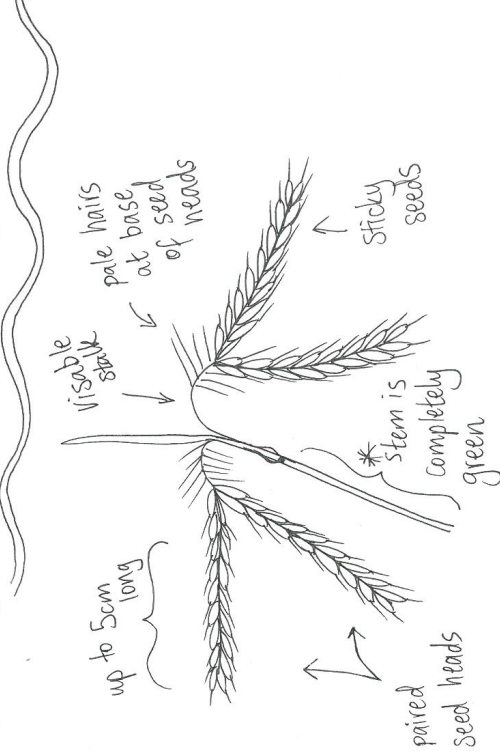
Control methods: Any sightings should be mapped on NatureMapr, and reported to the land manager for disposal. It should not be sprayed due to its resistance to herbicide, but must be carefully dug and bagged and incinerated in the correct facilities by the land manager. Mowing controls should be set up around the site to avoid seed spread

Time to control: Immediately when sighted

Follow up: Regular searching of the site and the surrounding area should be conducted three monthly and more often in the growing season for at least three years

Coolatai Grass Identification Tips

Coolatai Grass (*Hyparrhenia hirta*)



Cootamundra Wattle

Acacia baileyana

Description: A shrub or small tree growing 4-8 m high (*Figure 47*). The leaves are silvery-blue to blue-grey in colour and 'feathery' or 'fern like' in appearance, bipinnate (twice divided) (*Figure 48*). The flowers are bright yellow, fluffy and fragrant (*Figure 48*). It flowers from winter to early spring. Seedpods are 1 cm wide and 5 cm long, green/purple when fresh and mature to brown with black seeds inside. Bark is brown and rough at base

NatureMapr link: <https://canberra.naturemapr.org/species/35>



Figure 47 (VK) Growth form of Cootamundra Wattle



Figure 48 (JW) Flowers and leaves of Cootamundra Wattle

Seed life: Seeds are ripe when black and the seedpod begins to open. They are quickly dropped when the seedpods start to open, and can remain viable in the seedbank at least 10 years. Seeds do not continue to ripen if the pods are still immature when the tree is treated

Environmental impact: Major. Considered a transformer species

Risk Priority: High

Situation in which to control: All small infestations in CNP

Control methods:

- Hand pull seedlings
- Cut larger plants at ground level (no herbicide needed)

Time to control: Year round

Follow up: Seed can remain viable in the ground for long periods of time, so regular monitoring and removal of seedlings will be necessary. Fire and disturbance can trigger the seedlings to germinate, so monitor areas after fire or other disturbance.

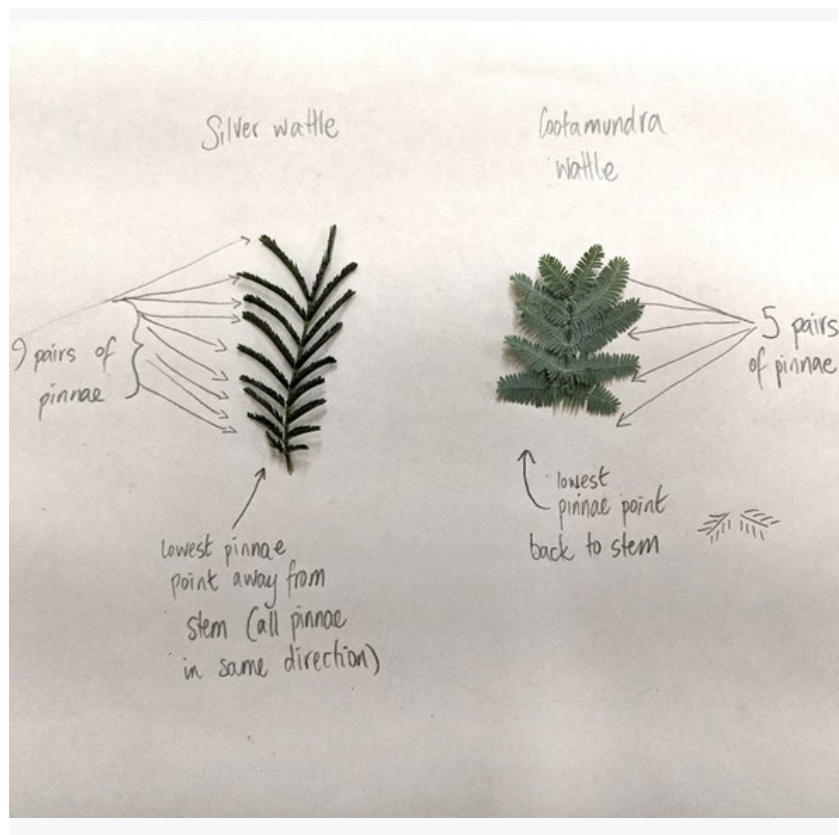


Figure 49 (ZL) Comparison between Cootamundra Wattle and Silver Wattle



Figure 50 (JW) Leaves and flowers of Silver Wattle *Acacia dealbata*

Similar species: May be mistaken for Silver Wattle (*Acacia dealbata*) (Figure 50), however the easiest way to tell the difference is in the leaves. The bipinnate leaves of Cootamundra Wattle have three to five pairs of pinnae (feathery leaves branching off the stem) (Figure 49), the lowest pair is shorter, swept back and embraces the stem to which the leaf is attached. The bipinnate leaves of Silver Wattle have 8-20 pairs of pinnae attached to the leaf stem and the lowest pair points away from the stem. Note that these two species can hybridise (cross with each other), and the leaves of these plants are intermediate between the parents. It is good to remove these as well.

Cotoneaster/Large-leaved Cotoneaster

Cotoneaster glaucophyllus

Description: Leggy evergreen prostrate or large bush to small tree with multiple stems (*Figure 51*). The round or oval leaves are smooth and olive green above, white and hairy underneath (*Figure 52*). The flowers are cream, white or pinkish (*Figure 53*), followed by bright red berries to 6 mm in autumn (*Figure 52*). The berries are very attractive to Currawongs, who spread the seed. The berry bearing weeds are one of the winter food sources which allow Currawongs to stay in the ACT all year round, and pose a threat to nesting small birds, whose nestlings they eat. The berries can, however, also provide food for Gang-gang cockatoos.

Cotoneaster is widespread in suburban gardens in Canberra. Consider replacing with species of *Acacia*, *Callitris* or *Allocasuarina*

NatureMapr link: <https://canberra.naturemapr.org/species/3539>



Figure 51 (TP) Cotoneaster growth habit



Figure 52 (DR) Leaves and fruit of Cotoneaster



Figure 53 (MS) Cotoneaster Flowers

Seed life: Two seeds per berry which are ripe when the berry is red. No information found on seed viability in the soil

Environmental impact: Major

Risk Priority: High

Situation in which to control: Control seed bearing specimens, and all small plants as they emerge

Similar species: Other Cotoneaster species such as Silver-leaved Cotoneaster (*Cotoneaster pannosus*) and *Cotoneaster rotundifolius*, which are treated the same way

Control method:

- Cut stump with Glyphosate 360 (half and half with water). Cut stem close to ground (15 cm or lower) and apply herbicide within 15 seconds using dabber. Check for all the side stems
- Chip out very small plants, ensuring all roots are removed, as plants re-sprout from suckers and even cut branches if in close contact with the soil

Time to control: All year round, but herbicide uptake less effective in winter

Egg-leaf Spurge/Caustic Weed

Euphorbia oblongata

Description: Perennial forb to 1m (*Figure 54*). Flowerhead is a yellowish/green. (*Figure 55*) It can sucker from its fibrous root system. One of a number of this genus which are sold in nurseries for suburban gardens and then pose a threat to bushland. Likely to take off if dumped, and in moister areas. Plants spread via seed and vegetatively from the roots. Monitor for new species and report via Nature Map or Fieldmaps. Note that a number of Euphorbia species have milky sap which can irritate skin and eyes, and may cause breathing difficulties, so it is important to wear long sleeves, gloves and eye protection

NatureMapr link: <https://canberra.naturemapr.org/species/5302>



Figure 54 (MS) Spurge growth habit



Figure 55 (AC) Spurge leaves and flowers



Figure 56 (MS) Spurge fruit and leaves



Figure 57 (MS) Spurge growth habit

Seed life: Seeds form in capsules, which are produced by a plant within two years. They may continue to ripen after plant is dug out. Some sources suggest the seed is viable for up to eight years. It can germinate thickly from the seed bank, so ensure plants are piled

Environmental impact: Moderate

Risk Priority: Moderate

Situation in which to control: New infestations as soon as they are spotted

Control method:

- Hand pull when soil is moist, ensuring all the roots come out. Pile plants if flower or seed head present. A trowel or hand mattock may be useful for easing roots out
- Spot spray with Fluroxypyr 400 g/L (Fireball 400) (5 ml/L water plus 1 ml/L surfactant), or Metsulfuron Methyl 600 g/kg (Brushoff) (0.1 g/L plus 1 ml/L surfactant)

Time to control: Preferably before seed set and when soil is moist. Spot spray all seasons except winter

Follow up: Annually for five years

Similar species: Other exotic Euphorbias such as Caper Spurge (*Euphorbia lathyris*), which can be treated similarly. There are native Euphorbias, but they are low to the ground and unlikely to be mistaken

English Ivy

Hedera helix

Description: Dark green evergreen climber which forms dense mats (*Figure 58*) which smother all other vegetation. Mature plants send long runners up trees from which it then flowers, producing black berries (*Figure 60*) eaten and spread by Currawongs and other birds. It often germinates in shady spots and moist gullies, where it is tough and can survive extended drought, springing to growth in wet years. A common garden plant and escapee.

NatureMapr link: <https://canberra.naturemapr.org/species/6275>



Figure 58 (SB) Ivy growth habit

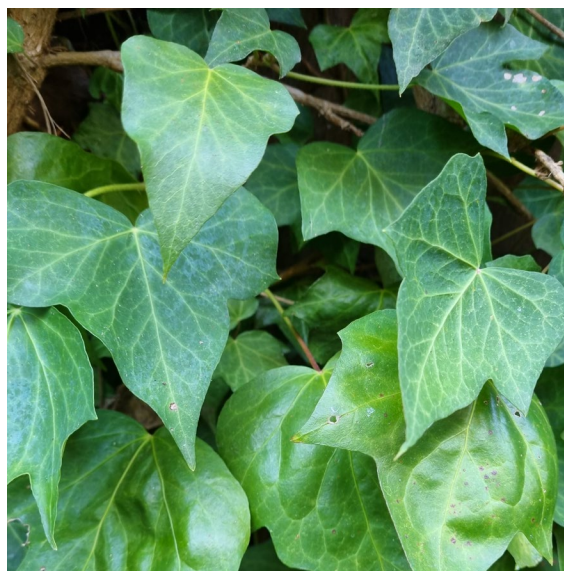


Figure 59 (VK) Ivy leaves



Figure 60 (SR) Berries of Ivy

Seed life: Two-three hard whitish seeds are found in each berry and are ripe when the berry turns black in winter and early spring. Unripe seed decays quickly, so unlikely to cause a problem after plant removal. Seed life is short, less than one year.

Environmental impact: Major

Risk Priority: High

Situation in which to control: New infestations as soon as they are spotted, because they are easy to remove when small

Control method:

- Manual removal. This is easy when plants are small. Once dense mats are formed a mattock is required to dig down and remove roots. Long stems are sent out very close to the ground which can take root at each leaf node. Care should be taken to ensure stems are followed and removed, otherwise they will break off and re-sprout. Removed stems will also readily re-grow if left lying in contact with the soil
- Layer cardboard and several inches of mulch such as woodchips. This needs to be in place for at least two seasons.
- Cut plant close to ground and paint the cut stems with Glyphosate 360 1:1. Spraying leaves may not be very effective as the leaves have a waxy coating making herbicide penetration difficult. Also consider non-target species in vicinity, especially any trees upon which the ivy is growing, as spraying the trunk may kill these.
- If the ivy is climbing and has not formed a large ground mat, cut the stems about a metre from the ground then scrape the lower parts and paint with Glyphosate 360 1:1
- Depending on the size of the patch a mix of above methods may be needed. Take care to save any existing desirable plants, and consider sowing seed into remaining bare ground

Time to control: Year round

Follow up: Several times in following season; thereafter an annual check

Similar species: No other species can be mistaken for Ivy

Firethorns/Orange Firethorn/Nepal Firethorn/Red Firethorn

Pyracantha spp.

Description: An evergreen, rounded, multi-stemmed spiny shrub to 3 m (*Figure 61*) with small, oblong, glossy green or grey-ish leaves (*Figure 63*) to 5 cm, thorns on the stems and small creamy flowers followed by bright yellow, orange or red berries (*Figure 62*) to 6 mm wide. Plant suckers from base to form a thicket and are spread by seed carried by birds and other animals. Note that the thickets may be providing habitat for nesting birds.

NatureMapr link: <https://canberra.naturemapr.org/species/11432>



Figure 61 (KL) Firethorn growth habit

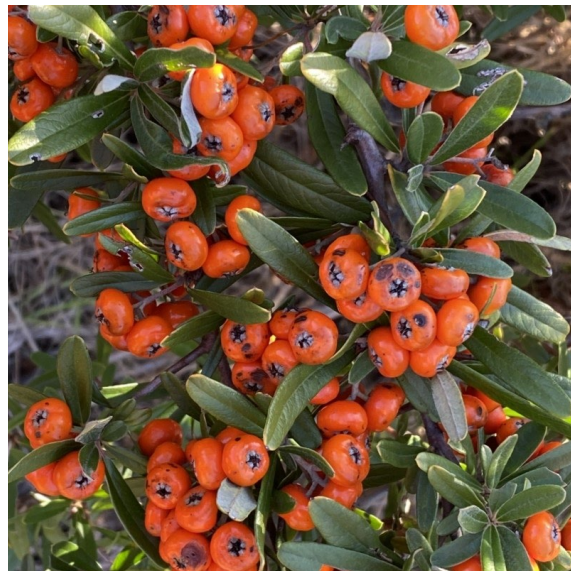


Figure 62 (SB) Firethorn leaves and berries

Seed life: The seed is rip ripe when the berries change colour. They require a cold period to break dormancy and germinate in spring. Maximum seed life is 10 years. Plants take two to three years to produce flowers



Figure 63 (SB) Firethorn leaves

Environmental impact: Moderate

Risk Priority: Moderate

Situation in which to control: In good areas, in gullies

Similar species: There are a number of *Pyracantha* species, all of which are environmental weeds and may be treated the same way

Control method: Hand pull very small seedlings, which often pop up in shady areas in gullies or under mature trees. Advisable to wear eye protection and welding gloves due to thorns

- cut and dab stems with one part Glyphosate 360 to one part water,

applying herbicide within 15 seconds of cutting stem close to ground

Time to control: Year round, but check for nesting birds

Follow up: The following year, to check for re-growth and emerging seedlings

Fireweed

Senecio madagascariensis

Description: Annual or biennial poisonous plant up to 60 cm (*Figure 64*) with narrow bright green fleshy leaves and bright yellow daisy flowers generally with 13 petals (*Figure 65*) in clusters on the end of stems. Plants are spread via wind, on people, animals or machinery.

NatureMapr link: <https://canberra.naturemapr.org/species/12196>



Figure 64 (MS) Fireweed growth habit



Figure 65 (MS) Fireweed flower

Seed life: Plants may flower within 6-10 weeks of germinating. Seeds are small and light, attached to silky hairs to aid wind dispersal, and look fluffy when ripe, a bit like dandelions. Seed can continue to develop after plant is removed if flowers are present. Fifteen percent of seeds remain dormant for over 10 years and can then germinate

Environmental impact: Major. It is a WONS (Weed of National Significance)

Risk Priority: Very High

Situation in which to control: All occurrences. This is not a widespread weed in the ACT, and should therefore be immediately removed

Similar species: Native Highland Groundsel (*Senecio pinnatifolius*) which is not common in the ACT.

Control method:

- Hand pull including roots. Remove whole plant and put in waste bin - not green bin

Time to control: Year round

Follow up: Check control sites periodically for seedlings.

Gleditsia/Honey Locust/Thorny Locust

Gleditsia triacanthos

Description: A popular garden tree, growing up to 20 m (*Figure 66*). It is deciduous, with bipinnate bright green leaves (*Figure 67*) turning yellow in autumn. Hanging creamy yellow flowers turn into long dark brown flattened pods (*Figure 68*) and distinct thorns grow from the trunk and limbs (*Figure 67*). The plant can sucker and form dense thickets.

NatureMapr link: <https://canberra.naturemapr.org/species/5865>



Figure 66 (MS) Honey Locust growth habit



Figure 67 (MB) Honey Locust leaves and thorn



Figure 68 (MB) Honey Locust pods

Seed life: Egg shaped brown seeds are ripe when pods turn brown. Seed is long lived

Environmental impact: Major

Risk Priority: Very High

Situation in which to control: All occurrences in CNP

Similar species: Nil

Control method:

- Cut and dab with Glyphosate 360 (one part Glyphosate to one part water) when actively growing, applying herbicide within 15 seconds

Time to control: When plants are green

Follow up: Following season, to check for re-growth

Hawthorn

Crataegus monogyna

Description: Deciduous large bush or small tree, generally with single trunk. The clustered white or pink flowers (*Figure 69*) are followed by round, bright orange/red berries to 12 mm (*Figure 70*) and savage thorns (*Figure 71*). The leaves are green and divided into 3-7 major lobes, and then may be further divided into minor lobes (*Figure 70*). Very tough and long lived plant. Like other woody weeds with attractive fruit, seedlings often germinate under trees, where birds have perched and passed the seeds. Can also sucker along disturbed roots

NatureMapr link: <https://canberra.naturemapr.org/species/3588>



Figure 69 (JDR) Hawthorn flowers and leaves



Figure 70 (MS) Hawthorn berries

Seed life: There is one hard seed per berry, ripe when the seed is brown and the berry red. They do not appear to ripen after plant is killed. Seed longevity is unknown



Figure 71 (SG) Hawthorn leaves and thorns

Environmental impact: Moderate

Risk Priority: Moderate

Situation in which to control: Remove mature seedbearing plants

Similar species: Nil

Control method:

- Check mature plants for actively nesting birds before treatment
- Wear gloves, preferable welding gloves, and eye protection when treating, due to thorns

- Cut stump with Glyphosate 360 (half and half with water). Cut stem close to ground (15 cm or lower) and apply herbicide within 15 seconds using dabber. Larger specimens will need to be sawn
- Drill and fill using neat Glyphosate 360. This allows tree to remain standing and provide habitat if needed
- Spot spray with Metsulfuron Methyl 600 g/kg (Brushoff), (0.1 g/L water plus 1ml/L surfactant)
- Hand pull small seedlings. Note that they have a long taproot and when soil is dry even tiny seedlings are almost impossible to pull out

Time to control: When plants are actively growing with green leaves, most likely from October to March/April

Follow up: Annually to check for any suckering (usually not much) and seedlings emerging from remaining seedbank

Horehound

Marrubium vulgare

Description: A bushy flowering plant in the mint family (*Lamiceae*) growing to a height of about 45-80 cm depending on growing conditions (*Figure 72*). It naturally occurs in Europe and North Africa but has become naturalised in most of the northern hemisphere. It is a herbaceous perennial with square stems and grey leaves 2-5 cm long and similar in shape to a crinkled mint leaf covered in short downy hairs (*Figure 72, Figure 74*). Small white flowers grow in clusters appearing throughout summer (*Figure 74*). The burr-like seed capsules are 1-2 mm long and covered with hooks that easily attach to animal fur (*Figure 73*).

NatureMapr link: <https://canberra.naturemapr.org/species/8188>



Figure 72 (JW) Horehound growth habit and leaves



Figure 73 (KC) Horehound seed heads

Seed life: The capsules contain four seeds which are ripe when the burr turns brown and dry. Mature plants can produce up to 20,000 seeds per year and these can survive seven to ten years in the soil

Environmental impact: Moderate

Risk Priority: Low

Situation in which to control: When the horehound is increasing enough to reduce natural biodiversity.

Similar species: Stagger Weed (*Stachys arvensis*) but these are garden plants (also weeds therefore) and are unlikely to be found in any great quantity in our reserves and urban open spaces.



Figure 74 (MB) Horehound flowers

Control method:

- Hand pull small plant
- Chip out mature plants
- Spot spray with 2.7 ml/L of MCPA 750g/L (Agritane) and 1 ml/L surfactant
- Biological control methods have also been used. The horehound bug (*Agnoscelis rutila*) has been used in the past, but although they have been distributed across the ACT, they did not provide a worthwhile control. Currently the horehound plume moth (*Wheelaria spilodactylus*) is used. It is host specific and the caterpillar, which is hairy and green with a white stripe, feeds on the tips of the Horehound.

This weakens the plant, reduces the numbers of flowers/seed produced, but does not eradicate it. Sightings of the moth or caterpillar have been recorded across the ACT.

Time to control: Manual removal in spring and early summer before seeds set. Spot spray in autumn

Follow up: Chip or hand pull regrowth regularly

Japanese Honeysuckle

Lonicera japonica

Description: A vigorous climber and scrambler (*Figure 75*) which forms dense mats (*Figure 76*) which smother all other vegetation. It twines around trees and shrubs, as well as sending out long stems along the ground. Often in moist gullies. A garden escapee, which mostly spreads vegetatively via runners or new plants via bird dispersed seed. May irritate skin

NatureMapr link: <https://canberra.naturemapr.org/species/7902>



Figure 75 (MS) Honeysuckle growth habit



Figure 76 (CE-R) Honeysuckle leaves



Figure 77 (MB) Honeysuckle flowers

Seed life: Seed is ripe when the berries turn black. They are dispersed by birds, meaning new plants germinate more frequently under large trees than elsewhere. Seed lasts two years in the soil

Environmental impact: Major.

Risk Priority: High

Situation in which to control: In high value gullies. As soon as plants are noticed

Similar species: Other introduced honeysuckles like Winter Honeysuckle (*Lonicera fragrantissima*); and European Honeysuckle (*Lonicera periclymenum*) but these are also weeds and may be treated the same way

Control methods:

- Manual removal. This requires careful attention to the long stems along the ground which root at nodes. Simply pulling the stems will break them off, where they continue to grow. Best to work systematically, using a trowel or mattock to loosen roots and then work along each stem ensuring it is all removed. Pile weeded parts elsewhere for visibility, making sure they cannot take root from the pile and start a new patch
- Cut stump with Glyphosate 360 (two parts Glyphosate to one part water) within 15 seconds
- Cut plant close to ground, then return in two-three weeks to spot spray new shoots with Metsulfuron Methyl 600 g/kg (Brushoff) (0.1-0.2 g/L water plus 1-2 ml/L surfactant).
- Depending on the size of the patch a mix of above methods may be needed. Take care to save any existing desirable plants, and consider sowing seed into remaining bare ground

Time to control: Year round

Follow up: Return two or three times in following six months, then annually for three years

Lavender/Spanish Lavender

Lavandula stoechas

Description: Fragrant grey herbaceous perennial with purple flower spikes (*Figure 78, Figure 79*). Forms dense stands, particularly on sunny slopes, and is very hardy. Seedlings can survive for years, but spread only slowly from original patch, so it is worthwhile tackling any new patches as soon as possible to avoid increase

NatureMapr link: <https://canberra.naturemapr.org/species/7332>



Figure 78 (WL) Spanish Lavender growth habit



Figure 79 (MB) Spanish lavender flowers and leaves

Seed life: Flowers for a long period, and seeds ripen progressively in the flowerheads, including after plant removal. Seeds are tiny and black, and appear to remain in the soil bank up to six years

Environmental impact: Data deficient, but an emerging weed in some reserves

Risk Priority: Medium-High

Situation in which to control: In habitat of threatened species, all scattered plants

Similar species: When not in flower can be mistaken for *Cassinia* spp and small plants for *Vittadinia* spp. A good method is to rub leaves between fingers, as the Lavender smell is very distinctive. Cassinias have a strong smell too, but more like curry, and unlikely to be mistaken for Lavender.

Control method:

- Manual removal. It is generally easy to pull by hand, or with the aid of mattock. Note that Lavender cannot re-shoot from stem below last green growth, so can also be cut if plants are large and woody. Avoid soil disturbance. Make piles of the flowering and seed-bearing plants to minimise seed spread. Sow seed or plant into larger remaining bare patches

Time to control: Year round

Follow up: Twice yearly for the first year, then annually for three to four years. Can germinate prolifically from seed over several years. Avoid letting more plants set seed. This is relatively easy to time, as new plants take at least six to twelve months to get to flowering stage

Mullein/Verbascum

Verbascum thapsus subsp. *thapsus*, *Verbascum blattaria* & *Verbascum virgatum*

Description: A biennial plant with a large rosette of furry grey leaves (*Figure 81*) with a deep tap root and a tall flowering stalk (*Figure 80*), usually in the second season, although sometimes in the first. Yellow flowers appear progressively along the stalk. Mullein out-competes grasses and native forbs and can adversely change the vegetation structure in Pink-tailed worm-lizard (PTWL) habitat.

NatureMapr link: <https://canberra.naturemapr.org/species/13769>



Figure 80 (AC) *Verbascum* growth and flowers



Figure 81 (VK) *Verbascum* leaves in rosette

Seed life: Seed matures progressively, even after flower stalk is cut, with up to 600 small poppy-like dark red to black seeds per capsule, which can remain in the dry stalks for many seasons. You would be able to see and hear them if you were to shake the dried stem like a salt shaker. Seed is viable for a long time, with successful germination of seed from soil samples after hundreds of years. In practice, however, most seed germinates in the first few years in the immediate vicinity of the parent plant

Environmental impact: Moderate

Risk Priority: Medium-High

Situation in which to control: In good patches, and in identified PTWL habitat

Control method:

- Chip while at rosette stage, ensuring roots are severed about 2 cm below the growing plant.
- Alternatively wait till the flower stalk has almost matured and in January - February cut the stalk at the base of the flower and drop the seedhead vertically into a plastic bag and seal, or pile together if not practical to remove from site. The timing is important with this method. The plants are biennial, so will not send up another flower stalk if done after flowering has finished. If using this method while flower stalk still green and young, the

plant will stalk again often with multiple stalks. One group has found that only around ten percent of rosettes send up a flower, so this method can be more efficient. It also avoids soil disturbance which can lead to further weed germination.

Time to control:

- Year round, depending on variables mentioned above

Follow up:

- Return to controlled area every six months for three years to remove new plants, or those which have been missed; thereafter occasional patrols are sufficient

Similar species: *Verbascum virgatum* (Figure 82) and *V. blattaria* (Figure 83) have a similar tall flowering stalk and may be treated in the same way



Figure 82 (DR) *Verbascum virgatum*



Figure 83 (MS) *Verbascum blattaria*



Figure 84 (MB) *Verbascum thapsus*

Olive/African Olive

Olea europaea subsp. *cuspidata*

Description: Graceful, dense, branched, evergreen, bush or small tree (*Figure 85*) with pale bark and leaves lighter coloured underneath (*Figure 86*). It can quickly form dense thickets which out-compete other plants. It spreads by seed and suckers when roots are damaged.

NatureMapr link: <https://canberra.naturemapr.org/species/9263>



Figure 85 (MS) Olive growth



Figure 86 (MS) Olive leaves and fruit

Seed life: There is one seed per fruit, which is ripe when the fruit turns dark purple-black. Seeds do not develop further after tree is killed. Seedbank longevity is unknown

Environmental impact: Major

Risk Priority: Very High

Situation in which to control: All individual plants, as it is not widespread in ACT reserves

Similar species: European Olive (*Olea europaea* subsp. *europaea*), also a weed

Control method:

- Hand pull seedlings and young plants
- Cut and dab using one part Glyphosate 360 to one and a half parts water within 15 seconds
- Drill and fill using one part Glyphosate 360 to one and a half parts water within 15 seconds
- Spot spray suckers with one part Glyphosate 360 (20 ml/L water plus 2 ml/L surfactant)

Time to control: Year round

Follow up: Return to remove emerging seedlings, and check for suckering from around cut stems, which is common

Paterson's Curse and Viper's Bugloss

Echium plantagineum and *Echium vulgare*

Description: Paterson's Curse is an annual herb with very hairy almost prickly stems and bright purple flowers (*Figure 87*, *Figure 89*) which appear progressively along the stems. Its early growth at the rosette stage (*Figure 88*) means that it can quickly out compete more desirable species. It spreads by seed and can take hold in bare areas.

NatureMapr links: <https://canberra.naturemapr.org/species/4563>,
<https://canberra.naturemapr.org/species/4565>



Figure 87 (MS) Paterson's Curse flowers



Figure 88 (MS) Paterson's Curse rosette of young leaves

Seed life: Four seeds develop per flower and are mature when they turn dark brown-grey starting about four to six weeks after the plant begins to flower. Seed can continue to develop after plant is removed from soil. Large amounts of seed can build up in the soil, and may remain dormant for up to five years, although most germinate the following season. When soil is bare, for example after removal of other weeds, Paterson's Curse will often appear

Environmental impact: Moderate

Risk Priority: Moderate

Situation in which to control: In good areas

Similar species: Viper's Bugloss (*Echium vulgare*) (*Figure 89*) which is also a weed and can be treated the same way. When at the rosette stage may also be mistaken for other rosette forming plants, like the native Bear's Ears (*Cymbonotus lawsonianus*) and Austral Bear's Ears (*Cymbonotus preissianus*). Note that the Bear's Ears (*Figure 90* next to *Echium*) has broader notched leaves and a bright yellow daisy flower.



Figure 89 (MF) *Echium vulgare*



Figure 90 (VK) -*Echium* spp. growing below *Cymbonotus preissianus* (Native Bear's Ears)



Figure 91 (SB) *Echium plantagium*

Control method:

- Hand weed small areas or individual plants. Plants do not re-sprout from small pieces of root remaining in the soil. If plant is in flower, ensure plants are piled to reduce seed spread.
- Spot spray with Metsulfuron Methyl 600 g/kg (Brushoff) (0.05 g/L water plus 1 ml/L surfactant) or MCPA 750 g/L (Agritone) (2.7 ml/L plus 1 ml/L surfactant). These are selective broad-leaved herbicides and preferred over Glyphosate 360

- There are a number of biological controls in use. Several insects all attack all stages of Paterson's curse. Leaf mining moth (*Dialectica scalariella*), Crown weevil (*Mogulones larvatus*), Root weevil (*Mogulones geographicus*), two flea beetles feed on the leaves (*Logitarsus aeneus*) and (*Logitarsus echii*) and Pollen beetle (*Meligethes planiusculus*).

Time to control: When actively growing

Follow up: Regular checking of treated site, particularly after good rain

Periwinkle/Blue Periwinkle/Greater Periwinkle

Vinca major

Description: Spreading vine with rounded leaves (*Figure 92*) and blue flowers (*Figure 93*) in spring. Smothers all plants in its path. It is a common garden plant which may be dumped in reserve areas by residents. It prefers moist and shady areas. Its root system is extensive and difficult to remove. The plant spreads with runners that can root where they touch ground.

NatureMapr link: <https://canberra.naturemapr.org/species/13830>

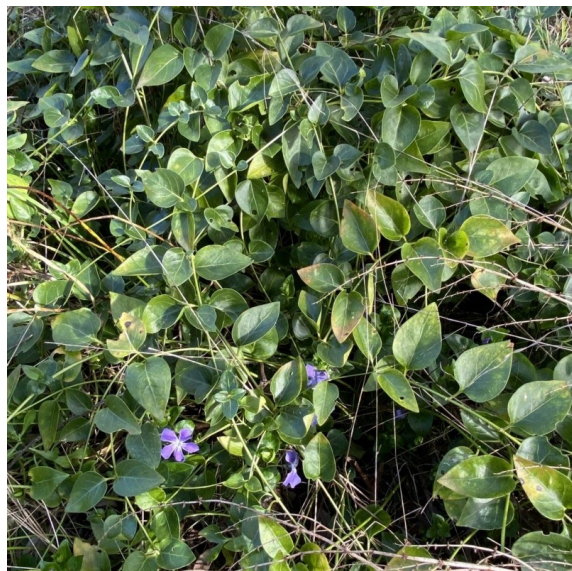


Figure 92 (SB) Vinca growth

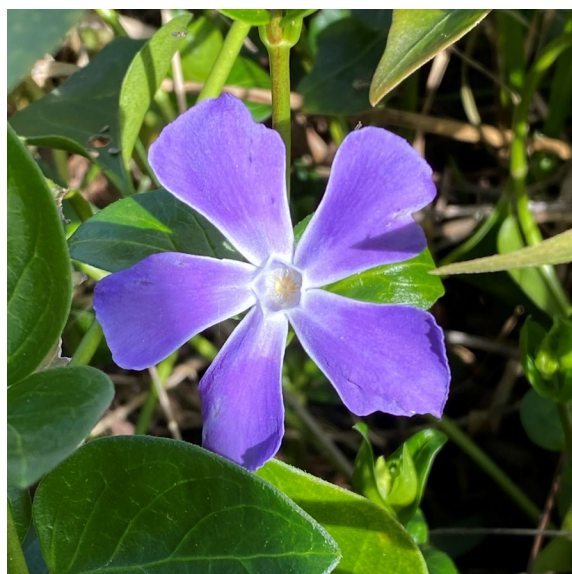


Figure 93 (SB) Vinca flower

Seed life: Rarely sets seed in Australia

Environmental impact: Major

Risk Priority: High

Situation in which to control: Best removed at a young stage

Similar species: Nil

Control method:

- Spray with Glyphosate 360 (20 ml/L water plus 2 ml/L surfactant), or Metsulfuron Methyl 600 g/kg (Brushoff) (0.1-0.2 g/L water plus 2 ml/L surfactant) The leaves are waxy, and this may affect penetration of the herbicide (hence using 2 ml/L surfactant as opposed to 1 ml/L). If possible, slash or mow then spray regrowth as above.
- Cut to near ground and dab cut stems within 15 seconds with one part Glyphosate 360 to three parts water
- For defined patches, work from the outer edges to the centre by roughly removing surface roots with a mattock. Shake off any soil from the runners. Return to remove any breakthrough vines at two weekly intervals and when there is minimal regrowth, mulch heavily

Time to control: Year round

Follow up: Return in three months to control any regrowth. Try and ensure site is revegetated with suitable natives

Prickly Pear

Opuntia stricta (consider also *O. elata*, *O. puberula*, *O. rufida*)

Description: Upright spreading cactus to 2 m with blue-grey egg shaped pads (*Figure 94*) instead of leaves and yellow flowers followed by fleshy reddish fruits (*Figure 95*). The spines can penetrate clothing and footwear, so extreme care should be exercised. Pads can survive and take root where they lie or are transported to after months and even years. Can form dense impenetrable infestations.

NatureMapr link: <https://canberra.naturemapr.org/species/9420>



Figure 94 (JDR) Prickly Pear growth



Figure 95 (MB) Prickly Pear fruits



Figure 96 (JDR) Prickly pear flower buds

Seed life: Seed is ripe when the fruit turns red or purple, and is spread by birds and other animals. Each fruit contains about 100 seeds. Immature fruit can also drop and produce roots. Seeds viable for up to 15 years

Environmental impact: Major. Also a Weed of National Significance (WONS)

Risk Priority: High

Situation in which to control: All individual plants before they set fruit and spread

Similar species: Indian Fig (*Opuntia ficus-indica*) which has few spines and is grown for its fruit by gardeners. Should still be removed from CNP

Control method:

- Manually remove small plants (exercising extreme care due to spines) and remove from site completely
- Spot spray plants with Glyphosate 360 (10 ml/L water plus 2 ml/L surfactant) ensuring whole plant is covered. Note that spraying with selective herbicide is recommended by NSW Weedwise, however none of those are approved for PCS volunteers.
- Drill and fill in the stem of big plants with large thick trunk.

Note: Do not cut down plant and leave pads on ground as they will simply form new plants, even after months and years

Time to control: Year-round.

Follow up: Following year to check for emerging seedlings or re-growth from dropped pads

Radiata Pine

Pinus radiata

Description: Large upright evergreen pine tree (*Figure 97*) with dense bright to dark green foliage (*Figure 97*, *Figure 98*). Plantation escapee. Seeds are spread by cockatoos for whom the plant can be a source of food, and also by wind. The thick litter under Radiata Pines stops other plants germinating and changes the nutrient cycle

NatureMapr link: <https://canberra.naturemapr.org/species/10464>



Figure 97 (MS) Pine growth habit



Figure 98 (MS) Pine seedlings



Figure 99 (SB) Pine cone

Seed life: Seeds are winged and can spread up to one km in the wind. Trees are self fertile, meaning one tree can produce seed. Seeds can remain viable in closed mature cone for up to five years. Seed is ripe when the cone turns brown

Environmental impact: Major

Risk Priority: Very High

Situation in which to control: Generally found as isolated individuals in CNP; remove

Similar species: Other pines, also non-native. Also distinguish from Black Cypress Pine (*Callitris endlicheri*), a local

native, which does not have long needles or large cones

Control method:

- Hand pull very small seedlings in moist conditions
- Cut at base with loppers for small plants and saw for large plants. Mature trees need a chainsaw, which PCS rangers can use. Application of herbicide not required as they cannot re-shoot, provided all twigs and green leaves are removed

Time to control: Year round

Follow up: Check for new seedlings periodically

Serrated Tussock

Nassella trichotoma

Description: A dense clumpy grass to 50 cm (*Figure 100*, *Figure 101*) with very fine leaves which are bright green when young, and always white at the very bottom. The leaves are serrated on the edges and feel rough to the touch. It often remains ungrazed. The whole plant looks pinkish/purple when flowering, brighter green in summer and is bleached golden yellow by frost in winter. The flowerheads are distinctive with long drooping stems and pink seeds (*Figure 102*). One way to distinguish the non-flowering plant is by very gently peeling back a leaf from its stem and checking for a short white ligule (<2 mm), which is a protruding bump (*Figure 103*, *Figure 104*). A 3D model of ST is available from the NSW DPI online at: <https://sketchfab.com/dpicomms/models>

This plant is in the same genus as Chilean Needlegrass (*Nassella neesiana*) and is also highly invasive and hardy.

NatureMapr link: <https://canberra.naturemapr.org/species/8866>



Figure 100 (DS) Serrated Tussock growth habit



Figure 101 (DS) Serrated Tussock growth habit



Figure 102 (JG) Seeds of Serrated Tussock



Figure 103 (MS) The ligule of Serrated Tussock

Seed life: The seeds take eight to ten weeks to mature once flowering stems emerge. The seedheads turn golden and blow or break off when mature. They can blow in the wind up to 10 km. Large plants can produce up to 100,000 seeds, which can remain dormant in the soil for up to 15 years

Environmental impact: Massive. Also a Weed of National Significance (WONS). A transformer species.

Risk Priority: Very High

Situation in which to control: Any outbreak in reserve, around edges of reserves where entry is likely

Control method:

- Chip out small infestations and bag and remove plants (including the soil around the roots which may have seeds) from site. If seed stalks remain attached, they easily pull from plant so should first be bagged. Also search nearby to collect and bag any detached seed stalks. Dispose of in general waste, not green waste
- Spot spray with Glyphosate 360 at 10 ml/L and 2 ml/L surfactant.

Time to control: Spray when plants are actively growing and not stressed, but helpful to control when in flower to aid identification, and before seed set. Mature plants with lots of dead material may prove difficult to kill with spray. Manual removal any time.

Follow up: Annually for several years to check for seedlings. Note that every minute of work before treatment carefully clipping ripe seed heads and bagging for removal is time well spent. However, this is impractical for large infestations. In those cases, the location will need to be revisited for possible control each year for many years

Similar species: Non-flowering plants can be mistaken for *Poa* spp., some wallaby grasses (*Rytidosperma* spp.) and Rough Speargrass (*Austrostipa scabra*). Serrated Tussock can be distinguished by the pale hairless ligule, serrated leaves (rough to touch) and the always white leaf base (Figure 104).

Serrated Tussock Identification Tips

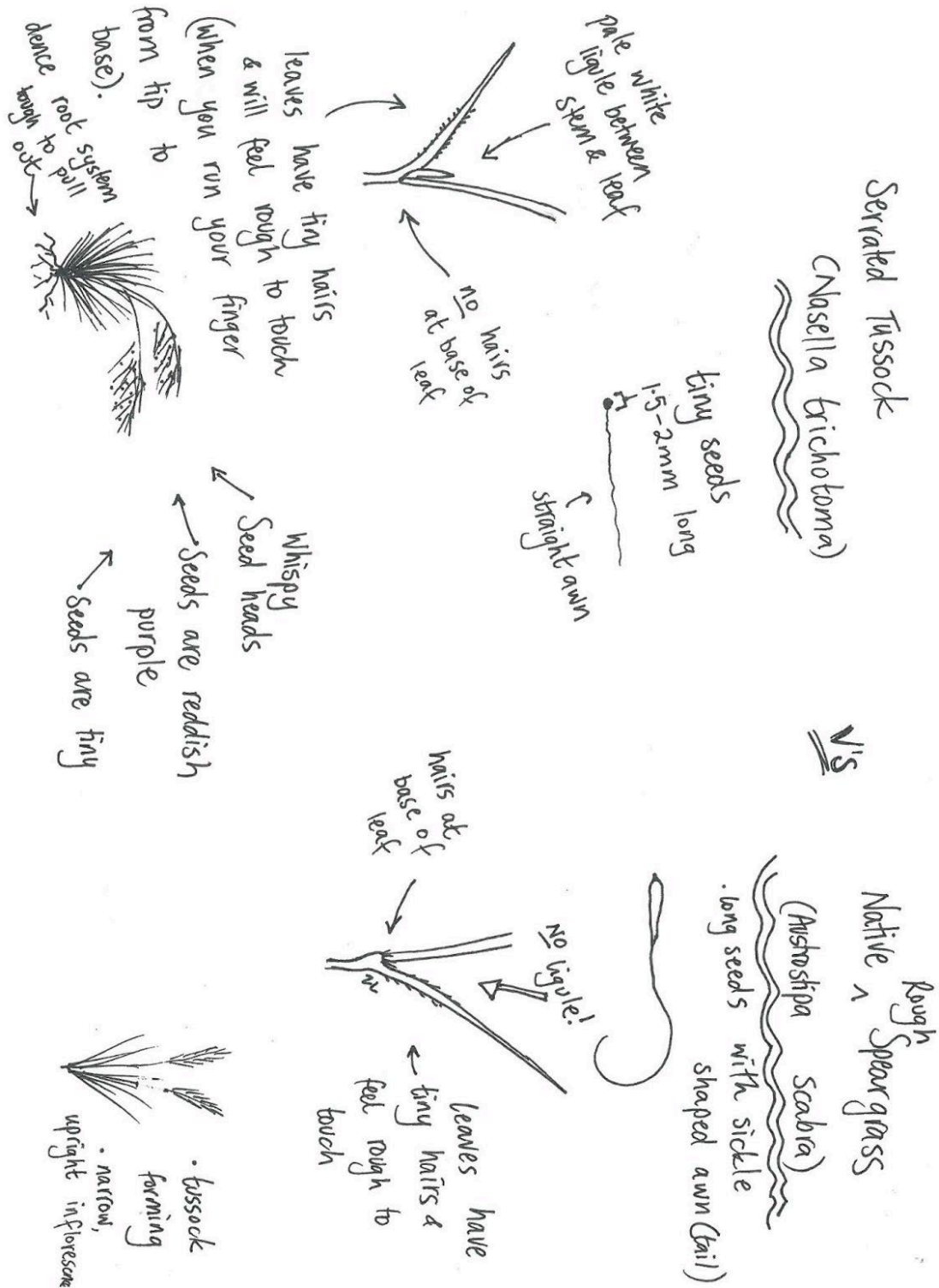


Figure 104 (ZL) Serrated Tussock identification tips

St John's Wort

Hypericum perforatum

Description: Perennial herb 30-120 cm high (*Figure 105*). Small bright green leaves on a rosette which re-sprouts in spring, before sending up tall flower spikes with bright yellow flowers (*Figure 106*). Flower stalks turn brown when ripe. It spreads vegetatively from an extensive root system which is hard to remove. It can dominate grassland, particularly where there is not sufficient competing groundcover.

NatureMapr link: <https://canberra.naturemapr.org/species/6754>



Figure 105 (AD) St John's Wort growth habit



Figure 106 (MS) St John's Wort flower

Seed life: It produces prolific seed which ripen progressively on the flower stalk, potentially over a period of months, as it responds to conditions. One plant may produce thousands of seeds which last 10-12 years. Seed is ripe when it progresses from milky to black, a process which can continue after the flower stalk or plant is removed or sprayed. Recent experiments by a member of Friends of Grasslands indicate that seed is still viable even after the plant is sprayed and killed. Seed was also found to be present in cut flower stalks months after cutting

Environmental impact: Moderate

Risk Priority: High

Situation in which to control: In good patches. See decision tree (*Figure 108*) by Richard Milner below to evaluate where and how to control SJW.

Similar species: Native Small St John's Wort (*Hypericum gramineum*) doesn't have the miniscule black dots on the back of leaf margins, like the exotic SJW has. It is generally smaller and more delicate looking, with single flowers on the ends of the stems.



Figure 107 (TP) St Johns Wort with Chrysolina beetle, a biological control agent

Control method:

- Spot spray with Fluroxypyr 400 g/L (Fireball 400) (15 ml/L water plus 1 ml/L surfactant), coating entire plant for at least two consecutive years, as plants can survive due to extensive root system. It is important to avoid off target damage to surrounding native plants, which are needed to out compete new SJW seedlings. Fireball 400 is a selective herbicide which means that it will not kill grasses but can kill other forbs such as peas.
- Manual removal for small areas, provided all root stock is removed. This may be better attempted in moist conditions. Carefully use a weeder to work under the roots and gradually pull whole plant with all its roots out, rather than hand pulling from the top and breaking roots off. St John's Wort has one set of roots that grow vertically to about 1 m deep into the soil, and another set that grow horizontally and produce buds that form new aerial growth. Plants with brown seed heads should be removed or piled to avoid seed spread
- Some groups have success with seed head removal over a period of years, thus weakening the plant and preventing seed accumulation. Seed heads are cut with shears and bagged, being careful to hold stems upright until bagged so as to avoid simply spreading the seed around further. Slashing could also be tried, providing it is done during early flowering *before seed is able to ripen*
- Biological control. Note that there are two *Chrysolina* beetle species (*Figure 107*) which can help to weaken plants and reduce seed production. Do not spray if beetle is present and consider moving beetles into other patches.

	Winter – rosette starts re-growing late winter	Spring – rosette and flower stems start to shoot	Summer – plant is green and flowering is progressive	Autumn – seedheads often start to turn brown, and plant dies off
Manual removal – when soil is moist enough to allow removal of most of the root Plants should always be piled or bagged if there is a current green flower stalk with yellow flowers, or an old brown one as the seeds can remain in the seed heads for months	✓ When old flower stem remains to hold on to	✓ When old flower stem is present, or new one is growing	✓	✓
Seedhead removal Any time flower or seedhead is present on the plant. Bag or pile cut stems	✓	✓	✓	✓
Slashing		✓ Only during early flowering, before seeds develop		
Spot spraying	✓	✓	✓	✓

Time to control: Spot spray when plant is at rosette stage in late winter, or early flowering stage as it is easiest to see and most sensitive to the herbicide. In the latter aim for six to eight weeks after substantial rain when the flower is at half bud stage and half open flower stage. This may be November through January, but varies according to season. Late summer rain may result in a new flush of growth. Manual removal after rain when soil is loose enough to remove roots. Manual removal can also be easier in wooded areas with more leaf litter

Follow up: Concentrate on the same patches, and return two to three times/season, as well as in following years

St John's Wort decision tree

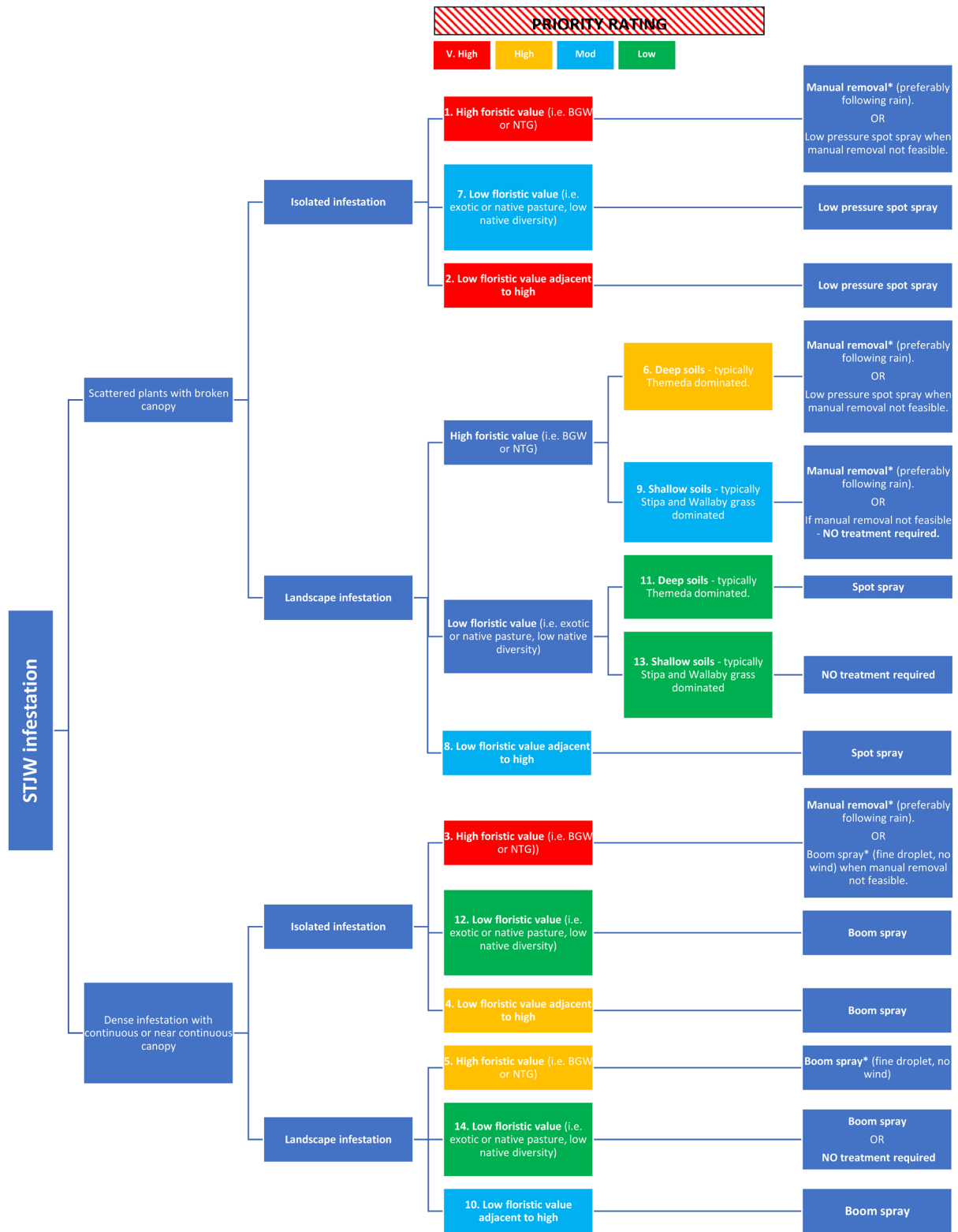


Figure 108- St John's Wort decision tree by Dr. Richard Milner, ACT Parks and Conservation Service

Tree of Heaven

Ailanthus altissima

Description: A deciduous tree or shrub. Dense suckering from its roots competes with other desirable plants. Can inhibit native germination. Grows up to 20 m high. It has greyish bark, small white or yellow-green flowers in clusters (*Figure 109*), and dark green leaves that turn yellow in autumn (*Figure 110*) (*Figure 111*) have a foul smell when crushed, giving rise to common names like Baked Sewage Tree)

NatureMapr link: <https://canberra.naturemapr.org/species/470>



Figure 109 (BR) Flowers of Tree of Heaven



Figure 110 (MS) Seedlings of Tree of Heaven



Figure 111 (MF) Winged seeds

Seed life: Seeds are winged and will travel by wind (*Figure 111*). Each winged fruit has one seed which is ripe when the wings turn red. Although large quantities of seed are produced it appears to spread mainly from cuttings and suckers. Information on seed life in soil not found

Environmental impact: Major

Risk Priority: High

Situation in which to control: When newly establishing in an area

Similar species: Nil

Control method:

- Dig or hand pull young plants
- Cut stump with Glyphosate 360 half and half with water applying herbicide within 15 seconds

Time to control: Hand pull any time when soil is moist, cut stump during growing season

Follow up: Annually, before new plants set seed

Viburnum/Laurustrinus

Viburnum tinus

Description: Bushy shrub with dull dark green leaves and cream flower head (*Figure 112*) followed by dark blue/black seeds (*Figure 113*). Very commonly used as a garden hedging plant in Canberra. Plants spread by seed via birds, but also sucker strongly from the base, or root from above ground stems (also called layering) forming thickets (*Figure 114*). Although it is listed as 'data deficient' on the Advisory list, Park Care groups have noticed it germinating freely in nature parks. Note also that NatureMapr has labelled this a sleeper weed, and urges everyone to report sightings.

NatureMapr link: <https://canberra.naturemapr.org/species/13814>



Figure 112 (MS) Viburnum flowers



Figure 113 (MF) Ripe fruit of Viburnum

Seed life: Seeds ripe when blueish in colour. No information found on seed longevity

Environmental impact: Data deficient

Risk Priority: Moderate

Situation in which to control: All new appearances, individual mature plants

Similar species: Nil

Control method:

- Hand pull seedlings
- Cut and dab mature plants with one part Glyphosate 360 to one part water. Mature plants will often have many stems, and care needs to be taken to work through all the stems, cutting close to the ground and applying herbicide within 15 seconds. Remove cut stems from work area to ensure all have been removed. Smaller surrounding stems can be pulled out by the roots with the aid of a mattock.
- Spot spray suckers with Glyphosate 360 (20 ml/L water plus 2 ml/L surfactant)

Time to control: Year round



Figure 114 (VK) Viburnum growth form



Figure 115 (KC) Leaves and buds of Viburnum

Follow up: Return to check mature plants six months after initial cut and dab to control suckers which often appear around mature cut stems, and from remaining underground roots, even with proper treatment

Additional weeds to keep an eye out for, but with no individual profile

There are many weeds and potential weeds in our urban bushland and nature reserves. Below is a more extensive list of plants that environmental volunteers have identified as being a problem in the reserves with which they are familiar. Depending on the situation they may or may not be worth treating. For example, in a 'good' patch, you may want to remove more weeds than in other areas. Removing individual or outlier weeds in these areas may prevent more serious incursions of this weed.

New and emerging weeds

Observant monitoring of the weeds (map with the Field Maps app) listed below, might reveal that some of them have rapidly spread, or are impacting adversely on a patch with high biodiversity, in which case action is warranted. What is true is that quickly removing a new incursion whilst it is small is easier than waiting till it has a real foothold. There will always be more new weed incursions, from gardens, from the result of changing climatic conditions and through disturbance. Volunteers are often best placed to detect new incursions, as they may be very familiar with their local area and notice any changes. Some 'environmental impacts' may appear to be 'moderate', with a species not having spread much in ten years, but some species have been known to rapidly spread after a non-threatening beginning, such as Lavender and Mullein. Note that NatureMapr has a list of sleeper weeds (<https://canberra.naturemapr.org/species/lists/52>) which they have identified as potentially problematic and may still be found for sale in local nurseries. Part of the issue is a lack of information, so they urge everyone to report these 'sleeper' weeds, all listed in the table below or in the profiles above. Thorough mapping is useful to assess spread.

Use the resources suggested in this manual to positively identify plants as weeds before treating. Photos have not been included for this second list. A quick internet search under the scientific name using one of the resources listed in this manual will provide photos of the weed in question. Please note this list is not exhaustive.

Some of the weeds listed below are easy to remove, using the methods described at the beginning of the manual. Where practical, the weed control method is suggested in the fourth column. The priority assessment given below comes from the [ACT Advisory list of naturalised alien plants – species assessment](#), which may be accessed by non-ACT Government employees by emailing ACTBiosecurity@act.gov.au. Environmental impact is not included due to a lack of data.

Common name	Scientific Name	Priority	Control method
Agapanthus	<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	High	Dig out plants before flowering/seeding. Note: NatureMapr has labelled this a sleeper weed, and urges everyone to report sightings
Alligator Weed	<i>Alternanthera philoxeroides</i>	Very High. Weed of National Significance (WONS)	Report Immediately
Amaranthus:			
Redroot Amaranth	<i>Amaranthus retroflexus</i>	Low	Pull or dig out plants before flowering/seeding
Pigweed, Stiff Tumbleweed	<i>Amaranthus albus</i>	Moderate	
Powell's Amaranth	<i>Amaranthus powellii</i>	Low	
Ashes:			
Desert Ash	<i>Fraxinus angustifolia</i> subsp. <i>angustifolia</i>	Moderate	Cut and dab in growing season. Note: NatureMapr has labelled these as sleeper weeds, and urges everyone to report sightings
Green Ash, Red Ash	<i>Fraxinus pennsylvanica</i>	Moderate	
Asparagus	<i>Asparagus officinalis</i>	Low	Pull or dig out plants

Common name	Scientific Name	Priority	Control method
Bathurst Burr	<i>Xanthium spinosum</i>	Moderate	Pull or dig out plants prior to burr forming, cut at ground level (these plants don't regrow without leaves)
Blue Gum (Southern Blue Gum)	<i>Eucalyptus globulus</i> subsp. <i>bicostata</i>	Medium / Seasonal	Pull out as sapling or cut and dab (consider leaving tree if it provides habitat)
Burgan (White Tea Tree)	<i>Kunzea ericoides</i>	Low	Hand pull seedlings, or cut and dab
Butterfly Bush (Clockweed)	<i>Oenothera lindheimeri</i>	Medium-High	Pull or dig out plants, cut at base or spray dense stands with selective herbicide
Californian Poppy	<i>Eschscholzia californica</i>	Low	Pull or dig out plants, or spray dense stands with selective herbicide
Campions or Catchflies:			
Rose Campion	<i>Silene coronaria</i>	High	Pull or dig out plants, get new incursions quickly. These plants produce a lot of seed. Due to fine hairs on leaves, spraying does not work well.
French Catchfly	<i>Silene gallica</i> var. <i>gallica</i>	Moderate	
Spotted Catchfly, Five-wounded Catchfly	<i>Silene gallica</i> var. <i>quinquevulnera</i>	Moderate	

Common name	Scientific Name	Priority	Control method
Cape Daisy (African Daisy)	<i>Dimorphotheca ecklonis</i>	Moderate	Hand pull
Capeweed (Cape Dandelion)	<i>Arctotheca calendula</i>	Moderate	Manual removal, spot spray
Catsears (Catsear)	<i>Hypochaeris radicata</i>	Moderate	Dig out, removing entire root
Century Plant	<i>Agave americana</i>	Low	Manual removal including root
Cherry Plum	<i>Prunus cerasifera</i>	Moderate	Cut and dab in growing season
Clovers:			
Subterranean Clover	<i>Trifolium subterraneum</i>	Low	Spot spray with selective herbicide, but best to out-compete with grass
White Clover	<i>Trifolium repens</i>	Low	
Cockle Burr (Noogoora Burr)	<i>Xanthium occidentale</i>	Moderate	Pull or dig out plants prior to burr forming, cut at ground level (these plants don't regrow without leaves)
Common Evening Primrose	<i>Oenothera stricta</i> subsp. <i>Stricta</i>	Moderate	

Common name	Scientific Name	Priority	Control method
Common Thornapple	<i>Datura stramonium</i>	Low	Pull or dig out plants prior to burr forming, cut at ground level (these plants don't regrow without leaves)
Cudweeds:			
Spiked cudweed	<i>Gamochaeta americana</i>	Low	Pull or dig out (being mindful of correct identification of native creeping cudweed <i>Euchiton japonicus</i> and <i>Euchiton sphaericus</i>)
Grey Cudweed	<i>Gamochaeta calviceps</i>	Low	
Purple Cudweed	<i>Gamochaeta purpurea</i>	Moderate	
Dandelion	<i>Taraxacum</i> sect. <i>Taraxacum</i> previously called <i>Taraxacum officinale</i>	Low	Dig out, removing entire root (being mindful flowers provide food for pollinators)
Docks and Sorrels:			
Sorrel, Sheep Sorrel	<i>Rumex acetosella</i>	Moderate	Dig out, removing entire root. This species has spreading root systems, so follow up treatments will be necessary.
Clustered Dock	<i>Rumex conglomeratus</i>	Moderate	
Curled Dock	<i>Rumex crispus</i>	Low	
Fat Hen	<i>Chenopodium album</i>	Low	Manual removal
Fennel	<i>Foeniculum vulgare</i>	Moderate	Spot spray

Common name	Scientific Name	Priority	Control method
Fleabanes:			
Flaxleaf Fleabane	<i>Erigeron bonariensis</i>	Moderate	Manual removal including root before seed set
Seaside Daisy	<i>Erigeron karvinskianus</i>	Moderate	
Tall Fleabane	<i>Erigeron sumatrensis</i>	Moderate	
Gazania	<i>Gazania linearis</i>	Very High	Manual removal including root
Hairy Mustard Weed (Buchan Weed, Yellow Turnip Weed)	<i>Hirschfeldia incana</i>	Low	Manual removal including root
Meadow Fescue	<i>Festuca pratensis</i>	Low	Manual removal or spray small infestations preferably before seed has set. Removing seed heads is effective.
Morning Glory	<i>Ipomoea purpurea</i>	Moderate	Manual removal including root
Moth Plant	<i>Araujia sericifera</i>	High	Manual removal including root, cut and dab bigger vines
Nettle Tree (Lote Tree)	<i>Celtis australis</i>	Moderate	Manual removal including root when small or cut and dab

Common name	Scientific Name	Priority	Control method
Nightshades:			
Whitetip Nightshade	<i>Solanum chenopodioides</i>	Moderate	Manual removal
Blackberry Nightshade	<i>Solanum nigrum</i>	Moderate	
Oregon Grape (Holly-leaved Barberry)	<i>Berberis aquifolium</i>	Very High	Pull out seedlings, cut and dab bigger plants
Ornamental Pears	<i>Pyrus</i> spp.	Low to moderate	Cut and dab Note: Nature Mapr has labelled these as sleeper weeds, and urges everyone to report sightings
Ox-eye Daisy	<i>Leucanthemum vulgare</i>	Very High	Report sightings immediately
Paspalum (Caterpillar Grass)	<i>Paspalum dilatatum</i>	Moderate	Manual removal preferably before seed has set. Removing seed heads is also effective. Or spray small infestations in spring and summer.

Common name	Scientific Name	Priority	Control method
Phalaris (Australian Canary Grass)	<i>Phalaris aquatica</i>	Low	Manual removal of small plants preferably before seed has set. Removing seed heads is also effective. Or spray small infestations in autumn, or spring
Pittosporum (Kohuhu)	<i>Pittosporum tenuifolium</i>	Low	Cut and dab Note: NatureMapr has labelled this a sleeper weed, and urges everyone to report sightings
Plantain (Ribwort Plantain)	<i>Plantago lanceolata</i>	Moderate	Manual removal including root
Proliferous Pink	<i>Petrorhagia nanteuilii</i>	Moderate	Manual removal including root
Purple Top (Shore Verbain)	<i>Verbena caracasana</i> <i>Verbena incompta</i>	Moderate	Manual removal
Red Bartsia	<i>Parentucellia latifolia</i>	Moderate	Manual removal including root
Rosemary Grevillea	<i>Grevillea rosmarinifolia</i>	Low	Manual removal including root. Cut and dab larger plants

Common name	Scientific Name	Priority	Control method
Sacred Bamboo	<i>Nandina domestica</i>	Medium-High	Cut and dab. Repeat spot spraying for larger plants as they are harder to kill Note: NatureMapr has labelled this a sleeper weed, and urges everyone to report sightings
Service Tree	<i>Sorbus domestica</i>	Low	Hand pull seedlings and small plants, cut large plants at ground level, no herbicide needed
Shepherd's Purse	<i>Capsella bursa-pastoris</i>	Low	Manual removal including root
Skeleton Weed	<i>Chondrilla juncea</i>	Low	Manual removal including root
Soapwort	<i>Saponaria officinalis</i>	Moderate	Manual removal including root
Sticky Weed (Cleavers)	<i>Galium aparine</i>	Moderate	Manual removal before flowering and seeds
Storksbills:			
Long Storksbill	<i>Erodium botrys</i>	Moderate	Chip
Héronsbill	<i>Erodium brachycarpum</i>	Low	
Common Storksbill (Common Crowfoot)	<i>Erodium cicutarium</i>	Moderate	

Common name	Scientific Name	Priority	Control method
Strawberry Tree	<i>Arbutus unedo</i>	High	Cut and dab, dig out small plants. Note: NatureMapr has labelled this a sleeper weed, and urges everyone to report sightings
Sulphur Cinquefoil	<i>Potentilla recta</i>	Moderate	Manual removal or spray with Glyphosate
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>	High	Manual removal including rhizomes, spot spray
Thistles:			
Nodding Thistle	<i>Carduus nutans</i>	Moderate	
Slender Thistle	<i>Carduus pycnocephalus</i>	Moderate	
Winged Slender Thistle	<i>Carduus tenuiflorus</i>	Moderate	
Saffron Thistle	<i>Carthamus lanatus</i>	Moderate	
Star Thistle	<i>Centaurea calcitrapa</i>	Low	
Maltese Cockspur (Cockspur Thistle)	<i>Centaurea melitensis</i>	Low	
Spear Thistle	<i>Cirsium vulgare</i>	Moderate	
Scotch Thistle	<i>Onopordum acanthium</i>	Moderate	
			Chip or spot spray rosettes, hand pull taller plants before flowering and pile to reduce seed spread. Slashing once flowering has started can be effective

Common name	Scientific Name	Priority	Control method
Variegated Thistle	<i>Silybum marianum</i>	Low	
Prickly Sowthistle	<i>Sonchus asper</i>	Low	
Common Sowthistle	<i>Sonchus oleraceus</i>	Moderate	
Toadflaxes:			Manual removal or spot spray
Corn Toadflax	<i>Linaria arvensis</i>	Low	
Pelisser's Toadflax	<i>Linaria pelisseriana</i>	Low	
Trad	<i>Tradescantia fluminensis</i>	Very High	Dig or pull out removing all roots, spray with Glyphosate. Follow up treatment is necessary as the plant can resprout from small root fragments
Tweedia (Southern Star)	<i>Oxypetalum coeruleum</i>	Low	Manual removal or spot spray
Umbrella Sedge	<i>Cyperus eragrostis</i>	Moderate	Manual removal
Violet (Sweet Violet)	<i>Viola odorata</i>	Moderate	Spot spray with Brushoff
Wild Apple	<i>Malus domestica</i>	Low	Cut and dab in growing season

Common name	Scientific Name	Priority	Control method
Wild Elms:			Cut and dab in growing season
Chinese Elm	<i>Ulmus parvifolia</i>	Low	Note: NatureMapr has labelled Chinese Elm as a sleeper weed, and urges everyone to report sightings
English Elm (Dutch Elm)	<i>Ulmus procera</i>	Low	
Wild Pistachio (Chinese Pistachio)	<i>Pistacia chinensis</i>	High	Cut and dab in growing season, with follow up essential
Wild Sage	<i>Salvia verbenaca</i> var. <i>verbenaca</i>	Moderate	Manual removal
Willows:			
White Willow	<i>Salix alba</i>	Moderate	Cut and dab during growing season.
Crack Willow	<i>Salix x fragilis</i>	High	
Weeping Willow	<i>Salix x pendulina</i>	Low	
Tortured Willow	<i>Salix matsudana 'Tortuosa'</i>	Low	
Black Willow	<i>Salix nigra</i>	High	
Willowherb:s			
Willowherb (Glandular Willowherb)	<i>Epilobium ciliatum</i>	Moderate	Chip, being mindful to distinguish from native species

Common name	Scientific Name	Priority	Control method
Great Willowherb	<i>Epilobium hirsutum</i>	Moderate	
Yellow Hawkweed	<i>Tolpis barbata</i>	Moderate	Manual removal
Yorkshire Fog	<i>Holcus lanatus</i>	Moderate	Manual removal preferably before seed has set. Removing seed heads is also effective. Or spray small infestations in autumn, winter, spring.
Yucca (Spanish Bayonet)	<i>Yucca aloifolia</i>	Low	Dig out plants if small enough

Using the Field Maps app

Field Maps is an app using ArcGIS Online for recording both treated and untreated weeds on public land in the ACT. It is designed to be used by land managers, staff, contractors and volunteers, so that all information related to weed control is readily accessible on the one platform.

Whilst it may seem like extra work to map our efforts it is strongly encouraged that you take the time to map what you are working on. There are lots of reasons for this, including a record of untreated weeds, how much work is undertaken by volunteers, contractors and so forth, whether treatment has effectively reduced weeds, control methods used, locations treated etc. If you are interested in an overview of control work, explore [Ten years of invasive plants control mapping 2013-2023 here](#).

The Field Maps app is easy to use on your mobile when you are out working. It's pretty much a case of turn your location on, open the app (easiest to stay logged in), choose the right map, wait for your location to show, choose a weed and fill in the accompanying form about method and abundance, then start streaming and walk around the patch. Detailed instructions are provided from the [Invasive Plants Operations Plan 2020-2025 Appendix 1](#). Regular training is provided for volunteers. Volunteers should obtain their login details from PCS or their group convenors.

This image (*Figure 116*) looking down at Mt Painter and Aranda Bushland gives you an idea of how Field Maps app looks. In practice one can display the legend, and/or hover over the coloured hatched area to bring up details on the type of weed, the size, the control method and who controlled it (eg Park Care volunteer). Or use the filter function on the operations dashboards.

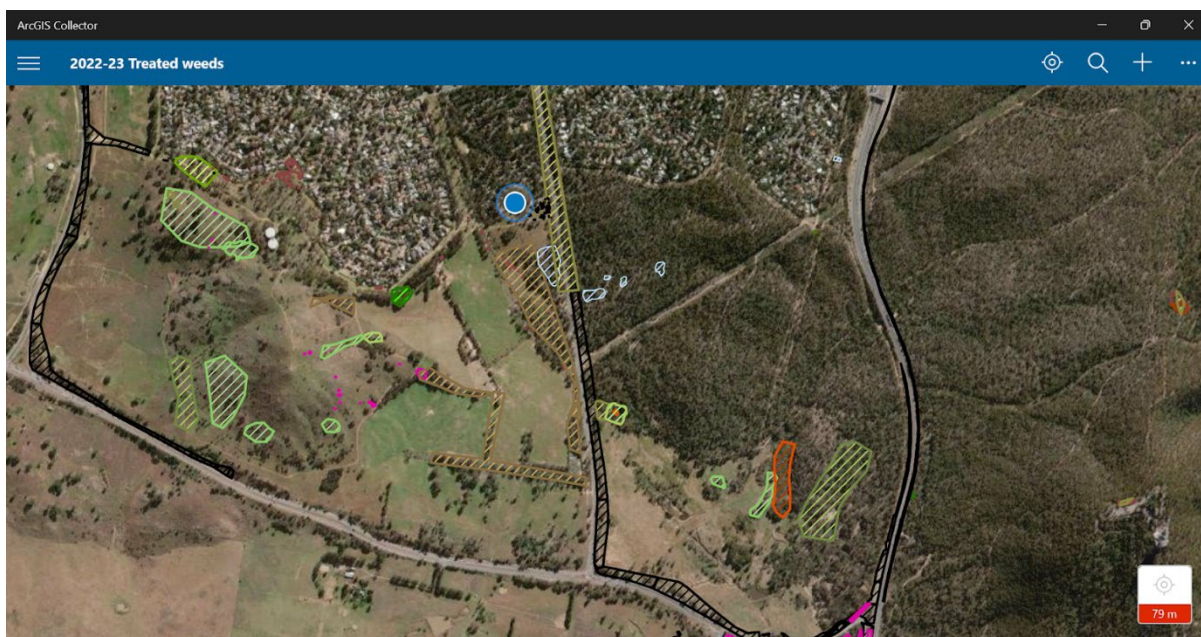


Figure 116 Visual of Field Maps app

Some suggestions for identifying new plants

Is it a weed? A non-local native? How damaging is it or could it be?

Many new weed incursions are spotted by local people who are very familiar with their area and notice any new plants. Sometimes these are entirely new to the area, or they have popped up after an absence of some years, or they are just new to you. Either way, identifying a plant is an important first step. Following are some simple steps to follow and resources you can check to identify a plant.

New plant

- Look at it closely. Note height, shape and arrangement of leaves, habit, unusual features etc
- Are flowers or fruit present?
- What type of plant is it? For example a grass, a tree, a shrub, a vine, a fern, a lilly, a waterplant
- Does it resemble another plant you already know? It may be related
- Where is it growing?

Take photo/s

- With location setting 'on', take one or more photos
- Include photos of the flower or fruiting body if present, leaves and stem and whole plant

Use resources to identify

- Use one of the excellent online tools we are lucky enough to have at our disposal:
- [Canberra Nature Map](#) This moderated website is a good first place to check. There are individual lists for each reserve in the ACT, broken down into plant groupings. For example if you think you have found a grass and you are in the Tuggeranong Hill Nature reserve, you can browse the plant list for grasses in that reserve. You can also register and upload your photos for moderators with expertise to identify
- [iNaturalist](#) This works in a similar way to Canberra Nature Map described above
- [ACT & SE NSW Invasive Plants facebook page](#). This is a good site to upload photos and ask the online community for help in identifying, with very little effort required
- [Lucidcentral](#) is a tool for what is called 'keying out' species. Once can use the key to narrow down a list of possible choices. The Environmental Weeds of Australia app uses this technology
- There are also plant ID apps, and reverse image searches on platforms like Google, but if one has no plant knowledge at all, these can easily make incorrect suggestions

Further resources

Online resources

- The NSW Department of Primary Industries Weedwise site (<https://weeds.dpi.nsw.gov.au/>) has very useful information about many weeds including biology and control methods. The NSW WeedWise app has the same information as a smartphone app. Note that many of the herbicides used are not currently permitted for use by PCS volunteers, so refer to individual weed profiles in this manual for prescriptions
- Weeds Australia (<https://weeds.org.au/weeds-profiles/>) also contains information about weeds which can be searched by common or scientific name
- The ACT Invasive Plants Control Plan 2020 – 2025 (<https://actgov.maps.arcgis.com/apps/MapJournal/index.html?appid=cd59d70662c94c75a0492635f7925384#>) outlines local priorities and triage methods. It includes links to the Advisory List of naturalised alien plant species, and a host of other great resources which are updated regularly, such as the 'look a-likes' to help differentiate native and invasive plants
- NatureMapr (<https://canberra.naturemapr.org/>) and iNaturalist Australia (<https://inaturalist.ala.org.au/>) are very useful tools for identifying plants if you are not sure what is what. These citizen science sites are moderated by experts who can identify most species by photos and location. This means you can search species in the area, and also upload photos to check for accurate identification. Ensure that your photos are useful for identification purposes. This includes location data (GPS on), and clear, close detailed photos which show multiple parts of the plant, like leaves, flowers and fruit. It is a good idea to add weeds to NatureMapr, as it provides a useful record.
- The ACT & SE NSW Invasive Plants Facebook page (<https://www.facebook.com/groups/292404337799463/>) is useful for getting weeds identified. Note that it is run by south coast NSW volunteers and is not an approved ACT Government Facebook group
- Weedscan (<https://weedscan.org.au/>) is a resource from CSIRO/Atlas of Living Australia with website and smartphone app that targets 300+ high priority weeds across the country and offers an online ID tool using AI methods with instant feedback for photos submitted in locations with mobile signals.
- The ACT Invasive Plants Control Plan 2020 – 2025 (<https://actgov.maps.arcgis.com/apps/MapJournal/index.html?appid=cd59d70662c94c75a0492635f7925384#>) has instructions for herbicide use via the APVMA off-label permits for the ACT.
- Operations dashboards are a quick way of looking at control work recorded on the Field Maps app and ArcGIS Online. They can filter on the species of interest and who undertook the control work:
 - 2023-24
(<https://actgov.maps.arcgis.com/apps/dashboards/6f505dbd0123454bafc80edbdfcd3f05>)

- 2022 – 23
(<https://actgov.maps.arcgis.com/apps/dashboards/5449adb632884d68aeb585e3e73dde99>)
- 2021-22
(<https://actgov.maps.arcgis.com/apps/dashboards/c6083d9db4f240c7a93f39dc b06244e2>)
- The NSW Department of Primary Industries makes a monitoring manual available (<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Pests-and-weeds/monitoring-manual-for-invasive-and-native-flora-210638.pdf>) which has some useful information about tracking results

Books

- Sharp S., Rehwinkel R., Mallinson D. and Eddy D. (2022) *Woodland Flora, a field guide for the Southern Tablelands*, Friends of Grasslands: Canberra. Brilliant field guide with descriptions and photos for plant identification (companion book to *Grassland flora*).
- Rose H., Kidson J., Rose R., and Edwards C. (2013) *Grasses of NSW Tablelands*, NSW Department of Primary Industries. An extremely useful book for grass identification, with great pictures.
- Eddy D., Mallinson D., Rehwinkel R., and Sharp S. (2011) *Grassland Flora a field guide for the Southern Tablelands* (NSW and ACT). An excellent field guide to grassland flora including grasses, forbs, lilies, orchids, shrubs and trees (companion book to *Woodland flora*).

Good luck!

Go on, get out there and pull some weeds.